Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

April 20, 2018

TO: American Lobster Management Board; Atlantic Coastal Cooperative Statistics Program Coordinating Council; Atlantic Herring Section; Atlantic Menhaden Management Board; Atlantic Striped Bass Management Board; Bluefish Management Board; Coastal Sharks Management Board; Executive Committee; ISFMP Policy Board; Law Enforcement Committee; Northern Shrimp Section; South Atlantic State/Federal Fisheries Management Board; Summer Flounder, Scup, and Black Sea Bass Management Board; Tautog Management Board; Winter Flounder Management Board

FROM: Robert E. Beal
Executive Director

RE: ASMFC Spring Meeting: April 30 – May 3, 2018 (TA 18-081)

The Atlantic States Marine Fisheries Commission's Spring Meeting will be April 30 – May 3, 2018 at **The Westin Crystal City** (Telephone: 703.486.1111), located at 1800 South Eads Street, Arlington, VA. Meeting materials are available on the Commission website at http://www.asmfc.org/home/2018-spring-meeting. Supplemental materials will be posted to the website on Wednesday, April 25, 2018.

The agenda is subject to change. The agenda reflects the current estimate of time required for scheduled Board meetings. The Commission may adjust this agenda in accordance with the actual duration of Board meetings. Interested parties should anticipate Boards starting earlier or later than indicated herein.

The Shad and River Herring Management Board, previously scheduled for May 1st (11:15 a.m. – Noon), has been cancelled. The Tautog Management Board will be meeting in its place (same date and time).

Board meeting proceedings will be broadcast daily via webinar beginning April 30th at 10 a.m. and continuing daily until the conclusion of the meeting (expected to be 2:15 p.m.) on Thursday, May 3rd. The webinar will allow registrants to listen to board/section deliberations and view presentations and motions as they occur. No comments or questions will be accepted via the webinar. Should technical difficulties arise while streaming the broadcast the boards/sections will continue their deliberations without interruption. We will attempt to resume the broadcast as soon as possible. Please go to https://attendee.gotowebinar.com/register/1945339924799258370 to register.

We look forward to seeing you at the Spring Meeting. If the staff or I can provide any further assistance to you, please call us at 703.842.0740.

Enclosures: Final Agenda, Hotel Directions, TA 18-081, and Travel Reimbursement Guidelines

Atlantic States Marine Fisheries Commission

Spring Meeting

April 30 – May 3, 2018

The Westin Crystal City

Arlington, Virginia

Public Comment Guidelines

With the intent of developing policies in the Commission's procedures for public participation that result in a fair opportunity for public input, the ISFMP Policy Board has approved the following guidelines for use at management board meetings:

For issues that are not on the agenda, management boards will continue to provide opportunity to the public to bring matters of concern to the board's attention at the start of each board meeting. Board chairs will use a speaker sign-up list in deciding how to allocate the available time on the agenda (typically 10 minutes) to the number of people who want to speak.

For topics that are on the agenda, but have not gone out for public comment, board chairs will provide limited opportunity for comment, taking into account the time allotted on the agenda for the topic. Chairs will have flexibility in deciding how to allocate comment opportunities; this could include hearing one comment in favor and one in opposition until the chair is satisfied further comment will not provide additional insight to the board.

For agenda action items that have already gone out for public comment, it is the Policy Board's intent to end the occasional practice of allowing extensive and lengthy public comments. Currently, board chairs have the discretion to decide what public comment to allow in these circumstances.

In addition, the following timeline has been established for the **submission of written comment for issues for which the Commission has *NOT* established a specific public comment period** (i.e., in response to proposed management action).

1. Comments received 3 weeks prior to the start of a meeting week will be included in the briefing materials.
2. Comments received by 5:00 PM on the Tuesday immediately preceding the scheduled ASMFC Meeting (in this case, the Tuesday deadline will be ***April 24, 2018***) will be distributed electronically to Commissioners/Board members prior to the meeting and a limited number of copies will be provided at the meeting.
3. Following the Tuesday, ***April 24, 2018 5:00 PM deadline***, the commenter will be responsible for distributing the information to the management board prior to the board meeting or providing enough copies for the management board consideration at the meeting (a minimum of 50 copies).

The submitted comments must clearly indicate the commenter's expectation from the ASMFC staff regarding distribution. As with other public comment, it will be accepted via mail, fax, and email.

Final Agenda

The Shad and River Herring Management Board, previously scheduled for May 1st (11:15 a.m. – Noon), has been cancelled. The Tautog Management Board will be meeting in its place (same date and time). The agenda is subject to change. The agenda reflects the current estimate of time required for scheduled Board meetings. The Commission may adjust this agenda in accordance with the actual duration of Board meetings. Interested parties should anticipate Boards starting earlier or later than indicated herein.

Monday, April 30

10:00 a.m. – Noon & 1:00 – 3:00 p.m.

Summer Flounder, Scup and Black Sea Bass Management Board Jointly with the Mid-Atlantic Fishery Management Council

Member States: New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina
Other Members: NMFS, PRFC, USFWS
Other Participants: Wojcik, Snellbaker
ASMFC Chair: Ballou
MAFMC Chair: O'Reilly
Staff: Starks, Rootes-Murdy, Dancy, Beaty, Muffley

1. Welcome/Call to Order *(B. Ballou/O'Reilly)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Consider Approval of Summer Flounder Draft Amendment and Public Hearing Document for Public Comment (*K. Dancy, K. Rootes-Murdy*) **Action**
   - Review Management Alternatives
   - Presentation of Management Documents
5. Summer Flounder, Scup and Black Sea Bass Management *(J. Beaty, C. Starks*) **Possible Action**
   - Overview of Black Sea Bass Recreational Management Discussion Document
   - Review Draft Alternatives for Framework/Addendum on Recreational Issues
   - Review Preliminary February 2018 Black Sea Bass Recreational Harvest Estimates
6. Other Business/Recess

3:15 – 4:45 p.m. **Bluefish Management Board Jointly with the Mid-Atlantic Fishery Management Council**

Member States: Maine, New Hampshire, Massachusetts. Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Other Members: NMFS, PRFC, USFWS
Other Participants: Celestino
ASMFC Chair: Luisi
MAFMC Chair: O'Reilly
Staff: Starks, Seeley

1. Welcome/Call to Order *(M. Luisi/R. O'Reilly)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2012
3. Public Comment
4. Consider Approval of Draft Scoping and Public Information Document for Allocation Amendment *(M. Seeley, C. Starks*) **Action**
   - Overview of Draft Scoping and Public Information Document
5. Other Business/Adjourn

Tuesday, May 1

9:00 – 11:00 a.m. **Coastal Sharks Management Board**

Member States: Maine, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Other Members: NMFS, USFWS
Chair: Miller
Other Participants: Belcher, Brewster-Geisz, Garner, Young
Staff: Rootes-Murdy

1. Welcome/Call to Order *(R. Miller)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2017
3. Public Comment
4. Review North Atlantic Shortfin Mako Stock Assessment, NOAA Fisheries Highly Migratory Species (HMS) Emergency Rule Measures and Amendment 11 *(K. Brewster-Geisz)*
   - Technical Committee Report *(K. Rootes-Murdy)*
   - Discuss Possible Board Comment to HMS on Amendment 11 *(K. Rootes-Murdy)*
   - Discuss Potential Management Response *(K. Rootes-Murdy)* **Possible Action**
5. Review SEDAR 54 Sandbar Shark Stock Assessment *(K. Brewster-Geisz*)
   - Technical Committee Report *(K. Rootes-Murdy)*
6. Update on Endangered Species Act Status of Oceanic Whitetip Shark *(C. Young)*
   - Technical Committee Report *(K. Rootes-Murdy)*
7. Consider Approval of 2016 and 2017 Fishery Management Plan Review and State Compliance Reports *(K. Rootes-Murdy*) **Action**
8. Other Business/Adjourn

9:00 a.m. – 5:00 p.m. **Law Enforcement Committee**

(A portion of this meeting may be a closed session for Committee members only)

Members: Anthony, Blanchard, Cloutier, Donovan, Eastman, Frampton, Furlong, Gadomski, Garner, Gordon, Hettenbach, Hogan, Kersey, King, Lauderman, Lynn, Messeck, Moore, Moran, Overturf, Pearce, Santiago, Simmons, Snellbaker

Other Participants: Simmons, Summers

Chair: Eastman

Staff: Robson

1. Social (Open to Commissioners and Staff)
2. Call to Order/Roll Call of the LEC Representatives
3. Approval of Agenda and May 2017 Minutes **Action**
4. Public Comment
5. Review and Comment on Ropeless Fishing Technologies *(Summers)* **Action**
6. Review of 2018 Action Plan Items
7. Review and Discuss ASMFC Species Management Issues
8. Federal Agency Reports
9. State Agency Reports
10. Review and Discuss Ongoing Enforcement Issues **Closed Session**
11. Discuss Use of Drones in Enforcement
12. Review Potential Changes to Atlantic Shortfin Mako Shark Rules
13. Update on Regional and National Enforcement Meetings
14. Update on LEC Orientation Process for New Members *(Robson)*
15. Review LEC Information on ASMFC Website *(Robson)*
16. Discuss NOAA FY19 Budget and Joint Enforcement Agreement Impact
17. New Business
18. Adjourn

11:15 a.m. – Noon **Tautog Management Board**

Member States: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia

Other Members: USFWS, NMFS

Other Participants: Barry, Snellbaker

Chair: McKiernan

Staff: Starks

1. Welcome/Call to Order *(D. McKiernan)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2017
3. Public Comment
4. Review Connecticut Commercial Measures Proposal (*C. Starks*) **Final Action**
   - Technical Committee Report
5. Other Business/Adjourn

Noon – 1:15 p.m. **Legislators and Governors' Appointees Luncheon**

1. Introductions
2. General Comments/Discussion
3. Discuss Noncompliance

1:15 – 2:45 p.m. **Atlantic Striped Bass Management Board**
Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina
Other Members: DC, NMFS, PRFC, USFWS
Chair: Armstrong
Other Participants: Blanchard, Lengyel
Staff: Appelman

1. Welcome/Call to Order *(M. Armstrong)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Provide Guidance to Stock Assessment Subcommittee Regarding Biological Reference Point Development for the 2018 Benchmark Stock Assessment **Final Action**
   - Board Guidance Work Group Report *(M. Appelman*)
   - Advisory Panel Report *(M. Appelman*)
   - Provide Guidance to Stock Assessment Subcommittee (*M. Armstrong*)
5. 2018 Benchmark Stock Assessment Progress Update *(K. Drew)*
6. Other Business/Adjourn

3:00 – 3:45 p.m. **Atlantic Herring Section**
Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey
Chair: Keliher
Other Participants: Eastman, Zobel
Staff: Ware

1. Welcome/Call to Order *(P. Keliher)*
2. Section Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Discuss Potential Impact of Possession Limits in the Atlantic Mackerel Fishery on the Atlantic Herring Area 1A Fishery *(M. Ware)*
5. Technical Committee Report on Spawning Fish Sampling Protocols *(R. Zobel)* **Possible Action**
6. Consider Approval of 2018 Fishery Management Plan Review and State Compliance *(M. Ware)* **Action**
7. Other Business/Adjourn

4:00 – 5:00 p.m. **Northern Shrimp Section**

(Meeting will not be available via webinar but interested parties may listen to proceedings via conference call at 1-888-394-8197, Passcode 499811)
Member States: Maine, New Hampshire, Massachusetts
Chair: Train
Other Participants: Eastman
Staff: Ware

1. Welcome/Call to Order *(S. Train)*
2. Section Consent
   - Approval of Agenda
3. Public Comment
4. Discuss Potential Inclusion of a Second Management Issue in Draft Addendum I to Extend Current Fishing Season Range in the Fishery Management Plan
5. Other Business/Adjourn

4:00 – 5:00 p.m. **Atlantic Coastal Cooperative Statistics Program (ACCSP) Coordinating Council**

Members: Aarrestad, Beal, Boyles, Jr., Brust, Carmichael, Cimino Clifford, Cyr, Detlor, Fegley, GA rep., Gary, Geer, Gilmore, Grout, Keliher, King, McCawley, McNamee, Michels, Moore, Murphey, Nies, Pierce, Porch, Risenhoover, Shiels, Stephen, VA rep., White
Chair: Fegley
Other Participants: Dukes
Staff: Cahall

1. Welcome/Introductions *(L. Fegley)*
2. Public Comment
3. Council Consent
   - Approval of Agenda
   - Approval of Minutes from October 2017
4. ACCSP Status Report
   - Program Status *(M. Cahall)*
   - Committee Updates *(A. Dukes)*
5. Review and Consider Approval of FY19 Request for Proposals *(M. Cahall)* **Action**
6. Accountability Standards *(L. Fegley)*
7. Other Business/Adjourn

6:00 – 8:00 p.m. **Annual Awards of Excellence Reception**

Wednesday, May 2

8:30 – 10:30 a.m. **Executive Committee**

Breakfast will be served when you arrive; you may arrive as early as 8:00 a.m.

(A portion of this meeting will be a closed session for Commissioners and Committee members only)

Members: Abbott, Blazer, Brust, Bowman, Boyles, Jr., Clark, Estes, Gilmore Grout, Haymans, Keliher, McNamee, Miller, Miner, Murphey, Pierce, Shiels

Chair: Gilmore

Staff: Leach

1. Welcome/Call to Order *(J. Gilmore*)
2. Committee Consent
   - Approval of Agenda
   - Approval of Meeting Summary from February 2018
3. Public Comment
4. Report of the Administrative Oversight Committee *(P. Keliher)*
   - Presentation of FY19 Budget **Action**
5. Report on Legal Opinion Regarding Proxies Serving as Officers *(R. Beal)*
6. Discuss Commissioner Conflict of Interest *(R. Beal)*
7. Discuss Appeals Process *(R. Beal)*
8. Discuss Future Scope of MRIP/APAIS Activities *(R. Beal/M. Cahall)*
9. Future Annual Meetings Updates *(L. Leach)*
   - October 21-25, 2018 – New York, New York
   - October 27-31, 2019 – Portsmouth, New Hampshire
   - 2020 – New Jersey
   - 2021 – North Carolina
10. Executive Director Performance Review **Closed Session**
11. Other Business/Adjourn

10:45 a.m. – 12:30 p.m. **Atlantic Menhaden Management Board**

Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida

Other Members: NMFS, PRFC, USFWS

Other Participants: Ballenger, Simmons

Chair: Meserve

Staff: Appelman

1. Welcome/Call to Order *(N. Meserve)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from November 2017
3. Public Comment
4. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Single Species Benchmark Stock Assessment and Peer Review *(K. Anstead)* **Action**

5. Review and Populate the Atlantic Menhaden Stock Assessment Subcommittee Membership *(K. Anstead)* **Action**
6. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Ecosystem-Based Benchmark Stock Assessment and Peer Review *(K. Drew)* **Action**
7. Consider Approval of 2018 Fishery Management Plan Review and State Compliance Reports *(M. Appelman)* **Action**
   - Review State Implementation Plans for Amendment 3
8. Other Business/Adjourn

1:15 – 3:15 p.m. **American Lobster Management Board**

Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia
Other Members: NEFMC, NMFS
Chair: Train
Other Participants: Cloutier, Gwin, Reardon
Staff: Ware

1. Welcome/Call to Order *(S. Train)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Lobster Conservation Management Team (LCMT) Proposals to Reduce Latent Effort **Possible Action**
   - Review Board Task Regarding Latent Effort *(M. Ware)*
   - Review LCMT Proposals
   - Discuss Board Goals and Objectives Regarding Task
   - Consider Board Action in Response to Proposals
5. Law Enforcement Committee Report *(R. Cloutier)*
   - Enforceability of Ropeless Fishing
6. Plan Development Team Update on American Lobster Draft Addendum XXVII *(M. Ware)*
7. Other Business/Adjourn

3:30 – 4:15 p.m. **Winter Flounder Management Board**

Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey
Other Members: NMFS, USFWS
Chair: Pierce
Other Participants: Blanchard, Nitschke
Staff: Ware

1. Welcome/Call to Order *(D. Pierce)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment

4. Review and Consider Rhode Island Proposal on Commercial Trip Limits *(M. Ware)* **Final Action**
   - Overview of Rhode Island Proposal
   - Technical Committee Report
   - Consider Approval of Rhode Island's Proposal
5. Other Business/Adjourn

Thursday, May 3

8:00 – 10:00 a.m. **Interstate Fisheries Management Program Policy Board**
Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Other Members: DC, NMFS, PRFC, USFWS
Other Participants: Denit
Chair: Gilmore
Staff: Kerns

1. Welcome/Call to Order *(J. Gilmore)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Update from the Executive Committee *(J. Gilmore)*
5. Review and Consider Commonwealth of Massachusetts, Rhode Island, Connecticut and New York Appeal of Addendum XXX to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan *(T. Kerns*) **Final Action**
6. Committee Reports
   - Artificial Reef *(L. Havel)*
   - Law Enforcement *(M. Robson)*
7. Marine Recreational Information Program Update on the Transition to the Fishing Effort Survey and the Calibration Process *(K. Denit)*
8. Review Noncompliance Findings, if Necessary **Possible Action**
9. Other Business/Adjourn

10:00 – 10:15 a.m. **Business Session**
Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Chair: Gilmore
Staff: Beal

1. Welcome/Introductions *(J. Gilmore)*
2. Board Consent
   - Approval of Agenda
3. Public Comment
4. Review Noncompliance Findings, if Necessary *(J. Gilmore)* **Possible Final Action**
5. Other Business/Adjourn

10:30 a.m. – 11:30 p.m. **Summer Flounder, Scup and Black Sea Bass Management Board**
Member States: New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina
Other Members: NMFS, PRFC, USFWS
Other Participants: Snellbaker, Wojcik
Chair: Ballou
Staff: Rootes-Murdy, Starks

1. Reconvene/Call to Order *(R. Ballou)*
2. Board Consent
   - Approval of Agenda
3. Public Comment
4. Consider ISFMP Policy Board Guidance Regarding Massachusetts, Rhode Island, Connecticut, and New York Addendum XXX Appeal, if Necessary *(T. Kerns)* **Final Action**
5. Other Business/Adjourn

11:45 a.m. – 2:15 p.m. **South Atlantic State/Federal Fisheries Management Board**
Member States: New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Other Members: PRFC, NMFS, SAFMC, USFWS
Other Participants: Lynn, McDonough, Poland, Rickabaugh
Chair: Geer
Staff: Schmidtke

1. Welcome/Call to Order *(P. Geer)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2018
3. Public Comment
4. Addendum I to the Black Drum Fishery Management Plan for Final Approval *(M. Schmidtke)* **Final Action**
   - Review Options and Public Comment Summary
   - Review Committee Reports
   - Consider Final Approval of Addendum I
5. Consider Management Action Based on Technical Committee/Plan Review Team Recommended Updates to the Annual Traffic Light Analyses for Atlantic Croaker and Spot (*M. Schmidtke*) **Possible Action**
6. Updates on SEDAR 58 Cobia Stock Identification Workshop and Board Tasking of Cobia Technical Committee from February 2018 *(M. Schmidtke)*
7. Review Draft Terms of Reference and Schedule for the SEDAR 58 Atlantic Cobia Stock Assessment *(M. Schmidtke)*
8. Discuss Questions from the South Atlantic Fishery Management Council Regarding Possible Transfer of the Atlantic Migratory Group Cobia Fishery Management *(M. Schmidtke)*
9. Other Business/Adjourn

12:30 – 1:00 p.m. **Lunch Provided for Commissioners, Proxies and Board Members**

Atlantic States Marine Fisheries Commission

Summer Flounder, Scup, and Black Sea Bass Management Board and Mid-Atlantic Fishery Management Council

April 30, 2018
10:00 a.m. – 3:00 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(R. Ballou/R. O'Reilly)* 10:00 a.m.

2. Board Consent 10:00 a.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2018

3. Public Comment 10:05 a.m.

4. Consider Approval of Summer Flounder Draft Amendment and Public Hearing Document for Public Comment (*K. Dancy/K. Rootes-Murdy*) 10:15 a.m.
   Action
   - Review Management Alternatives
   - Presentation of Management Documents

5. Lunch Break 12:00 p.m.

6. Summer Flounder, Scup and Black Sea Bass Management (*J. Beaty/C. Starks*) 1:00 p.m.
   Possible Action
   - Overview of Black Sea Bass Recreational Management Discussion Document
   - Review Draft Alternatives for Framework/Addendum on Recreational Issues
   - Review Preliminary February 2018 Black Sea Bass Recreational Harvest Estimates

7. Other Business/Recess 3:00 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Summer Flounder, Scup, and Black Sea Bass Management Board and Mid-Atlantic Fishery Management Council Joint Meeting
April 30, 2018
10:00 a.m. - 12:00 p.m. and 1:00 - 3:00 p.m.
Arlington, Virginia

Chair: Bob Ballou (RI) Assumed Chairmanship: 10/17	Technical Committee Chair: Greg Wojcik (CT)	Law Enforcement Committee Representative: Snellbaker (NJ)
Vice Chair: Adam Nowalsky	Advisory Panel Chair: Vacant	Previous Board Meeting: February 8, 2018 and Conference Call on March 20, 2018
Voting Members: NH, MA, RI, CT, NY, NJ, DE, MD, PRFC, VA, NC, NMFS, USFWS (13 votes for Black Sea Bass; 12 votes for Summer Flounder and Scup)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Consider Approval of Summer Flounder Draft Amendment for Public Comment (10:15-12:00 p.m.) Action

Background

- The Board and Council initiated a comprehensive amendment on summer flounder management in 2014. Since then the focus of the Draft Amendment has shifted to commercial management issues, specifically federal permit requalification, commercial allocation, and landings flexibility.
- In December 2017, the Board and Council were presented a range of alternatives on each of the commercial management issues and provided feedback on the development of the Draft Amendment. **(Supplemental Materials)**
- A Draft Public Hearing Document has been developed that summarizes the proposed alternatives and their expected impacts. **(Supplemental Materials)**

Presentations

- Review Management Alternatives and Management Documents by K. Dancy and K. Rootes-Murdy

Board actions for consideration at this meeting

- Review and Approve Public Hearing Document for public comment
- Approve Summer Flounder Draft Amendment for public comment

5. Lunch Break

6. Summer Flounder, Scup and Black Sea Bass Management (1:00-3:00 p.m.) Possible Action
Background • Some Commissioners have expressed interest in exploring ways to improve black sea bass management, and have prepared a discussion document to help the Board and Council strategize management in future years. **(Supplemental Materials)** • In December 2017 the Board and Council initiated a joint Framework/Addendum to address several recreational issues for summer flounder, scup and black sea bass, including Conservation Equivalency for black sea bass, slot limits, and transit issues. The Council formed a Fishery Management Action Team (FMAT) to develop draft alternatives. **(Briefing Materials)** • In March 2018, the Demersal Committee of the Council reviewed and provided feedback on the draft alternatives for the Framework/Addendum. **(Briefing Materials)** • In October 2017, the Council and Board approved like motions to open a black sea bass recreational fishery in February 2018. 100,000 pounds of harvest were allocated to that fishery, with each state allocated a proportion of the total based on historical wave 1 harvest. Only the states of Virginia and North Carolina participated in the 2018 February fishery. **(Briefing Materials)**
Presentations • Overview of Black Sea Bass Recreational Management Discussion Document by A. Nowalsky • Review of Draft Alternatives for Framework/Addendum on Recreational Issues by J. Beaty and C. Starks • Review of Preliminary February 2018 Black Sea Bass Recreational Harvest Estimates by C. Starks
Board actions for consideration at this meeting • Provide guidance on Draft Alternatives for Framework/Addendum on Recreational Issues

7. Other Business/Recess

Caitlin Starks

From: captophook@aol.com
Sent: Monday, February 12, 2018 3:55 PM
To: Caitlin Starks
Subject: Fwd: RE: Shameful BSB Managing

Hi Caitlin I met you at N.Y. MEETING BSB. If you would PLEASE put this comment in the files.

Thank you
Steven R Witthuhn.

From: bmuffley@mafmc.org
To: captophook@aol.com
Sent: 2/12/2018 10:20:18 AM Eastern Standard Time
Subject: RE: Shameful BSB Managing

Hi Steve

Thanks for the email and phone call. Even though we just talked, sending this so you know that I got your email. I will add this to the Council comments page.

Have a good one.

Brandon

From: captophook@aol.com [mailto:captophook@aol.com]
Sent: Monday, February 12, 2018 10:00 AM
To: Muffley, Brandon <bmuffley@mafmc.org>
Subject: Shameful BSB Managing

I listened to the last Commission Board meeting webinar, on the Black Sea Bass regulatory process. It was nothing short of (legal) organized crime. the management process, in my opinion, has lost it's credibility in managing a "rebuilt stock". Those of us that listened in on the webinar, heard the Northern Region states (NY-CT-RI-MA) now have the deck stacked against them. The vote was stacked, when it came time to vote on a motion for the whole region. The stock has definitely moved north along the coast to the northern region.

With the current path of management, I can assure you that NON-COMPLIANCE will continue to flourish out of control, based on the availability of fish the upcoming season. My job, as a New York state advisor in the fishery management process, is to instill a belief in working within the process for the recreational fishermen and the For-Hire sector in order to maintain sustainable fish stocks.

The methodology used for setting the Black Sea Bass allowable catch, MUST BE REVIEWED in order for fishery management to claim, they have and use the BEST SCIENCE for setting quotas, is no longer believable. All fishermen are asking for is an HONEST interpretation of National Standard One:..."the optimum yield from each fishery for the United States fishing industry". We ask for a fair and equitable use of the resource. "We the people" are experiencing an over managing of the resource, and in turn, "we the people" see and experience on the water what is essentially a rebuilt fishery, being managed poorly by the Mid-Atlantic council. The matter of managing the fish where they WERE in the south rather than where they ARE in the north. By looking backward rather than forward, ASMFC is forcing the states with the fish to reduce landing, while allowing states where the Biomass is lower to increase harvest, which is nonsensical on its face.

Respectfully

Steven R Witthuhn

Charter Boat Captain

New York MRAC member

AP BSB MAFMC

-----Original Message-----
From: Brian Marks [mailto:bkm072@gmail.com]
Sent: Monday, April 16, 2018 2:12 PM
To: info <info@asmfc.org>
Subject: sea bass

fishing 30 years more now then ever cut the baloney let people enjoy the great outdoors

NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENTAL QUALITY

March 28, 2018

Mr. Robert E. Beal, Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Dear Mr. Beal:

I am writing on behalf of the N.C. Marine Fisheries Commission regarding the amendment to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan that primarily addresses the commercial summer flounder fishery. The summer flounder fishery has been a very important component of the state's commercial fishing industry for the last several decades. In 2016, North Carolina's commercial fishery landed 2,071,089 pounds of summer flounder with a dockside value of $8,238,703. The summer flounder trawl fishery accounts for nearly all of the commercial summer flounder landings in North Carolina, and a total of 266 flounder trawl trips from 97 vessels landed summer flounder in our state in 2016.

The commercial allocations issue in this amendment is of utmost concern to the commission. North Carolina has the largest allocation of the commercial summer flounder quota based on its historic landings, and shore-based infrastructure and businesses were developed to support the state's commercial summer flounder fishery. We understand that the amendment is still under development, so we ask that proposed management measures concerning allocation include a broad range of options that considers the historic fisheries of the affected states.

Thank you for keeping this request in mind as the amendment to this plan is being developed and please know how much we appreciate the work you do on behalf of our Atlantic Coast fisheries.

Sincerely,

Sammy Corbett

Sammy Corbett, Chairman
N.C. Marine Fisheries Commission

cc: Steve Murphey, Director, N.C. Division of Marine Fisheries
N.C. Marine Fisheries Commission

Summer Flounder, Scup, and Black Sea Bass Recreational Management Framework and Addendum

Briefing Materials for April 30, 2018 Joint Meeting of the Mid-Atlantic Fishery Management Council and ASMFC Summer Flounder, Scup, and Black Sea Bass Board

Contents

Draft Framework/Addendum Alternatives

The Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission) staff propose the draft alternatives in Table 1 for the recreational management framework and addendum, based on input from the Fishery Management Action Team (FMAT), the Council's Demersal Committee, and a subset of the Commission's Summer Flounder, Scup, and Black Sea Bass Board (the Board). Specific considerations from the FMAT, Demersal Committee, and Board sub-group are described in more detail in the next section.

Table 1: Draft framework/addendum alternatives proposed by staff.

- **Alternative set 1: black sea bass conservation equivalency**
  - Alternative 1.A: no action (conservation equivalency cannot be used for black sea bass)
  - Alternative set 1.B: update the FMPs to allow conservation equivalency for black sea bass
    - Alternative 1.B.i: black sea bass conservation equivalency using the current summer flounder conservation equivalency process
    - Alternative 1.B.ii: black sea bass conservation equivalency using a similar process as summer flounder, with one or more of the following modifications:
      - Conservation equivalency rollover (when appropriate)
      - Joint Council and Board determination of state/regional allocations of RHL (vs. allocations developed through Board process as is current practice)
      - Manage to the ACL rather than the RHL
- **Alternative set 2: Block Island Sound transit provisions** (potentially Council only)
  - Alternative 2.A: no action (no transit provisions)
  - Alternative 2.B: Block Island Sound transit provisions
    - Which vessels?
      - Recreational only
      - Commercial and recreational
    - Which measures?
      - Season
      - Bag
      - Size
- **Alternative set 3: recreational slot limits** (Council only)
  - Alternative 3.A: no action (slot limits cannot be used in federal recreational summer flounder, scup, or black sea bass fisheries)
  - Alternative 3.B: modify the Council's FMP to allow use of a maximum size limit for recreational summer flounder, scup, and black sea bass fisheries (would allow for slot limits, split slot limits, trophy and guppy fish measures, and other size limit configurations requiring a maximum size)

Summary of FMAT, Demersal Committee, and Board Sub-Group Discussion of Draft Alternatives

The FMAT met in February 2018 to discuss this framework/addendum. The Council's Demersal Committee and a sub-group of the Board met in March 2018. Full summaries of these meetings can be found at: http://www.mafmc.org/actions/sfsbsb-recreational-management-fw.

Black Sea Bass Conservation Equivalency Alternatives

The Council and Commission's Summer Flounder, Scup, and Black Sea Bass Fishery Management Plans (FMPs) require uniform coastwide (state and federal waters) measures for the recreational black sea bass fishery; however, for the past several years, the Commission has used a series of addenda to allow temporary deviations from this requirement through an ad-hoc regional management approach.

Under the current process, the Council and Board agree to federal waters measures each year. Individual states or regions work through the Commission process to develop measures for state waters. For 2018 (Addendum XXX), the Commission used a combination of historical harvest and exploitable biomass information from the latest stock assessment to allocate the coastwide recreational harvest limit (RHL) among three regions: Massachusetts through New York (allocated 61.35% of the coastwide RHL), New Jersey (30.24%), and Delaware through North Carolina, north of Cape Hatteras (8.41%). The states within each region will cooperatively develop recreational measures designed to achieve, but not exceed, their regional RHL allocation. Each region will establish a standard set of measures, with each state in the region afforded the flexibility to adjust their measures up to one inch in minimum size and three fish in possession limit. The Board approved these provisions of Addendum XXX for use in 2018, with the possibility of extension into 2019.

Under the draft no action alternative for conservation equivalency (**alternative 1.A**), the ad-hoc regional management approach would likely continue to be used to set recreational measures for black sea bass in state waters and the Council and Board would set preferred federal water measures. The details of how this is carried out may vary year to year. The Board would also have the option of discontinuing the use of ad hoc regional management and reverting to uniform coastwide measures.

Alternative 1.B.i proposes establishing a process for black sea bass conservation equivalency based on the process currently used for summer flounder. Under this process, the Council and Board decide each year whether to use coastwide measures or conservation equivalency. If they agree to conservation equivalency, they must agree on a set of non-preferred coastwide measures consisting of a minimum fish size, possession limit, and season that, if implemented on a coastwide basis, would constrain harvest to the RHL. They also agree to a set of precautionary default measures (described in more detail below).

Individual states or regions develop measures that, when taken as a whole, are the conservation equivalent of the non-preferred coastwide measures. An agreed upon allocation scheme forms the basis for the state/regional measures. The summer flounder allocations are written into the Commission's FMP as state targets based on the percent of 1998 recreational harvest by state. The Board has developed addenda in recent years to deviate from these allocations.

The Commission's Technical Committee reviews the state/regional proposals to determine if, as a whole, they would constrain harvest to the RHL. The Board then considers the proposals for approval, taking into account the Technical Committee recommendations. If the Board does not approve an individual proposal, that state or region may submit a revised proposal. If a state or region implements

measures which are not approved by the Board, then the precautionary default measures should be enforced in that state or region. The precautionary default measures are intended to be restrictive enough to deter states/regions from implementing measures which are not approved through the conservation equivalency process.

After reviewing and approving the state/region proposals, the Board then submits a letter to NMFS certifying that the combination of state and regional measures is expected to constrain harvest to the RHL. NMFS then either approves or rejects the combination of proposals. If approved, NMFS waives the federal waters measures (i.e. the non-preferred coastwide measures) in favor of the state or regional conservation equivalency measures. Federally-permitted vessels and vessels fishing in federal waters are then subject to the regulations in the states where they land their catch.

Alternative 1.B.ii proposes to use a similar process to that described above, but with one or more modifications. Specific modifications (each of which are described in more detail below) discussed by the FMAT, Committee, and Board sub-group include conservation equivalency roll over, joint Council and Board determination of state/regional RHL allocations, and managing to the annual catch limit (ACL) rather than the RHL.

Conservation equivalency rollover: The FMAT, the Demersal Committee, and the Board sub-group agreed that it could be beneficial to allow conservation equivalency to roll over from year to year, which is not possible under the current federal summer flounder regulations. If conservation equivalency rolled over from year to year, NMFS would not need to go through the rulemaking process to waive the federal waters measures each year. The Committee and Board sub-group supported the use of conservation equivalency roll over (when appropriate) for both black sea bass and summer flounder.

The Council and Board would still need to review the non-preferred coastwide and precautionary default measures each year to ensure that the fishery would be constrained to the appropriate management target (i.e. a single-year ACL or RHL, see pages 7-11).Given the timing of data availability from the Marine Recreational Information Program (MRIP), the Council and Board would still need to review projected fishery performance in December and final recreational estimates early in the next year.

For conservation equivalency to roll over from one year to the next, the non-preferred coastwide and precautionary default measures would need to be appropriate for the ACL or RHL in both years. In the future, the non-preferred coastwide and precautionary default measures could be crafted with this flexibility in mind. The Committee and Board sub-group requested that staff examine recent summer flounder recreational fishery performance in relation to the non-preferred coastwide and precautionary default measures to determine how often conservation equivalency rollover could have been possible in the recent past if the regulations had allowed for it. The information included in **Appendix 1** suggests that rollover would have been possible in multiple years.

Under the current process for summer flounder, conservation equivalency expires at the end of the year, but the federal waters measures are not waived until the spring, after NMFS receives a letter from the Commission certifying that the combination of state and regional measures will constrain harvest to the RHL. This means that from January 1 until NMFS completes the rule-making process to waive the federal waters measures, the non-preferred coastwide measures from the previous year are technically in place in federal waters. This not only creates the potential for confusion, but can also create a situation where federal waters measures are more restrictive than state waters measures.

Managing to the ACL or RHL: The summer flounder conservation equivalency regulations specify that management measures must constrain harvest to the RHL. The black sea bass conservation equivalency regulations could be written to specify that measures must constrain catch to the ACL, rather than constraining harvest to the RHL. The Council and Board have expressed interest in evaluating measures based on the ACL rather than the RHL (see pages 7-11).

Joint allocation decisions: The FMAT, Committee, and Board sub-group discussed the possibility of the Council and Board jointly deciding on state or regional recreational allocations under black sea bass conservation equivalency. Summer flounder RHL allocations under conservation equivalency are not included in the Council's FMP and the Council does not have a formal role in the decision-making process for these allocations. An FMP amendment would likely be needed to add conservation equivalency allocations to the Council's FMP.

There was disagreement among Committee and Board sub-group members as to whether this framework/addendum should include an alternative for conservation equivalency allocations to be decided upon jointly by the Council and Board. Concerns were expressed about the balance of representation among the states between the Council and Commission. Massachusetts, Connecticut, and Rhode Island do not have voting members on the Council. Those states would not have equal voting power with mid-Atlantic states if allocations were decided jointly between the Council and Commission. In addition, there was some concern that adding the Council to the decision-making process would add complexity to and prolong the rule-making process for allocation changes.

The Board adopted black sea bass RHL allocations for 2018, with the possibility of extension into 2019, through Addendum XXX. However, the states of Massachusetts through New York have appealed this decision. MRIP plans to release a revised time series of recreational harvest estimates during the summer of 2018. The NEFSC currently plans to carry out a black sea bass operational assessment using the revised MRIP time series in early 2019. The revised MRIP estimates and the operational assessment could have implications for allocations based on historical harvest. The FMAT recommended that the Council and Board wait until after the results of the operational assessment are available to consider new allocation schemes under conservation equivalency.

General Conservation Equivalency Recommendations

The FMAT, Demersal Committee, and Board sub-group agreed that it would be beneficial to streamline the conservation equivalency process and decrease the amount of time needed to develop, approve, and implement state waters measures and waive federal waters measures.

The FMAT recommended that the Council and Board focus on updating the FMPs to allow conservation equivalency to be used in a future year, rather than crafting measures to implement conservation equivalency in 2019. However, the Committee and Board wished to retain all options for consideration for use in 2019 at this point in time.

Under the current schedule for this action (**Appendix 2**), NMFS will not be able to approve the use of black sea bass conservation equivalency until spring 2019 at the earliest. Therefore, if the Council and Board wish to use black sea bass conservation equivalency in 2019, they would need to approve a set of backup measures to be implemented if NMFS does not approve conservation equivalency or if conservation equivalency cannot be implemented by the start of the 2019 fishing season.

Table 1 does not include options for use of black sea bass conservation equivalency in 2019 because this could be achieved through the normal recreational specifications process (assuming that NMFS approves use of conservation equivalency through this framework/addendum). However, the current action timeline, combined with revisions to MRIP data which will impact allocation discussions, means that implementing conservation equivalency for 2019 may not be feasible.

One Committee member said he preferred a state-by-state system to a regional system for black sea bass conservation equivalency. This is possible under the current summer flounder conservation equivalency regulations and would be allowed for under alternatives 1.B.i and 1.B.ii as summarized in Table 1.

Block Island Sound Transit Provision Alternatives

Alternative set 2 includes alternatives related to transiting Block Island Sound. Under current regulations (**alternative 2.A**), when scup and black sea bass recreational fisheries are closed in federal waters but open in state waters, vessels may not transit federal waters with scup or black sea bass caught in state waters. This has been problematic in Block Island Sound during the September 22 – October 21 black sea bass federal waters closure in recent years. State waters in Rhode Island, Connecticut, and New York are open to black sea bass fishing during that time.[1] Anglers fishing in state waters around Block Island must pass through federal waters to return to the mainland. If they retain any black sea bass, they are in violation of the federal regulations while they pass through federal waters, even if those fish were legally caught in state waters. This has not been an issue for summer flounder as federal waters regulations for summer flounder are waived under conservation equivalency. It has also not been an issue for scup in recent years as the federal waters scup season has been open year-round since 2012.

Alternative 2.B would allow vessels to transit federal waters in Block Island Sound with summer flounder, scup, or black sea bass caught in state waters on board. It is possible that these changes could be implemented through the Council's FMP without a complementary change to the Commission's FMP. The existing transit provisions for striped bass could be used as a model to define the transiting area. These regulations state that "it is unlawful for any person to…Possess any Atlantic striped bass in or from the EEZ, except in the following area: The EEZ within Block Island Sound, north of a line connecting Montauk Light, Montauk Point, NY, and Block Island Southeast Light, Block Island, RI; and west of a line connecting Point Judith Light, Point Judith, RI, and Block Island Southeast Light, Block Island, RI. Within this area, possession of Atlantic striped bass is permitted, provided no fishing takes place from the vessel while in the EEZ and the vessel is in continuous transit" (50 CFR 697.7 (b)).

Instituting such transit provisions requires a simple change to the FMP and the regulations. Other FMPs would need to be updated if these provisions were to address additional species besides summer flounder, scup, and black sea bass. The FMAT recommended that this action consider only adding these changes to the Summer Flounder, Scup, and Black Sea Bass FMP. As other FMPs are modified for other purposes, similar transit provisions could easily be added for other species.

The FMAT recommended that, for ease of enforcement, these transit provisions address only recreational fisheries in Block Island Sound and only situations where federal waters are closed and state waters are open (i.e. not situations where the federal waters minimum fish size or bag limit is more restrictive than in state waters).

[1] With the exception that in 2017 Rhode Island closed their state waters fishery during the fall federal waters closure.

The Committee and Board sub-group requested that alternative 2.B also consider situations where the recreational bag or minimum size limit is more restrictive in federal waters than in state waters. The FMAT advised against this as it would be more complicated for enforcement than simply addressing situations where federal waters are closed and state waters are open.

The Committee and Board sub-group requested that similar provisions also be considered for commercial fisheries. Commercial black sea bass and summer flounder fisheries are managed on a state-by-state basis with no federal seasons or possession limits; thus, conflicting regulations are generally not an issue for individuals fishing under federal permits. However, state-only commercial permit holders are currently not permitted to transit Block Island Sound with summer flounder, scup, or black sea bass in excess of the recreational possession limit on board. The FMAT has not yet discussed the potential implications of applying these transit provisions to both commercial and recreational fisheries.

Slot Limit Alternatives

Alternative set 3 includes alternatives related to recreational slot limits. Currently, the Council may not use slot limits as a management tool for summer flounder, scup, or black sea bass as the Council's FMP does not allow for specification of a maximum fish size (**alternative 3.A**). Slot limits may be implemented through the Commission process; thus, they may be implemented for summer flounder by states or regions through conservation equivalency, or for black sea bass and scup for state waters measures only.

Under **alternative 3.B**, the Council's FMP would be modified to allow specification of a maximum fish size. This would allow for use of regular slot limits, split slot limits, and trophy fish. A complementary alternative is not needed in the Commission's addendum as slot limits can already be used through the Commission process.

A maximum size may not be desired for scup. In addition, some Committee and Board members cautioned that slot limits may not be appropriate for black sea bass given concerns about barotrauma for larger fish, which could be discarded at higher rates under certain slot limits.

Given the timing of this action, if the Council and Board wish to use slot limits in 2019, they would need to approve a set of backup measures in case NMFS does not approve adding the option for a maximum size to the FMP or if this change is not implemented by the start of the 2019 fishing season. Table 1 does not include options for use of slot limits in 2019 because this could be achieved through the normal recreational specifications process (assuming that NMFS approves use of a maximum size through this framework/addendum).

The Monitoring and Technical Committees have analyzed slot limits in the past. Their analysis and recommendations should be revisited if the Council and Board wish to consider use of specific slot limits in a given year. For example, given the current status of the summer flounder stock (i.e. biomass is below the target and overfishing is occurring) and resulting low RHLs in recent years, a slot limit would need to be very narrow to prevent RHL overages. Black sea bass spawning stock biomass is currently more than double the biomass target; therefore, black sea bass may be a better candidate for slot limits than summer flounder at this point in time.

ACL Evaluation Issue (Not Currently Included in Framework/Addendum)

Under current practice, recreational management measures for summer flounder, scup, and black sea bass are developed and modified based on a comparison of harvest to the RHL. The Board (through Addendum XXX) and the Council (as stated at their February 2018 meeting) are considering moving towards evaluating and modifying measures based on a comparison of catch to the ACL, rather than harvest to the RHL. The intent behind this change is to better address total mortality (i.e. harvest and dead discards) compared to the current process.

The Council and Board have not approved this issue for inclusion in the recreational management framework/addendum; however, it could have implications for the black sea bass conservation equivalency alternatives.

Depending on how this change is configured, FMP and regulation changes may not be necessary. However, a Commission Technical Addendum with associated public hearings may still be warranted. The current black sea bass and scup regulations require that recreational management measures ensure that the recreational ACL (not the RHL) is not exceeded. The summer flounder conservation equivalency regulations, however, state that measures must constrain harvest to the RHL. The black sea bass conservation equivalency alternatives considered through this framework/addendum could require measures that constrain harvest to the ACL, rather than the RHL.

Greater clarification on the Council and Board's intent is needed. For example, it is not clear if the intent is for recreational measures to be designed to achieve the ACL, or if they should continue to be based on the RHL, with the ACL taken into account when evaluating the performance of the measures. Table 2 includes examples of options which could be considered. In addition, it is not clear if the Council and Board intend for this change to apply only to black sea bass, or also to the other species in the FMP.

As previously stated, under the current process, recreational management measures are designed to ensure that harvest does not exceed the RHL. Late in year 1, projected year 1 harvest is compared to the year 2 RHL. This is re-evaluated early in year 2 when preliminary harvest estimates for all of year 1 are available. If year 1 harvest is significantly over or under the year 2 RHL, then the recreational management measures are modified to reduce or increase harvest to achieve but not exceed the year 2 RHL.

The timing of availability of discard estimates would be problematic if management measures were evaluated based on catch compared to the ACL, rather than harvest compared to the RHL. MRIP provides estimates of live discards in numbers of fish. Some of these fish are assumed to die after being released. Only dead discards and landings count towards the ACL, which is specified in pounds. NEFSC stock assessment scientists translate the MRIP live discard estimates in numbers of fish to dead discards in weight using the length distribution of recreational discards from MRIP party/charter sampling and other programs, length/age/weight relationship data, and an assumed 10% or 15% discard mortality rate, depending on the species. **Appendix 3** describes this process in more detail.

If recreational management measures were evaluated against the ACL, rather than the RHL, then discards in weight would be needed to estimate catch in year 1 for comparison with the year 2 ACL when drafting year 2 management measures. Estimates of discards in weight in year 1 are typically not available until mid-year in year 2 as they must be calculated based on final year 1 MRIP discard

estimates and other data which are typically not available until mid-year in year 2. Therefore, any necessary modifications to the year 2 measures due to year 1 catch that is significantly higher or lower than the year 2 ACL could not be implemented until late in year 2 or at the start of year 3. This is a notable time lag compared to the current process.

Addendum XXX states that if the ACL is exceeded, catch will be evaluated against a three-year moving average of the ACL. States/regions would develop proposals to reduce harvest in the following year if catch exceeds the three-year average ACL. It should be noted that in every year since 2012, recreational black sea bass catch exceeded both the ACL and the three-year moving average ACL (where the average includes the current year and the two prior years; Figure 1). Under this approach states/regions would still need to constrain catch to a given year's ACL, given current FMP requirements. However, a three-year moving average of the ACL could be used to provide rationale for why a given year's ACL won't be exceeded. Clarification is needed on which three years would be used to calculate the ACL moving average. It may be worth also considering a comparison of three years of catch to three years of the ACL. This would align with the current process for determining if recreational accountability measures (AMs) are triggered (i.e. the previous three complete years of catch is compared to the average of the previous three years of ACLs).

In the future, if the SSC uses a multi-year averaging approach to recommend ABCs, then the ACL averaging approach described above may not be able to be used as the single-year ACLs would already be based on an average.

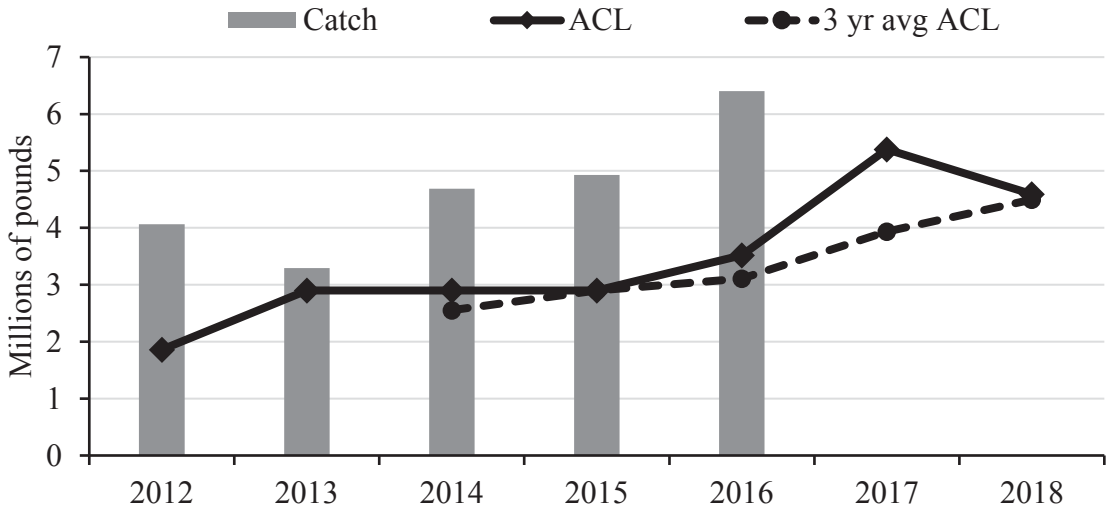

Figure 1: Recreational black sea bass catch, ACLs, and three-year moving average ACL, 2012-2018. Catch values are from the 2017 data update provided by the Northeast Fisheries Science Center.

Several challenges regarding managing to the ACL, rather than the RHL, are worth emphasizing. For example, some Committee and Board members cautioned that managing to the ACL would disadvantage northern states, given regional differences in the availability and size distribution of black sea bass. Some Council and Board members have expressed an interest in using information from the 2016 black sea bass benchmark stock assessment to manage the northern region (north of Hudson Canyon) differently than the southern region (Hudson Canyon through Cape Hatteras), for example,

with different fishing mortality and biomass targets. This could help address concerns about differences in availability and size distribution among the northern and southern states; however, this type of regional management is not currently feasible given the way the stock assessment is configured (see **Appendix 4** for more information).

In addition, concerns regarding the accuracy and precision of data used in the current process, as well as challenges with the timing of the current process, would be exacerbated if measures were evaluated based on the ACL because discard information would need to be considered. Recreational discards are much more difficult than landings to accurately estimate, in part because they are largely based on self-reported angler data (see **Appendix 3** for more information). In addition, dead discard data in weight for one year are typically not available until at least June of the next year. Preliminary harvest data can be used to project harvest for the full year late in that same year. Final harvest estimates for the full year are typically available the next spring. Given the data needed to estimate dead discards (i.e. MRIP live discard estimates, discard length distributions from a variety of programs, and age/weight/length relationship data from a variety of sources), dead discards in weight cannot be projected prior to the year's end as accurately as harvest.

Addendum XXX also specifies that, if the approach of evaluating measures based on the ACL is used, significant improvements need to be made in: 1) Biological sampling (length and weight), 2) Reduction in refusal rates of dockside MRIP intercepts/interviews, 3) Discard composition information (i.e. reason discarded, length), 4) Reduction in discarding relative to 2010-2015, 5) Improved compliance with management measures. These topics warrant further clarification and development of guidelines for achieving sufficient progress.

In recent years, the Monitoring and Technical Committees have worked toward improving the recreational measures setting process by identifying technical approaches for considering uncertainty in the recreational data and developing alternative methods for evaluating and responding to recreational harvest estimates. For example, the Committees identified methods of evaluating and smoothing extreme outlier harvest estimates using multiple years of data to project harvest and predict how modified measures will perform. The Monitoring and Technical Committees support continued evaluation of the current process for developing recreational management measures, including consideration of developing and evaluating measures based on the ACL, rather than the RHL. This topic warrants further discussion by the Monitoring and Technical Committees.

Table 2: Potential options for evaluating and modifying recreational management measures based on the RHL and/or the ACL (not included as alternatives in this framework/addendum).

- **Recreational management target options**
  - Recreational management measures are designed to allow the fishery to achieve, but not exceed, the **RHL** (current practice), or
  - Recreational management measures are designed to allow the fishery to achieve, but not exceed, the **ACL**. This does not require an FMP or regulation change for black sea bass or scup, but would require a change to the summer flounder conservation equivalency regulations.
- **Options for evaluation and modification of management measures**
  - **If the RHL is the management target:**
    - Evaluate and adjust measures based on a comparison of harvest (or projected harvest) in year 1 to the year 2 RHL. If the year 2 RHL is greater than year 1 harvest, then measures can be liberalized to help the fishery achieve but not exceed the year 2 RHL. If year 1 harvest exceeds the year 2 RHL, then:
      - Adjust management measures to reduce harvest so the year 2 RHL is not exceeded (current practice), or
      - Take the ACL into consideration (proposed in Addendum XXX)
        - **Consider a single-year ACL -** If year 1 catch does not exceed the year 2 ACL, then modifications to the management measures are not required. If year 1 harvest exceeds the year 2 RHL, and year 1 catch exceeds the year 2 ACL, then measures should be modified so harvest in year 2 does not exceed the year 2 RHL, or
        - **Compare the three-year average of catch to the three-year average ACL -** If the three-year average catch does not exceed the three-year average ACL, then modifications to the management measures are not required. If year 1 harvest exceeds the year 2 RHL and the three-year average catch exceeds the three-year average ACL, then measures should be modified so harvest in year 2 does not exceed the year 2 RHL.
  - **If the ACL is the management target:**
    - Evaluate and adjust measures based on a comparison of catch (or projected catch) in year 1 to the year 2 ACL. If the year 2 ACL is greater than year 1 catch, then measures can be liberalized to help the fishery achieve but not exceed the year 2 ACL. If year 1 catch exceeds the year 2 ACL, then:
      - Adjust management measures to reduce catch so the year 2 ACL is not exceeded, or
      - Compare the three-year average of catch to the three-year average ACL – If the three-year average catch exceeds the three-year average ACL, then measures should be modified so catch in year 2 does not exceed the year 2 ACL. If the three-year average catch does not exceed the three-year average ACL, then modifications to the management measures are not required.

Multi-Year Approaches to Management

The Committee and Board sub-group discussed the potential for evaluating the recreational black sea bass fishery based on multiple years of performance and multiple years of RHLs and/or ACLs, regardless of whether conservation equivalency is used. This could add efficiency to the process and could result in less frequent modifications of recreational management measures. Table 3 summarizes potential options for multi-year approaches to management for recreational summer flounder, scup, and black sea bass fisheries.

Multiple years of data are already considered in some parts of the process. For example, the Monitoring and Technical Committees consider multiple years of data to project harvest when developing management measures for the upcoming year. In addition, three years of catch and ACLs are compared when determining if recreational AMs are triggered.

The Magnuson Stevens Fishery Conservation and Management Act and the National Standard 1 Guidelines allow some flexibility in terms of multi-year approaches to management, including allowing a single-year ACL to be exceeded in certain circumstances. For example, stock status, the reason for the overage, and other details can be considered when determining whether an ACL overage necessitates implementation of an AM. However, it should be noted that the summer flounder conservation equivalency regulations require constraining harvest to a single-year RHL.

The Commission's Cobia FMP was referenced on the Committee and Board sub-group call as an example of setting measures for multiple years and modifying them only if there is a significant change in circumstances (e.g. stock status or fishery performance). Currently, the 2018-2020 cobia RHLs in the Commission's FMP are identical. States set recreational management measures with the goal of constraining average harvest over 2018-2020 to their individual RHL allocations. Single-year overages do not require changes to the management measures, as long as the three-year average harvest does not exceed the RHL allocation in a given state. Applicability of this type of management for summer flounder, scup, or black sea bass has not yet been considered in detail. However, it should be noted that the current summer flounder conservation equivalency regulations require constraining harvest in a single year to a single-year RHL. The FMP also requires that catch of all three species be constrained to the appropriate single-year ACL, thus, this approach could not currently be used if it results in a single-year ACL overage.

The Council's FMP currently allows for constant ABCs to be set for up to three years for summer flounder, scup, and black sea bass. This approach has not yet been used.

Table 3: Potential multi-year approaches to management of recreational summer flounder, scup, and black sea bass fisheries.

Already allowed under current FMPs:

- ABC averaging for constant ABCs over up to three years and thus the potential for constant ACLs, quotas, and RHLs for up to three years at a time.
- Evaluating fishery performance using multiple years of data
    - Under current practice, the average of the most recent three complete years of recreational catch is compared to the average ACLs in those years to determine if AMs are triggered for the recreational fishery.
    - Under current practice, when appropriate, the Monitoring and Technical Committees consider data on fishery performance in multiple past years when projecting recreational harvest in a given year when developing recommendations for recreational management measures for the following year.
    - Under current practice, when appropriate, the Monitoring and Technical Committees evaluate recreational data for extreme outliers and use multiple years of data to adjust these outlier estimates.

FMP and/or regulation changes required:

- Cobia approach - Under the Commission's Cobia ISFMP recreational measures are set such that average harvest over three years does not exceed the RHL, which is constant over three years. The RHL may be exceeded in a single year without requiring further action as long as the three-year average harvest does not exceed the RHL. Under current regulations, this would not be possible for summer flounder through conservation equivalency because harvest must be constrained to a single-year RHL. The FMP also requires that catch be constrained to a single-year ACL, thus, this approach could not currently be used if it results in a single-year ACL overage.

Appendix 1: Summer Flounder Conservation Equivalency Rollover Potential

Demersal Committee members requested information on how often the non-preferred coastwide and precautionary default measures for summer flounder conservation equivalency could have remained the same from year to year in recent history. This question is relevant to the issue of conservation equivalency rollover. If conservation equivalency rolled over from one year to the next, assuming fishery conditions and the upcoming year's RHL allowed for it, then the non-preferred coastwide and precautionary default measures would remain unchanged and federal waters measures would continue to be waived until additional action was taken to implement changes. This could result in administrative savings and allow staff to prioritize other projects because a recreational specifications package for summer flounder would not need to be developed annually.

Determining whether or not the non-preferred coastwide measures could justifiably stay the same from one year to the next is complicated, as multiple factors are taken into account when setting them (e.g. harvest and effort trends, changes in the RHL, and availability factors such as stock trends and year class strength). Non-preferred coastwide measures must be realistically expected to constrain harvest to the RHL if implemented on a coastwide basis.

Precautionary default measures are also determined annually but are less variable from year to year as they are not as closely tied to the RHL as the non-preferred coastwide measures. Precautionary default measures simply need to be restrictive enough to deter states from not adopting acceptable conservation equivalency measures through the Board's process.

Since 2012, the non-preferred coastwide measures have generally remained similar from year to year with minor to moderate changes in 2013, 2017, and 2018. The precautionary default measures remained the same from 2012-2016 and were made more restrictive for 2017 and 2018 (Table 4).

Table 4: Non-preferred coastwide and precautionary default measures under summer flounder conservation equivalency, 2012-2018.

Fishing year	**Non-preferred coastwide measures (changes from previous year in bold)**	**Precautionary default measures (changes from previous year in bold)**	**RHL (mil lb)**	**Reduction needed? (at time of Dec. meeting)**	**Notes**
2012	18 inches, 2 fish, May 1-September 30	20 inches, 2 fish, May 1-September 30	8.49	0%	
2013	18 inches, **4 fish**, May 1-September 30	20 inches, 2 fish, May 1-September 30	7.63	0%	
2014	18 inches, 4 fish, May 1-September 30	20 inches, 2 fish, May 1-September 30	7.01	0%	2014 start of regional management; Constant state measures 2014-2016 (except DE Bay)
2015	18 inches, 4 fish, May 1-September 30	20 inches, 2 fish, May 1-September 30	7.38	0%	
2016	18 inches, 4 fish, May 1-September 30	20 inches, 2 fish, May 1-September 30	5.42	0%	
2017	**19 inches**, 4 fish, **June 1-September 15**	20 inches, 2 fish, **July 1-August 31**	3.77	41%	Addendum XXVIII required 1-inch increase in size limits and reduced possession limits to achieve reduction
2018	19 inches, 4 fish, **May 15**-September 15	20 inches, 2 fish, July 1-August 31	4.42	0%	Collective 17% cap put on liberalization of state/regional measures

Appendix 2: Draft Timeline for Framework/Addendum Development and Implementation

Task Description	**Date** (all are subject to change)
Initiation	December 2017
FMAT call to develop initial draft alternatives	February 2018
Demersal Committee and Board sub-group call to discuss initial draft alternatives	March 2018
Council and Board approval of draft alternatives	April 2018
Development of draft ASMFC public hearing document	May – August 2018
AP meeting	June 2018
Monitoring Committee meeting	July 2018
Council and Board review of draft alternatives and impacts analysis; Board approval of public hearing document	August 2018
ASMFC public hearings	Fall 2018
Monitoring and Technical Committee meeting (if needed)	November 2018
AP meeting - recommendations for final action	November 2018
Demersal Committee and Board sub-group meeting - recommendations for final action	November or December 2018
Council and Board final action	December 2018 or February 2019
Finalization of framework and addendum documents; submission of EA to NMFS	Early 2019
EA revisions and resubmission to NMFS	Spring 2019
Proposed rule	Spring or summer 2019
Final rule	Summer or fall 2019

Appendix 3: Recreational Discard Estimation for Summer Flounder, Scup, and Black Sea Bass ACL Accounting

Recreational harvest estimates from MRIP include kept fish observed by MRIP samplers (referred to as catch type A) and fish that are kept, filleted, used as bait, or released dead, as reported by anglers but not observed by MRIP samplers (catch type B1). Harvest estimates (catch types A and B1) are provided both in numbers of fish and weight. Angler-reported harvest (catch type B1) in weight is estimated based on numbers of fish reported by anglers and weights recorded by MRIP samplers (the type A data). MRIP also provides estimates of live discards (catch type B2) in numbers of fish as reported by anglers (not observed by MRIP samplers). MRIP does not provide estimates of total catch (i.e. harvest plus live and dead discards) in weight.

Total dead catch (i.e. all harvest and dead discards) in weight is needed for evaluation of catch against the recreational ACL. This requires converting MRIP estimates of live discards in numbers of fish to dead discards in weight. The general methodology for this conversion is described below. The specific data inputs vary slightly by species.

First, estimated live discards in numbers of fish are combined with recreational discard length frequency data to calculate the numbers of discarded fish by length. Recreational discard length frequencies are derived from a number of sources including sub-legal lengths from MRIP landings sampling, MRIP sampling aboard party/charter boats, the American Littoral Society tagged fish database, special sampling of the New York and Massachusetts party/charter fleets, and volunteer angler surveys in Connecticut, New Jersey, Maryland, and Virginia. The weight of all discarded fish is then estimated by applying a length/weight relationship to the estimated discards by length.

Some of the fish released alive die from their injuries or from predation which would not have otherwise occurred (e.g. if the fish is disoriented or suffering from barotrauma after release). The assumed recreational discard mortality rate for a given species (10% for summer flounder, 15% for scup and black sea bass) is applied to the estimate of total live discards in weight to arrive at the estimate of total dead discards in weight.

Estimates of dead discards in weight for a given year typically cannot be calculated until at least halfway through the next year as data from most of the sources listed above are typically not available until June of the following year, at the earliest.

Annual recreational harvest estimates are available earlier in the year than discard estimates. Preliminary MRIP harvest estimates for the full year are typically available in February of the following year. Final estimates are typically available in April or later.

Recreational discards are more difficult to accurately estimate than recreational harvest. Self-reported angler data play a larger role in recreational discard estimates than harvest estimates. Self-reported data from private anglers are recorded after fishing has occurred; therefore, recall bias can be an issue. For example, anglers tend to report discarded fish in increments of five. This reduces the accuracy of the discard estimates. The number of fish that are released by private recreational anglers is not validated.

Discards make up significant proportions of total recreational catch for summer flounder, scup, and black sea bass. According to MRIP estimates, during 2007-2017, recreational live discards in numbers

of fish averaged 88% of total summer flounder recreational catch, 58% of total scup recreational catch, and 82% of total black sea bass recreational catch.

For both recreational discards and harvest, annual coastwide estimates for all modes are generally considered more accurate and precise than estimates for smaller regions and subsets of waves and modes.

Appendix 4: Utility of the Black Sea Bass 2016 Benchmark Stock Assessment in a Two-Region Management Approach

Council and Board members have questioned if information from the 2016 black sea bass benchmark stock assessment could be used to manage the northern region (north of Hudson Canyon) differently than the southern region (Hudson Canyon through Cape Hatteras), suggesting that this could help address concerns about differences in availability and size distribution between northern and southern states.

Council staff discussed the potential for the stock assessment to inform development of regional sub-unit catch advice and reference points with the lead stock assessment scientist. The information below is a summary that discussion.

The 2016 benchmark stock assessment model portioned the black sea bass stock north of Cape Hatteras, North Carolina into two sub-units (North and South with a separation at approximately Hudson Canyon) to account for the spatial differences in the data and fishery. The SAW/SARC peer review did not consider these sub-units to be separate stocks. They recommended that sub-unit fishing mortality and biomass model results be combined for the development of reference points and black sea bass catch specifications. In addition, it should be noted that a sub-committee of the SSC reviewed the Black Sea Bass Assessment Working Group's recommendation to spatially partition the black sea bass stock for developing spatial models. This sub-committee concluded the spatial separation at Hudson Canyon was appropriate for the purposes of modeling and parameter estimation; however, there was little biological justification for a split and the spilt did not support the development of two separate stocks.

Since both reviews indicated these sub-units do not represent unique stocks, the development of sub-unit reference points and targets to inform management is not supported by the best available science.

As such, the current stock assessment model should not be used to provide catch advice for the two sub-units. The assessment includes estimates of abundance and fishing mortality for each sub-unit. However, any regional management catch advice based on these sub-unit estimates would be uncertain and would require a number of significant caveats and assumptions be made for any possible consideration in their use. In addition, a number of allocation decisions beyond just the recreational sector would need to be considered and evaluated. For example, the current assessment is comprised of four fleets:

- North sub-unit recreational hook and line and commercial hook and line/pot
- South sub-unit recreational hook and line and commercial hook and line/pot
- North sub-unit offshore trawl
- South sub-unit offshore trawl

Each sector contributes to the total fishing mortality within a sub-unit and targets black sea bass at different times of the year with different selectivities. In addition, the offshore trawl fleet operates on a combination of north and south sub-unit fish. Therefore, allocation decisions would need to be developed across the sub-units and fleets in order to manage as two separate units.

A two-region management approach would increase the complexity of the model and the demands for finer spatial resolution of commercial catch (particularly from the offshore trawl fishery) going forward.

Retrospective patterns are present in both sub-units for multiple variables (F, SSB, total biomass) and are in the opposite direction (e.g. the North model under estimates SSB and the South model over estimates). The retrospective patterns generally canceled each other out when combined and resulted in little retrospective patterns for the total stock. These retrospective patterns, which are more pronounced in the South sub-unit, could pose significant issues when developing sub-unit catch advice.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

April 16, 2018

To: **Summer Flounder, Scup and Black Sea Bass Management Board**

From: **Caitlin Starks, FMP Coordinator**

RE: **Preliminary February 2018 Black Sea Bass Recreational Harvest Estimates**

In October 2017, the Council and Board approved a motion to allow a February 2018 black sea bass recreational fishery for interested states in federal waters. Anglers were limited to 15 fish per day at a minimum size of 12.5". The projected harvest assuming participation of all states was 100,000 pounds.

The two states that opted into the February fishery were Virginia and North Carolina. Based on wave 1 landings data from 1996-2000 and 2013 they were projected to harvest 5,496 pounds and 62 pounds, respectively. Preliminary harvest estimates from the two states indicate between 4,826 and 5,206 pounds of black sea bass were harvested by Virginia anglers, and zero pounds were harvested by North Carolina anglers. Descriptions of sampling and estimation methods for each state are provided below.

Virginia Sampling and Estimation

The Virginia Marine Resources Commission (VMRC) required mandatory reporting for all black sea bass harvested during the 2018 February season. All reports were due by March 15, 2018. A total of 2,540 black sea bass were reported as kept, including the for-hire fleet. VMRC staff sampled 75 fish from 4 private recreational trips. VMRC APAIS staff also rode on 4 of the 5 party boat trips that took place. Sampling from the private vessels showed an average weight of 1.7 pounds per fish. There were a total of 21 private anglers who reported a total of 33 trips. The 4 trips sampled may not be the best representation of all 33 trips. As an alternate approach to characterizing those trips, VMRC staff reviewed the MRIP average weight (for all modes) for waves 5 and 6 for 2017. The average weight was 1.7 pounds for wave 5 and 1.9 pounds for wave 6. Applying 1.9 pounds per fish for all modes for the February fishery, Virginia harvested 4,826 pounds.

The amount of sampling for party boats was extensive compared to the number of trips taken. However, only lengths were collected on sampled fish, not weights. Therefore VMRC staff used the 2015-2017 length-weight regression from data collected by the Northeast Fisheries Science Center (NEFSC) survey for the southern region for the length samples and calculated an average weight of 2.18 pounds for the party boat samples. Applying that to the number of fish kept by the party boats, and still using the 1.9 pounds per fish for the private mode, the total estimate goes up to 5,206 pounds harvested in February.

North Carolina Sampling and Estimation

North Carolina Division of Marine Fisheries staff intended to work with charter boat captains who target black sea bass north of Cape Hatteras to collect black sea bass carcasses for age and growth samples. However, no carcasses were collected due to very low fishing effort for black sea bass (only two known trips). MRIP staff reported zero intercepts with black sea bass north of Cape Hatteras in February. Weather conditions prevented many boats from going offshore out of Oregon Inlet, which played a role in little fishing effort during February.

Atlantic States Marine Fisheries Commission

Bluefish Management Board and Mid-Atlantic Fishery Management Council

April 30, 2018
3:15 – 4:45 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order *(M. Luisi/R. O'Reilly)*	3:15 p.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from February 2012	3:15 p.m.
3.	Public Comment	3:20 p.m.
4.	Consider Approval of Draft Scoping and Public Information Document for Allocation Amendment (*M. Seeley/C. Starks*) **Action** • Overview of Draft Scoping and Public Information Document	3:30 p.m.
5.	Other Business/Adjourn	4:45 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Bluefish Management Board and Mid-Atlantic Fishery Management Council Joint Meeting
April 30, 2018
3:15 – 4:45 p.m.
Arlington, Virginia

Chair: Mike Luisi (MD) Assumed Chairmanship: 1/14	Technical Committee Chair: Mike Celestino (NJ)	Law Enforcement Committee Representative: Rob Kersey (MD)
Vice Chair: Vacant	Advisory Panel Chair: Vacant	Previous Board Meeting: December 13, 2017
Voting Members: ME, NH, MA, RI, CT, NY, NJ, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (17)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2012

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Consider Approval of Scoping and Public Information Document for Allocation Amendment (3:30-4:45 p.m.) Action

Background

- In December 2017 the Board and Council initiated a joint Amendment to the Bluefish FMP to review and possibly revise commercial/recreational allocation of the resource, as well as the distribution of the commercial quota among the states.
- The Council's Fishery Management Action Team (FMAT) has developed a Draft Scoping and Public Information Document for Board review. **(Briefing Materials)**

Presentations

- Overview of Draft Scoping and Public Information Document by M. Seeley & C. Starks

Board actions for consideration at this meeting

- Consider Approval of Draft Scoping and Public Information Document

5. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

BLUEFISH MANAGEMENT BOARD

Crowne Plaza Hotel Old Town
Alexandria, Virginia
February 8, 2012

These minutes are draft and subject to approval by the Bluefish Management Board.
The Board will review the minutes during its next meeting.

TABLE OF CONTENTS

INDEX OF MOTIONS

ATTENDANCE

Board Members

Sen. Brian Langley, ME (LA)
Steve Train, ME (GA)
Terry Stockwell, ME, proxy for P. Keliher (AA)
Doug Grout, NH (AA)
Dennis Abbott, NH, proxy for Rep. Watters (LA)
G. Ritchie White, NH (GA)
William Adler, MA (GA)
Jocelyn Carey, MA, proxy for Rep. Peake (LA)
Mark Gibson, RI, proxy for B. Ballou (AA)
Rick Bellavance, RI, proxy for Rep. Martin (LA)
Bill McElroy, RI (GA)
David Simpson, CT (AA)
Rep. Craig Miner, CT (LA)
James Gilmore, NY (AA)
Brian Culhane, NY, proxy for Sen. Johnson (LA)
Pat Augustine, NY (GA)
Tom Fote, NJ (GA)
Peter Himchak, NJ, proxy for David Chanda (AA)
Adam Nowalsky, NJ, proxy for Asm. Albano (LA)
Bernie Pankowski, DE, proxy for Sen. Venables (LA)
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Tom O'Connell, MD DNR (AA)
Bill Goldsborough, MD (GA)
Russell Dize, MD, proxy for Sen. Colburn (LA)
Jack Travelstead, VA, proxy for S. Bowman (AA)
Louis Daniel, NC (AA)
Mike Johnson, NC, proxy for Rep. Wainwright (LA)
Robert Boyles, SC (LA)
John Frampton, SC (AA)
John Duren, GA (GA)
Pat Geer, GA, proxy for S. Woodward (LA)
Aaron Podey, FL (AA)
Jaime Geiger, USFWS
A.C. Carpenter, PRFC
Steve Meyers, NMFS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Staff

Vince O'Shea
Robert Beal
Mike Waine
Chris Vonderweidt
Mark Robson

Guests

David Pierce, MA DMF

The Bluefish Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel, Alexandria, Virginia, February 8, 2012, and was called to order at 8:30 o'clock a.m. by Chairman Jack Travelstead.

CALL TO ORDER

CHAIRMAN JACK TRAVELSTEAD: Good morning, everyone. This is the Bluefish Management Board. We have a relatively short agenda today. Are there any additions or changes to the agenda from the board members? Seeing none, the agenda stands.

APPROVAL OF PROCEEDINGS

CHAIRMAN TRAVELSTEAD: You have seen the proceedings from the February 2010 board meeting. Are there any changes to those minutes? Seeing none, they're approved.

PUBLIC COMMENT

CHAIRMAN TRAVELSTEAD: Is there any member of the public that wishes to make comment at this time on any item that is not on today's agenda? Okay, moving right along, Draft Amendment 1 for final approval. Mike, you're going to take us through the document?

REVIEW OF DRAFT AMENDMENT 1 FOR FINAL APPROVAL

MR. MICHAEL WAINE: Staff first brought this draft addendum to the joint board meeting at the Mid-Atlantic Fishery Management Council Meeting in August of 2011. The board approved the document for public comment at that time. I will review the document right now. The SARC approved an age-structured assessment program in 2005, and in 2009 the bluefish stock was declared rebuilt.

However, the peer review stated that results should be used with caution because of assessment uncertainties. More specifically, there was aging difficulty in the assessment. Scales were used for the early part of the time series and otoliths for the latter part. SARC was concerned about discrepancies between scale and otolith ages and the general difficulties of aging bluefish.

The assessment was further hampered by gaps in age-length keys resulting from a lack of samples from certain age and size classes. These gaps were filled by pooling samples across years, which increased uncertainty. Also, age samples were graphically limited coming from only Virginia and North Carolina.

This figure shows the length frequency of the fishery in the dashed line and the age samples collected in the solid line for 2004. You can see that there are gaps in the age samples from several length classes, particularly for larger fish. In response to the SARC recommendations for the bluefish assessment, the 2011 Action Plan included a task to work with states on developing a cooperative program to collect otoliths to improve the age data for assessments for several species, including bluefish.

Additionally, under this task the Bluefish Aging Workshop was conducted in May of 2011 to assess the need for bluefish monitoring and ensure the optimal and consistent sampling methods be established coastwide. The recommendations from the SARC and the Bluefish Aging Workshop are the premise for the development of the addendum to review the sampling protocols.

Out of that aging workshop the technical committee, with the help of the Quantitative Ecology Lab at Old Dominion University, established a protocol to age bluefish using otoliths and also established that Massachusetts, New Jersey, North Carolina, Florida, NEAMAP and SEAMAP all have aging capability currently set up.

A final result of that workshop was a recommendation for a coast-wide sampling program to determine the optimal sample size for a coast-wide age-length key and test the feasibility of state-level sampling. The addendum has two options. The first is status quo, sampling is not part of state compliance.

The second option is that sampling is part of state compliance, and that states that account for 5 percent of the coast-wide bluefish landings from '98 to 2008 would be required to collect a hundred bluefish ages. That would be fifty from the first half of the year and fifty from the second half. The states are Massachusetts, Rhode Island, Connecticut, New York, New Jersey,

North Carolina and Virginia that currently does all the sampling for bluefish itself.

The idea here is to cover the full range of bluefish sizes and that states may help each other with the aging as this would be new for some states and would be getting stuff set up and off and running. After the first year, the TC will review the sampling design to assess and make any changes at that point; and then ten was for an implement date of this season in 2012. I'll move into the public comment summary, which is pretty lengthy. We received on public comments on this document. That concludes my presentation. Thank you, Mr. Chairman.

CHAIRMAN TRAVELSTEAD: That set some kind of record, I guess. I don't know what you did; you scared them off. Comments on the addendum; questions of Mike? David.

DR. DAVID PIERCE: Regarding the sampling design, the technical committee will review the sampling design after we collect the samples in 2012, so is there any guidance beforehand regarding what the sampling design should be?

MR. WAINE: Yes, it's actually detailed in the addendum that the states will collect 50 ages from the first half of the year and fifty ages from the second half of the year. The intent is to collect ages from the widest lengths of bluefish possible so that we can fill in gaps in the age-length key.

DR. PIERCE: Okay, I didn't realize that was called the sampling design. The TC will review the sampling design; that means that the TC will see if the states collected fifty in one part of the year and fifty in another part of the year; it's just simple as that, right? Okay, I get it.

CHAIRMAN TRAVELSTEAD: Other questions or comments? Okay, I guess we're ready for a motion. Pat.

MR. PATRICK AUGUSTINE**: Mr. Chairman, I move that we approve sending this Draft Addendum I to Amendment 2 to the Bluefish Plan out to the public**.

CHAIRMAN TRAVELSTEAD: We're beyond that.

MR. AUGUSTINE: I'm sorry, that we approve the document as presented.

CHAIRMAN TRAVELSTEAD: Let me suggest something. **We're looking for a motion to approve the addendum and I would suggest that you approve Option 2 in the addendum on Page 5 and that you include an effective date of March 1, 2012,** so that we can start collecting these samples as soon as possible.

MR. AUGUSTINE: Thank you, Mr. Chairman. Joe, did you get all that?

CHAIRMAN TRAVELSTEAD: Is there a second to that motion; David, thank you. Comments on the motion? Do we need to caucus before we vote? The motion is move to approve Option 2 with an effective date of March 1, 2012. I would just suggest a slight change to that to say move to approve the addendum with Option 2 just so it's clear we're approving the entire document. Any objection to that? Seeing none, is there any objection to the motion**? The motion carries and the addendum is approved.**

We're moving to Item 5, elect a vice-chair. I'm informed we already have a vice-chair, A.C. Carpenter. This is my last meeting as Chair so, A.C., you'll be taking over as Chair at the next meeting and we'll put that back on the agenda for the next meeting to find a new vice-chair. Is there any other business? Pete.

MR. PETER HIMCHAK: Mr. Chairman, I'm not committing to anything, but perhaps New York and New Jersey can work out some kind of a sharing arrangement whereby we may be able to process and age bluefish samples should they be able to take over the monitoring of our research set-aside quota.

CHAIRMAN TRAVELSTEAD: All right, good luck.

MR. JAMES GILMORE: We would be very interested in pursuing that; and, Pete, if we don't get enough fish, it was my masters thesis and I still have some otoliths in the basement.

ADJOURNMENT

CHAIRMAN TRAVELSTEAD: Is there a motion to adjourn? We're adjourned; thank you.

(Whereupon, the meeting was adjourned at 8:41 o'clock a.m., February 8, 2012.)

Bluefish Allocation Amendment
Draft Action Plan

(Updated as of February 2018 and subject to change)

Amendment Goal

The goal of this amendment is to review and possibly revise the allocation between the commercial and recreational fisheries and the commercial allocations to the states. This action may be needed to avoid overages, achieve optimum yield, prevent overfishing, and reduce the need for quota transfers off the U.S. east coast.

Fishery Management Action Team

The Council will form a team of technical experts, known as a Fishery Management Action Team (FMAT) to develop and analyze management alternatives for this amendment. The FMAT is led by Council staff and includes management partners from the National Marine Fisheries Service (NMFS) Greater Atlantic Regional Fisheries Office (GARFO), the Northeast Fisheries Science Center (NEFSC), the New England Fishery Management Council (NEFMC), the Southeast Fishery Management Council (SAFMC), and the Atlantic States Marine Fisheries Commission (ASMFC). The FMAT will work with other experts to address specific issues, as needed.

FMAT Membership

Name	Role/Expertise	Agency
Matthew Seeley	FMAT Chair	MAFMC
Danielle Palmer	Protected Resources	NMFS GARFO
David Stevenson	Habitat Conservation	NMFS GARFO
Cynthia Hanson	Sustainable Fisheries	NMFS GARFO
Sarah Gurtman	NEPA	NMFS GARFO
Tony Wood	Population Dynamics	NEFSC
Trish Clay	Social Sciences	NEFSC
Caitlin Starks	Plan Coordinator	ASMFC
Mike Celestino	Bluefish Technical Committee	NJDFW

Applicable Laws

Magnuson-Stevens Act	Yes
National Environmental Policy Act	Yes – will require an Environmental Assessment or Environmental Impact Statement
Administrative Procedure Act	Yes
Regulatory Flexibility Act	Yes
Paperwork Reduction Act	Possibly; depends on data collection needs
Coastal Zone Management Act	Possibly; depends on effects of the action on the resources of the coastal states in the management unit
Endangered Species Act	Possibly; level of consultation will depend on the actions taken
E.O. 12866 (Regulatory Planning and Review)	Yes
E.O. 12630 (Takings)	Possibly; legal review will confirm
E.O. 13123 (Federalism)	Possibly; legal review will confirm
Essential Fish Habitat	Possibly
Social Impact Analysis	Possibly
Information Quality Act	Yes

Expected Document

Acronym	NEPA Analysis	Requirements
EA	Environmental Assessment	NEPA applies, no scoping required, public hearings required under MSA
EIS	**Environmental Impact Statement**	**NEPA applies, scoping required, public hearings required**

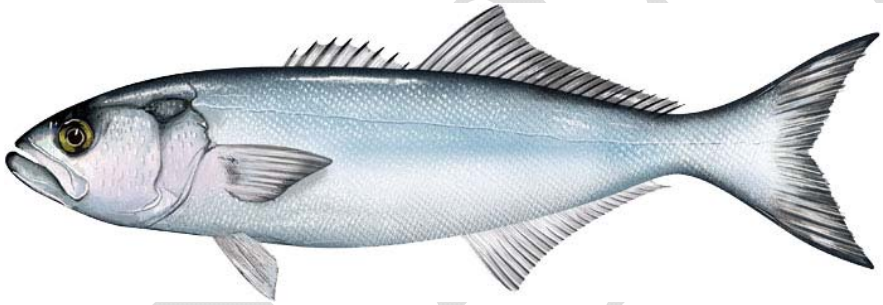
Draft Timeline for Amendment Development and Implementation

Task Description	Date (all are subject to change)
Initiation and request of FMAT participants	December 2017
Formation of FMAT	January 2018
Initial FMAT discussion	March 2018
Council (or ASMFC) meeting - review scoping plan and document	April 2018 (May 2018)
Scoping hearings/scoping comment period	June-July 2018
Advisory Panel (AP) meeting - review amendment goals and objectives, FMAT recommendations, develop recommendations for alternatives; any amendment issues?	June or 2018
Council meeting - review scoping comments and FMAT, AP, and MC recommendations; discuss management alternatives	August 2018
FMAT Meeting – review comments and develop recommendations for alternatives	September 2018
Demersal Committee Meeting - review comments and develop recommendations for alternatives	November 2018
Council meeting - approve range of alternatives for public hearings	February 2019
FMAT Meeting	February/March 2019
Public hearing document and EIS - draft approval	April 2019
Public hearings	Spring-Summer 2019
AP meeting - recommendations for final action	Summer 2019
MC meeting - recommendations for final action	Summer 2019
Council meeting - final action	Fall 2019
Submission of draft EA/EIS to GARFO	Fall 2019
Draft EA/EIS revisions and resubmission	Winter 2020
Rulemaking (proposed rule)	Spring 2020
Rulemaking (final rule)	Summer 2020

DRAFT SCOPING AND PUBLIC INFORMATION DOCUMENT

BLUEFISH ALLOCATION AMENDMENT TO THE BLUEFISH MANAGEMENT PLAN

April 2018



Prepared by the
Mid-Atlantic Fishery Management Council (MAFMC or Council)
and the
Atlantic States Marine Fisheries Commission (ASMFC or Commission)

Public Comment Opportunities and Instructions

In December 2017, the Mid-Atlantic Fishery Management Council (Council) initiated the development of an amendment to the Bluefish Fishery Management Plan (FMP). In April/May 2018, the Council and the Atlantic States Marine Fisheries Commission (Commission)'s Bluefish Board jointly approved this public scoping document to solicit information during the public scoping process. The amendment process will involve a review and potential update of the FMP's sector based allocations, commercial allocations to the states, transfer processes, and goals & objectives. This scoping document presents background on bluefish management, the amendment process and timeline, and issues that may be addressed in the amendment.

The public is encouraged to submit comments regarding the range of potential issues to be addressed in the amendment. In addition to providing comments at any of the scheduled scoping hearings listed below, you may submit written comments by **11:59 p.m., Eastern Standard Time, on Day, Date** per the notice of intent and notice of public scoping, as published in the Federal Register.

Written comments may be sent by any of the following methods:

1. **Online** at http://www.mafmc.org/actions/bluefish-allocation-amendment
2. **Email** to the following address: mseeley@mafmc.org
3. **Mail or Fax** to either:

Chris Moore, Ph.D., Executive Director	Bob Beal, Executive Director
Mid-Atlantic Fishery Management Council	Atlantic States Marine Fisheries Commission
North State Street, Suite 201	1050 North Highland Street, Suite 200A-N
Dover, DE 19901	Arlington, VA 22201
FAX: 302.674.5399	FAX: 703.842.0741

Please include "Bluefish Allocation Amendment Scoping Comments" in the subject line if using email or fax or on the outside of the envelope if submitting written comments.

All comments, regardless of submission method, will be compiled in one document for review and consideration by both the Council and Commission. Please do not send separate comments or the same comments by multiple submission methods to the Council and Commission.

The public will be notified via the Federal Register of additional opportunities to comment later in the process, however, **this is the first and best opportunity for members of the public to raise concerns related to the scope of issues that will be considered in the amendment.**

For information and updates, please visit: http://www.mafmc.org/actions/bluefish-allocation-amendment. If you have any questions, please contact either:

Matthew Seeley, FMP Coordinator	Caitlin Starks, FMP Coordinator
Mid-Atlantic Fishery Management Council	Atlantic States Marine Fisheries Commission
mseeley@mafmc.org	cstarks@asmfc.org
(302) 526-5262	(703) 842-0717

Public scoping hearings will be held on the following dates:

Date and Time	Location
TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD
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TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD
TBD	Webinar

Draft Timeline for Completion of Proposed Bluefish Allocation Amendment:

December 2017	Council initiates amendment
February-May 2018	Draft action plan developed; Fishery Management Action Team (FMAT) formed; Council's Demersal Committee meets to discuss scoping process
April-May 2018	Joint Council and Commission draft scoping document developed; Council and Commission review and approve draft document for public comment
Summer 2018	**Scoping hearings and public comment period**
Fall 2018	Council and Commission identify priority issues for inclusion in the amendment; Issue-specific working groups established; FMAT and working group meetings; FMAT beings development of options
Spring/Summer 2019	FMAT continues development of options (with working group input); meetings of the FMAT, working groups, Council and Commission, and Advisory Panel
Fall 2019/Spring 2020	Council and Commission review FMAT and working group recommendations for options; Draft Environmental Impact Statement (DEIS) development begins
Spring 2020	Range of options refined and approved; DEIS development continues
Summer 2020	DEIS finalized; Council and Commission select preferred options; public hearings
Fall/Winter 2020	Council and Commission consider public comments; final action; rulemaking and comment periods (5-7 months)

Current Step →

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Introduction

The bluefish fishery is managed cooperatively by the Council and NOAA Fisheries in Federal waters (3-200 miles) and the Commission in state waters (0-3 miles). The management unit for bluefish in US waters is the western Atlantic Ocean from the east coast of Florida northward to the US-Canadian border.

The Council and Commission are seeking public input for the development of a "Bluefish Amendment" to the Bluefish Fishery Management Plan (FMP). This amendment will review and potentially revise allocations between the commercial and recreational fisheries, the commercial allocations to the states, the goals and objectives, and the transfer processes.

This action was identified as a priority in the Council's 2017 Implementation Plan (http://www.mafmc.org/strategic-plan/), and the Council is now seeking public input to inform development of an amendment. The Council and Commission would like your comments on the range of issues and information that should be considered, including comments related to allocations as well as any other issues that might be of concern to you regarding management of the bluefish fishery.

Why is this action being proposed?

The Council and Commission have proposed this action in order to:

1) Perform a comprehensive review of the bluefish sector allocations, commercial allocations to the states, and transfer processes within the Bluefish FMP
2) Update the FMP goals and objectives for bluefish management

Several issues and concerns relative to bluefish management were raised by Council and Commission members, advisors, and other interested stakeholders in recent years. Many of these concerns are related to the catch histories that current allocations are based on. Amendment 1 to the Bluefish FMP was published in 1998 to set sector and state allocations. These allocations were developed using catch data from 1981-1989 (the years prior to regulations that may have affected both recreational and commercial landings) and are still the basis for the current bluefish allocations. Stakeholders would like to see allocations reviewed using more recent catch histories.

In addition, the Council and Commission have proposed this action to evaluate the need for management response to changing conditions in the bluefish fishery. This includes addressing apparent shifts in bluefish distribution (potentially related to the effects of climate change), as well as possible changes to social and economic drivers for these fisheries. This action was also proposed so that the FMP goals, objectives, and management strategies can be assessed in light of possible changing fishery conditions.

Issues for consideration

The amendment is likely to consider a variety of approaches for reviewing bluefish allocations. These could include (a combination of), *but would not be limited to*:

- Analyses of recent catch histories
- Analyses of overages/underages in recent history
- Recent trends in sector-based or state transfers
- Shifts in temporal and spatial distributions

A draft Environmental Impact Statement (DEIS) will be developed for public comment and used by the Council to evaluate any proposed measures. The Council will consider the biological and socio-economic impacts of any management measure before making a final decision.

Amendment Process and Timeline

The Council and Commission will first gather information during the scoping period. The scoping process is the first and best opportunity for members of the public to raise concerns related to the scope of issues that will be considered in the bluefish allocation amendment. The Council and Commission need your input both to identify management issues and to develop effective alternatives. Your comments early in the amendment development process will help us address issues of public concern in a thorough and appropriate manner.

Following the initial phase of information gathering and public comment, the Council and Commission will evaluate potential management alternatives and the impacts of those alternatives. The Council and Commission will then develop a draft amendment, incorporating the identified management alternatives, for public review.

As required by the National Environmental Policy Act (NEPA), the Council will develop an environmental analysis document to evaluate the impacts of the management measures considered. This can be either an environmental assessment (EA) or environmental impact statement (EIS), depending on the results of the scoping process. The public will have several opportunities to review and comment on any environmental analysis document that is prepared as part of the bluefish allocation amendment process.

This is the public's opportunity to inform the Council and Commission about changes observed in the fishery, actions the public feels should or should not be taken in terms of management, regulation, enforcement, research, development, enhancement, and any other concerns the public has about the resource or the fishery. The measures outlined in this document are not a list of "preferred alternatives" or measures that the Council and Commission will necessarily include in the amendment. No management measures have yet been analyzed for their effectiveness or impacts. **Please comment on any bluefish management measures or strategies you think may or may not be useful or practical and explain your rationale. Please also comment on any other issues that should be addressed in the amendment.** The list of relevant issues may be expanded as suggestions are offered during the scoping process.

A tentative schedule for the completion of the amendment is included at the beginning of this document. Please note that this timeline is subject to change.

Background on Bluefish Management

The Council and Commission implemented the first Bluefish FMP in 1990. Since then, six amendments and one framework have been developed and approved for the Bluefish FMP, all of which made changes to bluefish management measures. These documents can be found here: http://www.mafmc.org/bluefish/.

Amendment 1 (1999) introduced the updated allocations to the recreational and commercial fisheries as 87% and 13%, respectively. This amendment also implemented the state-by-state commercial allocations from Maine to Florida (FL east coast) using catch histories from 1981-1989. States manage their own commercial quotas and are subject to accountability measures if they exceed their individual quota. Additionally, Amendment 1 allows for a transfer of up to 10.5 million pounds of quota from the recreational to the commercial fishery as long as the recreational sector is not projected to take their share of the quota.

To further allow for the successful utilization of state quotas, Amendment 1 allows for quota to be transferred between two or more states under mutual agreement and with the approval of the NMFS Regional Administrator. The ability to transfer or combine quota allows states the flexibility to respond to variations in the resource, short term emergency situations, or other factors affecting the distribution of catch. The transferring of quota does not affect the share of quota each state receives annually.

Approved quota transfers are published in the Federal Register. To allow for these in-season adjustments, commercial state landings for bluefish are monitored by the states and NOAA via the Dealer Electronic Reporting to the Standard Atlantic Fisheries Information System (SAFIS), as well as state agencies.

Description of the Bluefish Resource

Status of the Stock

The bluefish benchmark stock assessment was peer reviewed in June 2015 and approved for use by management at the 60th Stock Assessment Workshop/Stock Assessment Review Committee.

Results from the most recent benchmark stock assessment indicate that the bluefish stock is not overfished and overfishing was not occurring in 2014 relative to the biological reference points from the 2015 SAW/SARC 60. Modeling results indicated that the estimated spawning stock biomass (SSB) was 190.77 million pounds (86,534 mt) in 2014 (85 percent of the accepted reference point SSB_{MSY} proxy = $SSB_{35\%SPR}$ = 223.42 million pounds or 101,343 mt, which was updated by the SSC from $F_{40\%SPR}$ =0.17 in 2015). SSB declined since the beginning of the time series, from a high of 340.90 million pounds (154,633 mt) in 1985 to a low of 116.34 million pounds (52,774 mt) in 1997, before increasing again (Figure 1). The stock spawning biomass average for the 1985-2014 time series is 175.15 million pounds (79,449 mt). Fully-selected fishing mortality in 2014 was estimated to be 0.157, below the F threshold ($F_{MSY\ proxy}$ = $F_{35\%SPR}$ = 0.19). Fully selected F peaked in 1987 at 0.477 and then declined gradually since then, with a time series average of 0.284 (Figure 2.).

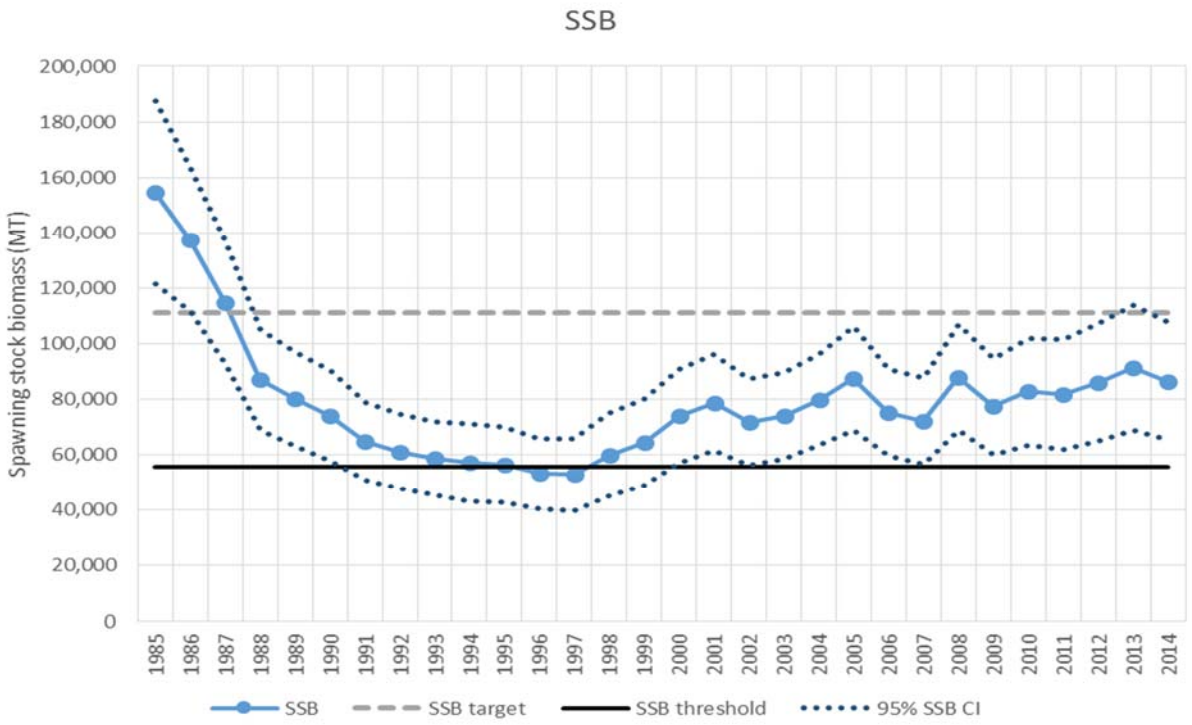

Figure 1. Fully selected spawning stock biomass of bluefish plotted with thresholds and 95% confidence intervals identified in SAW 60.

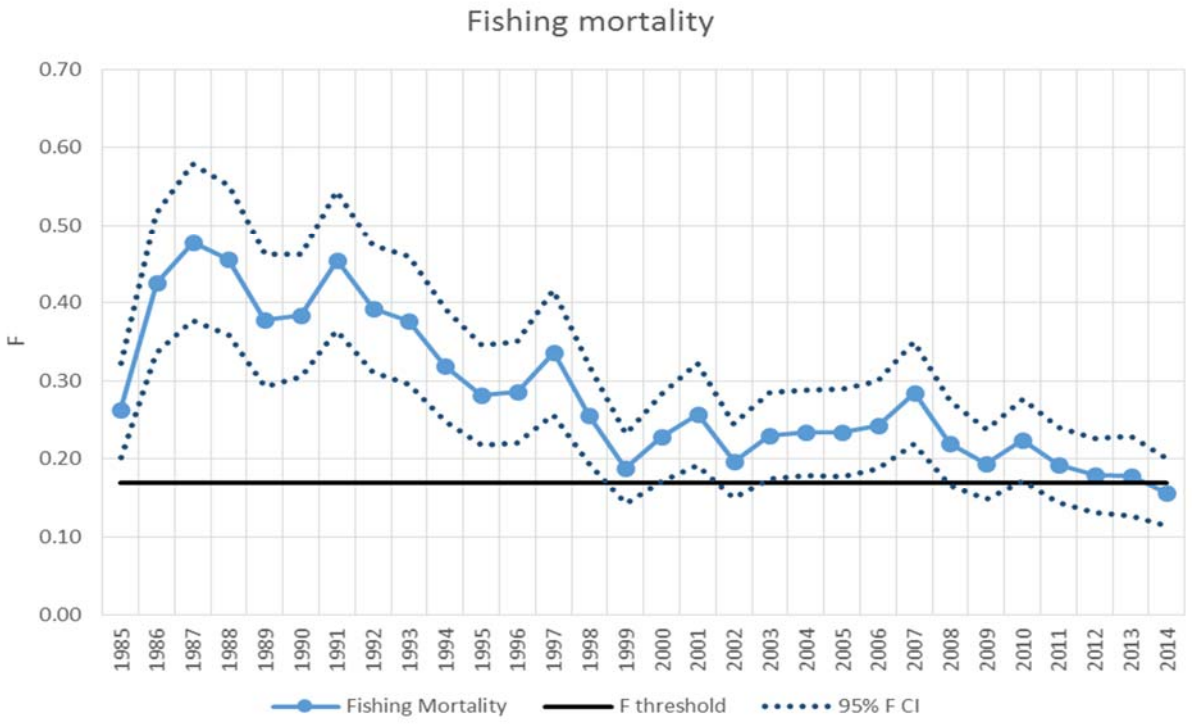

Figure 2. Fully selected fishing mortality of bluefish plotted with thresholds and 95% confidence intervals identified in SAW 60. The F threshold ($F_{MSY\ PROXY} = F_{35\%SPR}$ =0.19) was changed by the MAFMC SSC from $F_{40\%SPR}$ =0.17.

Biology and Stock Definition

Bluefish are found worldwide in tropical and subtropical waters, but in the western North Atlantic range from Nova Scotia and Bermuda to Argentina. The Council and Commission FMP for bluefish defines the management unit as all bluefish from the east coast of Florida northeast to the US-Canada border. Bluefish travel in schools of like-sized individuals and undertake seasonal migrations, moving into the Middle Atlantic Bight (MAB) during spring and then south or farther offshore during fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Juvenile stages have been recorded in all estuaries within the MAB, but eggs and larvae occur in oceanic waters (Able and Fahay 1998). Growth rates are fast, and they may reach a length of 3.5 ft and a weight of 27 pounds (Bigelow and Schroeder 1953). Bluefish live to age 12 and greater (Salerno et al. 2001).

Bluefish eat a wide variety of prey items. The species has been described by Bigelow and Schroeder (1953) as “perhaps the most ferocious and bloodthirsty fish in the sea, leaving in its wake a trail of dead and mangled mackerel, menhaden, herring, alewives, and other species on which it preys."

Bluefish born in a given year (young of the year) typically fall into two distinct size classes suggesting that there are two spawning events along the east coast. Literature supports the existence of a small third spawn in the fall as well (Juanes et al. 2013). As a result of the bimodal size distribution, young are referred to as spring-spawned or summer-spawned. In the MAB, spring-spawned bluefish appear to be the dominant component of the stock.

Description of the Fishery

Recreational Fishery

All recreational data presented in this document for 2017 are listed as preliminary. Recreational data is now collected and reported through the Marine Recreational Information Program (MRIP). Prior to MRIP was the Marine Recreational Fisheries Statistics Survey (MRFSS), which ran for two decades until 2006. Data collection and reporting transitioned from MRFSS to MRIP due to increasing demand for better precision, accuracy, timeliness, and coverage. The majority of data collection occurred through a telephone survey that used a random-digit dialing method to target households in coastal counties. Over time, this method has become less effective as more people are abandoning landlines for cell phones. Now, MRIP is transitioning to a mail survey design that utilizes the National Saltwater Angler Registry. New survey designs may produce very different results than those from older surveys. Preliminary MRIP calibration work suggests all effort estimations will increase ~3-5 times. This increase has the potential to drastically alter bluefish catch/landings/effort data for the shore and private angler modes. No change will occur for party/charter as vessel operators either submit VTRs or report through a separate telephone survey.

The current recreational bluefish allocation is 83% of the overall annual catch limit (ACL), resulting in a 2018 post-sector transfer recreational harvest limit of 11.58 million pounds. Bluefish are targeted as a recreational fishery from Maine to Florida. The Council has management jurisdiction in federal waters and the Commission within state waters.

A coastwide time series of recreational harvest and catch in numbers of fish is provided in Figure 3. To calculate landings in pounds, the average weight of a harvested bluefish (2016 - 2.22

pounds) can be multiplied by the number of fish harvested. Additionally, a recent time series (2013-2017) of landings by state is provided in Table 1.

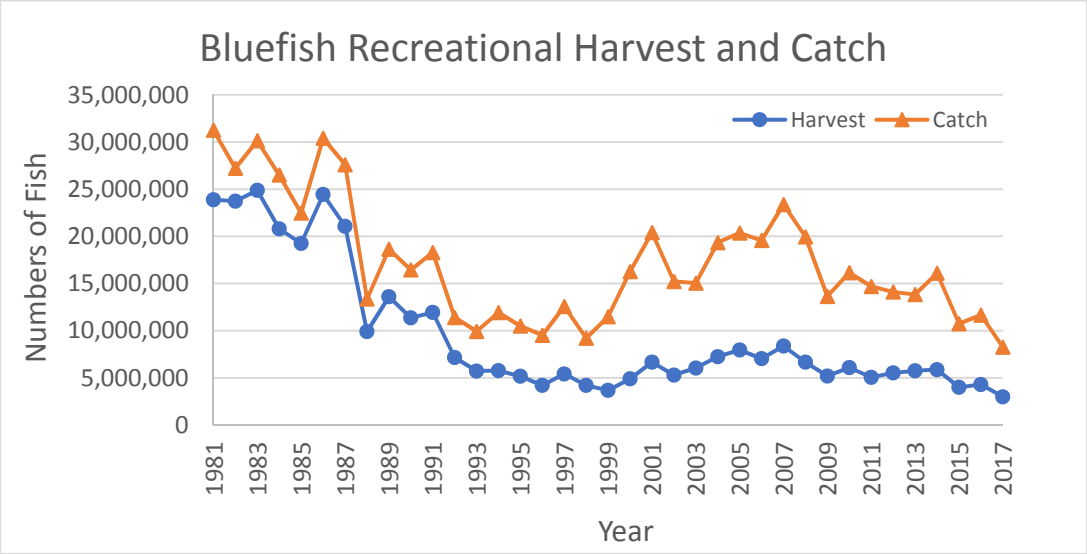

Figure 3. Bluefish recreational harvest and catch spanning ME to FL (east coast) from 1981-2017.

In 2017, the greatest harvest (retained catch) of bluefish by weight occurred in New Jersey with 3.33 million pounds, followed by Florida (1.38 million pounds), New York (1.06 million pounds), and Delaware (831,000 pounds). According to MRIP, only 27 and 0 bluefish were caught in Maine and New Hampshire, respectively. Average weights, based on dividing MRIP landings in weight by landings in number for each state, suggest that bluefish size tends to increase toward the north along the Atlantic coast. Discards in the recreational fishery remain relatively high throughout the time series (Figure 4).

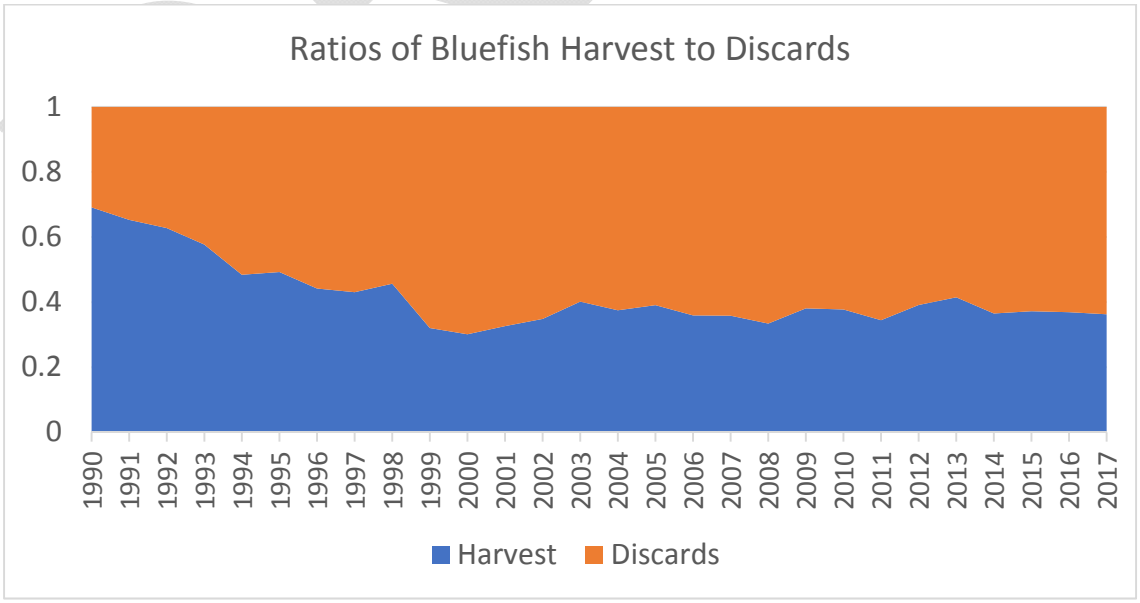

Figure 4. Ratio of bluefish harvest (A+B1) to discards (based on numbers of fish); 2017 estimate is preliminary.

Table 1. Bluefish recreational landings (pounds) by state from 2013-2017.

State	2013	2014	2015	2016	2017
Maine	62,654	636	3,780	57	27
New Hampshire	0	5,310	24,942	16	0
Massachusetts	2,562,308	1,968,114	1,837,308	697,834	537,297
Rhode Island	1,431,880	347,030	338,087	421,797	362,589
Connecticut	4,281,939	1,018,115	2,650,562	966,241	594,817
New York	4,266,712	1,877,864	2,095,307	2,025,744	1,055,014
New Jersey	1,877,196	3,002,699	2,566,738	3,493,997	3,333,175
Delaware	26,760	121,972	84,781	93,402	830,999
Maryland	63,249	227,618	147,595	157,161	223,604
Virginia	273,735	83,104	147,363	156,836	31,207
North Carolina	988,664	966,004	868,868	855,631	700,724
South Carolina	109,218	104,495	140,155	145,961	83,816
Georgia	3,646	12,261	3,717	2,880	1,227
Florida	516,404	720,464	764,037	520,365	1,377,636
Grand Total	**16,464,365**	**10,455,686**	**11,673,240**	**9,537,922**	**9,132,132**

Figure 5 reflects MRFSS/MRIP-based estimates of landings by mode (1991 through 2017) and indicates that the primary landing modes for bluefish are private boats followed by the for-hire mode. About 53 percent of the landings of bluefish on a coastwide basis came from private/rental boats, followed by for-hire boats (25 percent) for the 1991 to 2016 period. Shore mode contributes about 22 percent of the total landings. For the last six years (2012-2017), 40 percent of the total bluefish landings came from private/rental boats, 37 percent from shore mode, and 23 percent from for-hire boats.

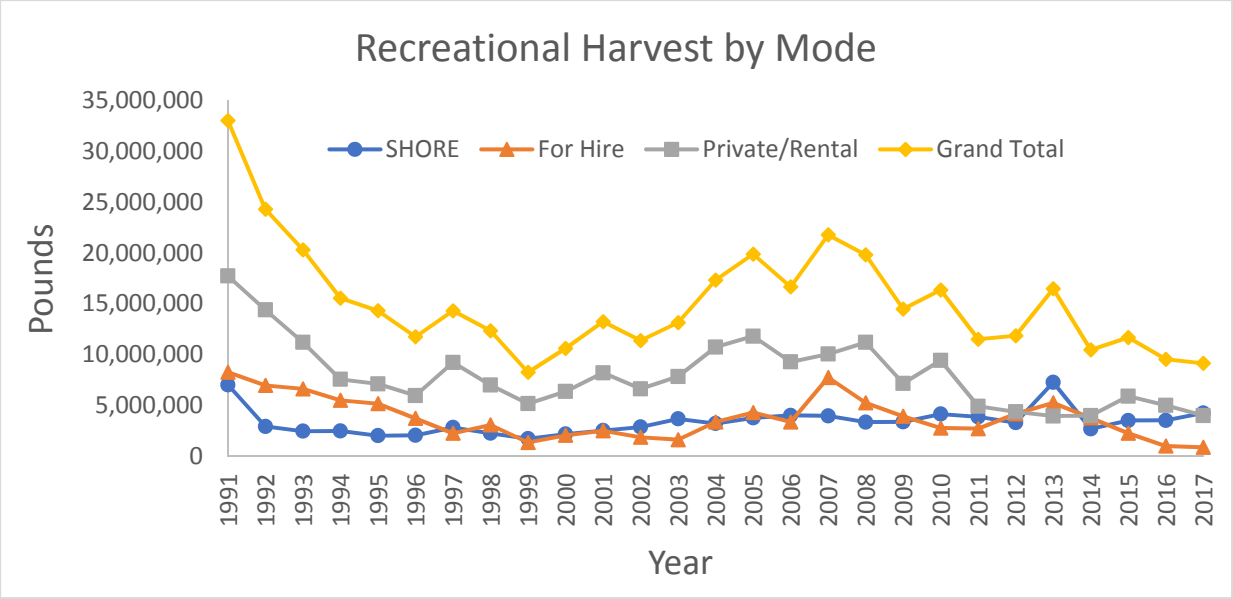

Figure 5. Bluefish landings (pounds) by recreational fishermen by mode, Atlantic Coast, 1991-2017.

Trends in recreational trips associated with targeting or harvesting bluefish from 1991 to 2017 have been slowly declining since 2007. The lowest annual estimate of bluefish trips was 1.61 million trips in 2017, a decrease from 2.17 million trips in 2016. The highest annual estimate of bluefish trips in this timeframe was 5.95 million trips in 1991. For the last five years (2013-2017), bluefish trips have ranged from 1.61 million trips in 2017 to 2.40 million trips in 2014. Number of trips is further broken down by state (last five years) in Table 2. Relative to total angler effort in 2017, bluefish were either the primary target and/or harvested in 5.7 percent of all recreational angler trips.

Table 2. Number of recreational trips by state from 2013-2017 where bluefish were the primary target and/or where bluefish were harvested regardless of target.

	2013	**2014**	**2015**	**2016**	**2017**
Maine	10,493	4,157	2,846	4,058	212
New Hampshire	6,761	1,026	3,777	3,004	98
Massachusetts	288,852	493,501	185,421	167,855	106,786
Rhode Island	105,070	121,231	57,285	44,275	42,855
Connecticut	193,270	238,880	191,390	209,317	191,189
New York	468,625	541,966	406,297	651,045	291,135
New Jersey	248,338	429,928	336,354	442,673	497,680
Delaware	21,197	51,989	25,783	53,948	68,176
Maryland	6,053	44,392	26,596	33,938	24,014
Virginia	59,201	36,136	44,952	69,583	10,191
North Carolina	275,868	272,732	226,333	356,635	245,656
South Carolina	35,758	34,879	89,359	46,614	35,019
Georgia	98	4,670	1,813	1,390	2,970
Florida	91,505	126,334	121,220	82,640	96,983
Total	**1,811,089**	**2,401,821**	**1,719,426**	**2,166,975**	**1,612,964**

MRIP classifies catch into three fishing areas, inland, nearshore ocean (< 3 mi), and offshore ocean (> 3 mi). About 51 percent of the harvest of bluefish on a coastwide basis came from inland waters, followed by nearshore ocean (33 percent) for the 1991 to 2017 period. Therefore, 84% of harvest is within state waters. Only about 16% of the total harvest occur offshore. For the last six years (2012-2017), 58% of the total bluefish harvest came from inland waters, 9% from offshore ocean, and nearshore ocean was 33 % of the total. These results are grouped by state or federal waters to present where the majority of the harvest is taking place.

Commercial Fishery

The presented data is representative of recent fishery performance (2012-2016, 2013-2017, or 2017) depending on data availability.

The current commercial bluefish allocation is 17% of the overall ACL, resulting in a 2018 commercial quota of 7.24 million pounds (Figure 6). Current state allocations were partitioned using catch histories from 1981 to 1989, as that period represents the years prior to the regulations that may have affected both recreational and commercial landings. Quotas were distributed to the states based on their percentage share of commercial landings during that period. The current commercial allocations to the states are presented in Table 3. State quota allocations have generally kept the proportion of total landings among states stable over time, though state-specific landings vary (e.g., Table 3).

Dealer data for 2017 indicate that the bulk of the bluefish landings were taken by gillnet (47 percent), followed by unknown gear (29 percent), handline (7 percent), bottom trawl (10 percent), and pound net (3 percent).

VTR data were used to identify all NMFS statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch. Seven statistical areas accounted for approximately 78 percent of the VTR-reported catch from 2013-2017. Statistical area 612 was responsible for the highest percentage of the catch. These seven statistical areas have accounted for the majority of bluefish commercial landings since the mid-1990s. A map of the statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch is shown in Figure 7.

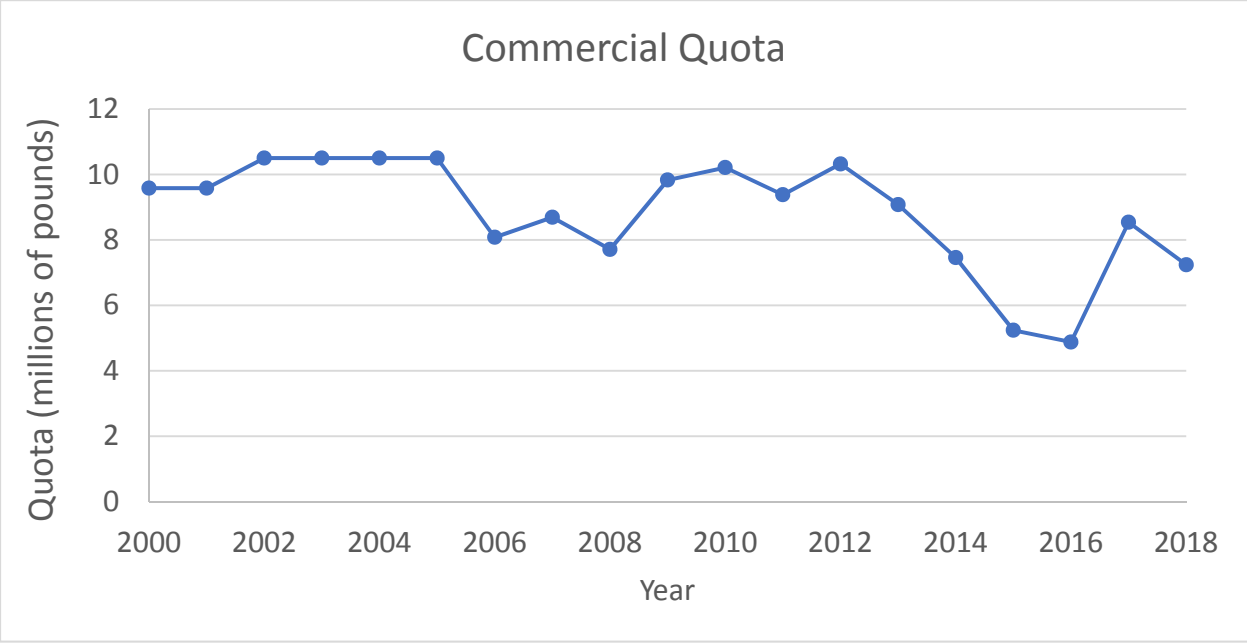

Figure 6. Total coastwide commercial quotas from 2000-2018 (after any transfer from the recreational sector).

Table 3. Commercial state allocations (percent share) and 2013-2017 initial quotas (pre-transfer) and landings (pounds).

State	Percent Share	2013 Initial Quota	2013 Landings	2014 Initial Quota	2014 Landings	2015 Initial Quota	2015 Landings	2016 Initial Quota	2016 Landings	2017 Initial Quota	2017 Landings
Maine	0.67	60,673	28	49,861	0	35,037	0	32,655	20	57,105	0
New Hampshire	0.41	37,620	161	30,916	3,048	21,725	1,192	20,247	10	35,408	0
Massachusetts	6.72	609,606	591,743	500,970	471,443	352,036	601,400	328,096	500,562	573,755	364,810
Rhode Island	6.81	617,902	457,382	507,786	504,863	356,826	514,278	332,561	463,513	581,563	647,112
Connecticut	1.27	114,929	31,755	94,448	31,513	66,369	40,310	61,856	68,673	108,170	33,088
New York	10.38	942,548	1,261,364	774,579	943,191	544,304	958,734	507,289	913,996	887,118	690,675
New Jersey	14.82	1,344,713	346,251	1,105,075	509,103	776,547	710,612	723,739	669,113	1,265,633	304,710
Delaware	1.88	170,465	10,074	140,087	8,592	98,440	77,223	91,746	16,690	160,440	5,679
Maryland	3.00	272,443	45,726	223,891	83,507	157,330	94,667	146,631	68,000	256,420	25,147
Virginia	11.88	1,078,179	315,954	886,040	239,295	622,629	196,125	580,287	205,564	1,014,773	36,251
North Carolina	32.06	2,909,829	952,307	2,391,274	1,864,168	1,680,371	645,952	1,566,100	981,454	2,738,704	1,319,384
South Carolina	0.04	3,195	0	2,625	0	1845	0	1,719	0	3,007	0
Georgia	0.01	862	0	709	0	498	0	464	0	812	0
Florida	10.06	913,016	110,489	750,309	113,045	527,249	183,460	491,394	186,598	859,322	209,864
Total	**100.01**	**9,075,976**	**4,123,234**	**7,458,570**	**4,771,768**	**5,241,202**	**4,023,953**	**4,884,784**	**4,074,193**	**8,542,230**	**3,636,720**

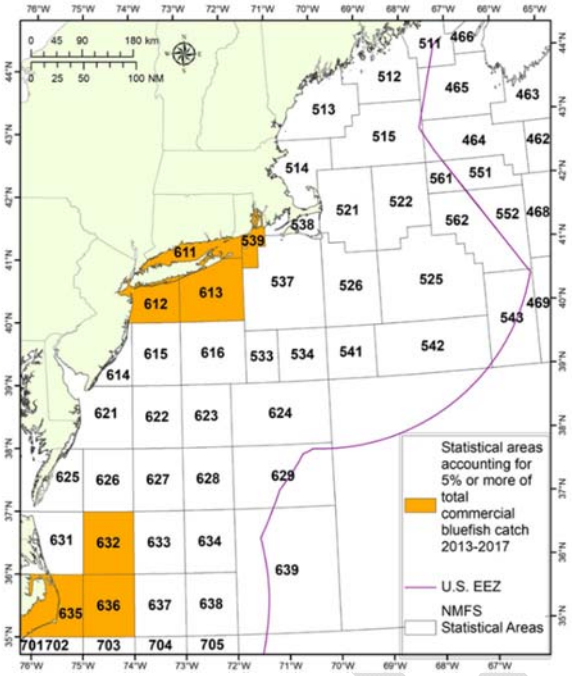

Figure 7. Statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch from 2013-2017.

According to dealer data, commercial vessels landed about 4.13 million pounds of bluefish valued at approximately $2.88 million ex-vessel value from 2013-2017. Average coastwide ex-vessel price of bluefish was $0.71 per pound from 2013-2017. The relative value of bluefish is very low among commercially landed species, less than 1% of the total value of all finfish and shellfish landed along the U.S. Atlantic coast in 2017. A time series of bluefish landings, revenue, and price is provided in Figure 8.

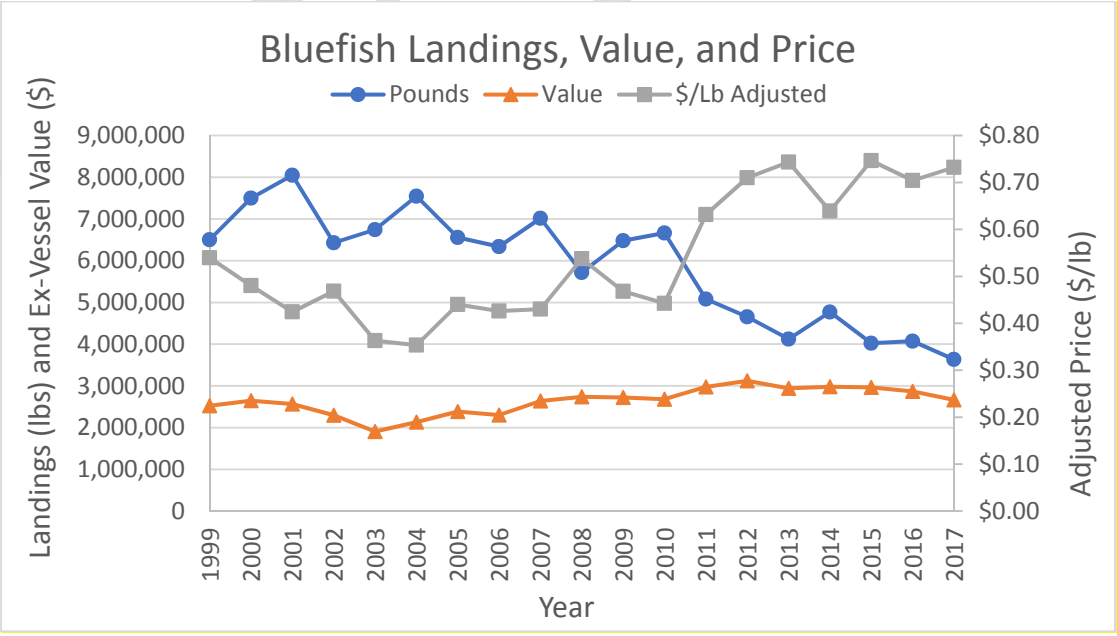

Figure 8. Landings, ex-vessel value, and price (adjusted to 2016 real dollars; 2017-unadjusted) for bluefish, 1999-2017.

According to dealer data when a state or federal permit could be associated with an individual trip (which is ~90%, except for SC, GA, FL ~0%), Massachusetts, Rhode Island, New York, New Jersey, Virginia, and North Carolina all accounted for greater than 5% of bluefish trips, which represents 94% of all bluefish trips from 2013-2017.

Transfers

Transfers of quota from the recreational to the commercial fishery occur almost on a yearly basis (Table 4). Typically, this transfer of quota is written into the specifications, and then adjusted as needed when recreational landings from the previous year become available. However, these in-season adjustments have only begun in recent years. This represents quota that would otherwise go unused if not transferred to the commercial sector. These transfers occur once confirmation has been made by the Greater Atlantic Regional Fisheries Office that the recreational sector will not meet their bluefish quota.

Transfers of bluefish quota also occur within the commercial fishery between states. Quota transfers occur on a year to year basis, as needed. As a state nears its commercial quota, that state can request a poundage quota transfer from another state that is not on track to land their quota. See Table 3 for the pounds of commercial quota landed by each state (before and after any state transfers). Based on recent fishery performance (2013-2017), only MA, RI, and NY have received quota transfers. Of the eleven states that did not receive any transfer, nine of them transferred quota to other states in one or more years (Table 5). Transfers during this time frame (2013-2017) occurred largely during a period of declining coastwide commercial quota (Figure 6). Past reduced quota periods (2006-2008) resulted in different patterns of transfers than seen in recent years. Over longer periods of time (2005-2016), New York has received quota from other states in 10 of 12 years.

Table 4. Final bluefish quota transfers from the recreational to commercial sector.

Year	Final Sector Transfer Amount	FR Citation
2000	0	65 FR 45844
2001	3.15 million lbs	66 FR 23625
2002	5.933 million lbs	67 FR 38909
2003	4.161 million lbs	68 FR 25305
2004	5.085 million lbs	69 FR 47798
2005	5.254 million lbs	70 FR 13402
2006	5.367 million lbs	71 FR 9471
2007	4.780 million lbs	72 FR 4458
2008	4.088 million lbs	73 FR 9957
2009	4.838 million lbs	74 FR 20423
2010	5.387 million lbs	75 FR 27221
2011	4.772 million lbs	76 FR 17789
2012	5.052 million lbs	77 FR 25100
2013	4.686 million lbs	78 FR 26523
2014	3.340 million lbs	79 FR 35293
2015	1.579 million lbs	80 FR 46848
2016	1.577 million lbs	81 FR 51370
2017	5.033 million lbs	82 FR 13402

Table 5. Commercial state-to-state transfers from 2005-2017 (light grey indicates quota received and dark grey indicates quota transferred).

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
ME	0	-52,000	-25,000	-45,000	0	0	0	0	0	-45,000	-30,000	-32,000	0	-17,615
NH	0	0	0	0	0	0	0	100,000	0	0	0	-20,000	0	6,154
MA	0	0	0	0	0	0	0	0	200,000	45,000	250,000	225,000	0	55,385
RI	0	60,000	155,000	-50,000	0	0	0	0	0	100,000	180,000	132,000	150,338	55,949
CT	0	0	0	-20,000	-75,000	0	0	0	0	0	0	0	0	-7,308
NY	0	250,000	450,000	455,000	425,000	0	200,000	50,000	300,000	250,000	550,000	420,000	0	257,692
NJ	0	0	309,125	0	0	0	0	0	-300,000	-50,000	0	-40,000	-50,000	-10,067
DE	0	-15,000	-80,000	-90,000	0	0	0	0	0	0	0	-50,000	0	-18,077
MD	0	-45,000	-50,000	-50,000	0	0	0	0	0	-50,000	0	-50,000	0	-18,846
VA	0	-525,000	-350,000	0	-150,000	0	0	0	0	0	-250,000	-210,000	-338	-114,257
NC	0	652,000	0	-100,000	0	0	0	-100,000	-200,000	0	-550,000	-225,000	-100,000	-47,923
SC	0	0	0	0	0	0	0	0	0	0	0	-150,000	0	-11,538
GA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FL	0	-325,000	-409,125	-100,000	-200,000	0	-200,000	-50,000	0	-250,000	-150,000	0	0	-129,548

Issues for Public Comment

Public comment is sought on a range of issues that may be considered in the amendment. The issues listed below are not necessarily exhaustive, but are intended to focus the public comment and provide the Council and Commission input necessary to develop the amendment. **The public is encouraged to submit comments on the issues listed below as well as any other issues that should be addressed in the amendment.**

ISSUE 1: FMP GOALS AND OBJECTIVES

Background

The original FMP (1990) contains the first set of goals and objectives. The five goals of the FMP are the following:

1. Increase understanding of the stock and of the fishery
2. Provide the highest availability of bluefish to U.S. fishermen while maintaining, within limits, traditional uses of bluefish (defined as the commercial fishery not exceeding 20% of the total catch).
3. Provide for cooperation among the coastal states, the various regional marine fishery management councils, and federal agencies involved along the coast to enhance the management of bluefish throughout its range.
4. Promote compatible management regulations between State and Federal jurisdictions.
5. Prevent recruitment overfishing.
6. Reduce the waste in both the commercial and recreational fisheries.

Description of the Issue

As the management of bluefish over the last 20 years has changed through amendments, framework adjustments, and addendums, the management objectives in the FMP have remained the same. During this period, the status of the stock has changed, as well as potential changes in availability, effort, and fishery productivity. Given these changes, do the management objectives still capture the needs and goals of the FMP?

Management Questions

- Are the existing objectives appropriate for managing the bluefish fishery?
- If these are not appropriate, what should the goals and objectives be?
- What else should the Council and Commission consider with regard to goals and objectives in the bluefish fishery management plan?

ISSUE 2: COMMERCIAL AND RECREATIONAL ALLOCATIONS

Background

The original FMP (1990) contains the first set of allocations at 80% recreational and 20% commercial of the ACL. This was adjusted to 83% recreational and 17% commercial of the ACL in Amendment 1 (1999).

Description of the Issue

While the designation of the 83/17% split in 1999 was determined based on the historical significance (1981-1989) of the bluefish fishery, the characteristics and participation in both the commercial and recreational fisheries might have changed over the last 20 years.

Management Questions

- Is the existing allocation between the commercial and recreational sectors based on the annual ACL appropriate for managing the bluefish fishery?
- If not, how should the current allocations be revised?
- What else should the Council and Commission consider with regard to quota allocation between the commercial and recreational bluefish fisheries?

ISSUE 3: COMMERCIAL ALLOCATIONS TO THE STATES

Background

Amendment 1 (1999) set the commercial allocations to the states using catch histories from 1981-1989.

Description of the Issue

Trends in state harvest have shifted, especially with yearly state-to-state transfers in recent years. See Tables 3 and 5.

Management Questions

- Are the existing commercial state allocations appropriate for managing the bluefish fishery?
- If not, how should current measures and requirements be revised?
- What else should the Council and Commission consider with regard to commercial state allocations for bluefish?

ISSUE 4: QUOTA TRANSFERS

Background

The original FMP (1990) contained alternatives regarding quota transfers. Quota transfers can occur from state-to-state within the commercial fishery and from the recreational to commercial fishery once deemed the recreational fishery will not meet the quota.

Description of the Issue

Commercial state-to-state quota transfers occur on a yearly basis and become repetitive amongst a few states, especially in recent years. Transfers from the recreational to commercial sector have occurred in every year since 2001, inclusive (Table 4).

Management Questions

- Are the existing transfer processes appropriate for managing the bluefish fishery?
- If not, what are appropriate requirements for managing the transfers within the commercial fishery?
- When and why do state transfers occur?
- What else should the Council and Commission consider with regard to quota transfers in the bluefish fishery?

ISSUE 5: OTHER ISSUES

Background

As stated earlier in this document, the goal of the Public Information Document is to solicit comments on a broad range of issues for consideration in this amendment. This "Issue" is in place to allow the public to identify any other associated issues with the fishery. Comments do not need to be limited to issues included in this document.

Management Considerations

- Fishery productivity
- Ecosystem considerations
- Changes in the fishery
- Changes in distribution of bait fish
- Average fish size
- Changes in availability, effort, and marketability
- Impacts of changes observed over time

References

Able, K.W. and M.P. Fahay. 1998. The first year in the life of estuarine fishes in the Middle Atlantic Bight. Rutgers University Press, New Brunswick, NJ. 342 p.

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Serv., Fish. Bull. 53. 577 p.

Juanes, F., P. J. Clarke, and J. Murt. 2013. Fall and winter estuarine recruitment of bluefish Pomatomus saltatrix: selectivity for large lipid-rich prey increases depleted energy levels. Marine Ecology Progress Series (492):235-252.

MAFMC. 1989. Fishery Management Plan for the Bluefish Fishery. Dover, DE: MAFMC.

MAFMC. 1998. Amendment 1 to the Fishery Management Plan for the Bluefish Fishery. Dover, DE: MAFMC.

NEFSC (Northeast Fisheries Science Center). 2015. 60th Northeast Regional Stock Assessment Workshop (60th SAW) Assessment Report. NEFSC Reference Document 15-08; 870 pp.
Wood, T. 2014. Bluefish 2014 Stock Assessment Update Data and Model Update Through 2013. Coastal/Pelagic Working Group, Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA. 37 p.

Salerno, D.J., J. Burnett, and R.M. Ibara. 2001. Age, growth, maturity and spatial distribution of bluefish, *Pomatomus saltatrix* (Linnaeus), off the northeast coast of the United States, 1985-96. J. Northwest Atl. Fish. Sci., 29: 31-39.

Wood, A. 2017. Personal communication. Atlantic bluefish assessment lead.
NMFS/NEFSC/READ/PDB. Woods Hole, MA.

Atlantic States Marine Fisheries Commission

Coastal Sharks Management Board

May 1, 2018
9:00 – 11:00 a.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*R. Miller)* 9:00 a.m.

2. Board Consent 9:00 a.m.
   - Approval of Agenda
   - Approval of Proceedings from October 2017

3. Public Comment 9:05 a.m.

4. Review North Atlantic Shortfin Mako Stock Assessment, NOAA Fisheries Highly Migratory Species (HMS) Emergency Rule Measures, and Amendment 11 (*K. Brewster-Geisz*) 9:15 a.m.
   - Technical Committee Report (*K. Rootes-Murdy*)
   - Discuss Possible Board Comment to HMS on Amendment 11 (*K. Rootes-Murdy*)
   - Discuss Potential Management Response (*K. Rootes-Murdy*) **Possible Action**

5. Review SEDAR 54 Sandbar Shark Stock Assessment (*K. Brewster-Geisz*) 10:00 a.m.
   - Technical Committee Report (*K. Rootes-Murdy*)

6. Update on Endangered Species Act Status of Oceanic Whitetip Shark (*C. Young*) 10:30 a.m.
   - Technical Committee Report (*K. Rootes-Murdy*)

7. Consider Approval of 2016 and 2017 FMP Review and State Compliance Reports (*K. Rootes-Murdy*) **Action** 10:50 a.m.

8. Other Business/Adjourn 11:00 a.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Coastal Sharks Management Board Meeting
May 1, 2018
9:00 – 11:00 a.m.
Arlington, Virginia

Chair: Roy Miller (DE) Assumed Chairmanship: 5/2017	Vice Chair: Pat Geer	Law Enforcement Committee Representative: Greg Garner/ Chrisolm Frampton
Coastal Shark Technical Committee Chair: Brent Frazier (SC)	Coastal Shark Advisory Panel Chair: Lewis Gillingham (VA)	Previous Board Meeting: October 2017
Voting Members: ME, MA, RI, CT, NY, NJ, DE, MD, VA, NC, SC, GA, FL, NMFS, USFWS (15 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 2017

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the Agenda. Individuals that wish to speak at this time must sign in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Review North Atlantic Shortfin Mako Stock Assessment, NOAA Fisheries Emergency Rule Measures, and Amendment 11 (9:15-10:00 a.m.) Possible Action

Background

- The 2017 ICCAT stock assessment on North Atlantic shortfin mako indicates that the resource is overfished and overfishing is occurring. In response to the results, NOAA Fisheries has implemented emergency rule measures to reduce landings by approximately 72-79 percent. (**Briefing Materials**)
- NOAA Fisheries has also began scoping on an Amendment to rebuild the stock by 2040. (**Briefing Materials**)
- The Technical Committee met to review the stock assessment, review the emergency rule measures, and provide recommendations to the Board on potential action. (**Briefing Materials**)

Presentations

- North Atlantic shortfin mako shark stock assessment, NOAA Fisheries Emergency Rule Measures and Scoping Document for Amendment 11 by K. Brewster-Geisz
- Technical Committee Report by K. Rootes-Murdy
- Potential Management Response Options by K. Rootes-Murdy

Board Actions for Consideration at this Meeting

- Potential Management Response to 2017 Stock Assessment and Emergency Rule Measures

5. Review SEDAR 54 Sandbar Shark Stock Assessment (10:00-10:30 a.m.)

Background

- SEDAR 54 was completed in fall 2017. The results of the assessment indicate that sandbar sharks remain overfished but overfishing isn't occurring. (**Briefing Materials**)
- The Technical Committee was tasked with reviewing the assessment results and providing recommendations to the Board (**Briefing Materials**)

Presentations

- SEDAR 54 Assessment results by K. Brewster-Geisz
- Technical Committee Report by K. Rootes-Murdy

6. Update on Endangered Species Act Status of Oceanic Whitetip Shark (10:30-10:50 a.m.)

Background

- NOAA Fisheries initiated a status review in 2015 based on a petition to list Oceanic Whitetip Sharks as either threatened or endangered. Based on their review, NOAA Fisheries has determined that the resource has a moderate risk of extinction is proposed to be listed as threatened under the Endangered Species Act (ESA). (**Briefing Materials**)
- The Technical Committee was tasked with reviewing this status update and providing recommendations to the Board (**Briefing Materials**)

Presentations

- Update on ESA Status of Oceanic Whitetip Shark by C. Young
- Technical Committee Report by K. Rootes-Murdy

7. Consider Approval of 2016 and 2017 FMP Review and State Compliance (1:50-2:10 p.m.) Final Action

Background

- State compliance reports are due August 1.
- The Plan Review Team reviewed each state report and drafted the 2016 and 2017 combined FMP Review. (**Briefing Materials**)

Presentations
• Overview of the 2016 and 2017 Fishery Management Plan Review by K. Rootes-Murdy
Board Actions for Consideration at this Meeting
• Accept the 2016 and 2017 Fishery Management Plan Review and approve *de minimis* requests

8. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

COASTAL SHARKS MANAGEMENT BOARD

The Marriott Norfolk Waterside
Norfolk, Virginia
October 17, 2017

These minutes are draft and subject to approval by the Coastal Sharks Management Board.
The Board will review the minutes during its next meeting.

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INDEX OF MOTIONS

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Rep. Sarah Peake, MA (LA)
Dan McKiernan, MA, proxy for D. Pierce (AA)
Jason McNamee, RI, proxy for J. Coit (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Colleen Giannini, CT, proxy for M. Alexander (AA)
Lance Stewart, CT (GA)
John Maniscalco, NY, proxy for J. Gilmore (AA)
Sen. Phil Boyle, NY (LA)
Emerson Hasbrouck, NY (GA)
Tom Fote, NJ (GA)
Tom Baum, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Stew Michels, DE, proxy for D. Saveikis (GA)
Roy Miller, DE (GA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Mike Luisi, MD, proxy for D. Blazer (AA)
Rachel Dean, MD (GA)
Rob O'Reilly, VA, proxy for J. Bull (AA)
Cathy Davenport, VA (GA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Michelle Duval, NC, proxy for B. Davis (AA)
Doug Brady, NC (GA)
David Bush, NC, proxy for Rep. Steinburg (LA)
Robert Boyles, Jr., SC (AA)
Malcolm Rhodes, SC (GA)
Pat Geer, GA, proxy for Rep. Nimmer (LA)
Spud Woodward, GA (AA)
Nancy Addison, GA (GA)
Rep. Thad Altman, FL (LA)
James Estes, FL, proxy for J. McCawley (AA)
Karyl Brewster-Geisz, NOAA

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Doug Messeck, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Kirby Rootes-Murdy
Jessica Kuesel
Caitlin Starks

Guests

Sign-In Sheet Not Distributed

The Coastal Sharks Management Board of the Atlantic States Marine Fisheries Commission convened in the Hampton Roads Ballroom V of the Marriott Waterside Hotel, Norfolk, Virginia, October 17, 2017, and was called to order at 1:03 o'clock p.m. by Chairman Roy W. Miller.

CALL TO ORDER

CHAIRMAN ROY W. MILLER: I think we should go ahead and call the Coastal Shark Management Board to order. I'm Roy Miller; serving as Chair. I'm from the state of Delaware, so welcome to the Shark Board meeting this afternoon.

APPROVAL OF AGENDA

CHAIRMAN MILLER: You have an agenda, are there any additions or corrections to the agenda? Seeing none; I'm assuming it's approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN MILLER: The proceedings from the May, 2017 meeting that were the most recent meeting of the Shark Board. Are there any additions or corrections to those proceedings? Seeing none; I'll assume they're approved as they are printed before you.

PUBLIC COMMENT

CHAIRMAN MILLER: At this time I would like to call on Public Comment. As is our custom, this would be for items not specifically on our agenda. There is one person who would like to offer public comment; would you please step forward, and say your name please, and your affiliation?

MS. KATIE WESTFALL: Hi, yes this is actually for an item that is on the agenda. Will that be after the agenda item is addressed? Okay, I'll hold off then.

CHAIRMAN MILLER: That would be the best time to address it then. Just remind me when we get to your agenda item.

FINAL RULE FOR HIGHLY MIGRATORY SPECIES AMENDMENT 5B (DUSKY SHARKS)

CHAIRMAN MILLER: All right next on our agenda, we're going to go over the Final Rule for Highly Migratory Species Amendment 5b (Dusky Sharks). To lead off this discussion concerning the review of the final rule and NOAA Fisheries Request for Complementary Measures, I'm going to call on Karyl Brewster-Geisz. Karyl.

REVIEW FINAL RULE AND NOAA FISHERIES REQUEST FOR COMPLEMENTARY MEASURES

MS. KARYL BREWSTER-GEISZ: For those of you who don't know me, I work for NOAA Fisheries in the Highly Migratory Species Management Division. If you remember last spring, I gave a presentation about the final rule and requested for complementary measures then. I believe the Commission decided to think about it, review what the states wanted, and then we are at the stage now where NOAA Fisheries at least is hoping for the Commission to take on and implement some complementary measures for Amendment 5b.

I have a very quick presentation where I will explain the background of Amendment 5b, what we finalized, the implementation status of those measures, and then our request for complementary measures. If you remember, this is all regarding dusky sharks. It is a ridgeback shark found along the coast.

The stock assessment found they were overfished and experiencing overfishing, and a mortality reduction of 12 percent was needed to end overfishing immediately, and an additional reduction, so total reduction of 35 percent is needed to rebuild the stock by 2107. That is not a typo, it's not 2017, and it is 90 years from now, 2107. We have a bit of work to do to reduce fishing mortality by 35 percent. Our final rule published last April, and then I presented that to the Commission in May. One of the final measures we had was requiring that all recreational permit holders

obtain a shark endorsement; and this shark endorsement would allow you to fish for and catch and land sharks, not just dusky sharks but any sharks.

This will be required as of January. It is something that you can get when you apply for your HMS angling, HMS charter headboat, or a couple other permits. You watch a video that is up on our web page. You can look for it on YouTube or Vimeo or any of the other places. It's about two minutes long, it goes through how to identify dusky sharks and other ridgeback sharks, how to safe handle and release them, so you do not injure the shark, nor do you injure yourself.

It also talks about the circle hook requirements and the recreational regulations. In addition to the shark endorsement, we have updated our shark identification placard. If you remember, this is on waterproof, tear proof paper for anyone. We hand it out to tournaments who request it. Anyone can get them. I have a couple copies up here.

We created a prohibited shark identification placard that has the prohibited species, particularly ridgeback sharks, which is what we're focusing on, and on the back has handling and release techniques. We also updated our careful catch and release guide; and this guide goes through how to release not just sharks, but other HMS, including billfish and tunas and swordfish.

All of this is underway, and we've been getting really good response so far on the placards, the careful catch and release guide, the video, we've undergone beta testing for the quiz that people will need to take to take the shark endorsement. We've made some tweaks to the video so the new video will be available with the quiz.

Those tweaks were more focusing on the safety requirements. You do not have to use a dehooker, but we do ask everybody to release the shark with a minimum amount of gear. The other measure we have for the recreational fishery is requiring circle hooks. The circle hook requirement is for anywhere south of Chatham, Massachusetts.

That is pretty much the northernmost range of dusky sharks. Some of the research particularly that by Angel Willey and Mark Sampson in Maryland showed that circle-hooks do have a very positive impact on fishing mortality; it reduces it by quite a lot. We have really begun outreach on this, and it is all in our outreach materials.

Commercially we are requiring that all fishermen with a limited access permit and pelagic longline gear, need to release sharks that they are not planning on keeping by using a dehooker, or by cutting the gangion less than three feet from the hook. Again, all of our pelagic longline fishermen are trained in how to use a dehooker; but if they deem it unsafe to do so, given the activity of the shark, they need to cut it with a minimum amount of gear.

This minimum amount of gear is more of a commonsense effort to try to minimize fishing mortality; so that shark when it's released has the opportunity to survive, thus reducing fishing mortality. We also implemented how to do this and how to identify sharks for commercial fishermen; by having a new shark segment in our safe handling and identification release workshops. These workshops were already required. We are not including a new segment on shark identification. We have increased dusky shark outreach and awareness tremendously; we've included some more commercial outreach materials, and require all pelagic longline, bottom longline, and shark gillnet fishermen to abide by dusky shark fleet communication and relocation protocol.

What this means is if they catch a dusky shark they need to let other vessels in the area know there are dusky sharks in the area; and they need to move one nautical mile, once they pull up their gear, to try to get away from the sharks. This is the same requirement we have

when it comes to marine mammals and sea turtles; so we again felt this was a commonsense measure, to try to move away from the dusky sharks.

Then the last alternative we have for them is requiring the circle hooks in bottom longline gear. We already require circle hooks for sea turtles in the pelagic longline fishery. Now we will be requiring it in the bottom longline fishery as well. This slide, I'm not expecting you to be able to read it. It is just a summary of all of that.

All of these measures are already in effect, some of those commercial measures, or will be in effect come January 1st. Then this is our request that you help us with the outreach and education, and provide links to some of our materials or create your own materials; that you collaborate on the development of best practices for the handling and release of sharks when shore or pier fishing.

Again, all of our handling and release is from the vessels; because we are in federal waters. We're really looking to the states to drive the development of best practices up and down the coast, so all fishermen know how to release sharks when they catch them from that pier or on the beach. We're also asking the states to consider requiring circle hooks in your various hook-and-line fisheries.

This could be your recreational fisheries, but it could also be some of your commercial hand gear or commercial short lines. We are asking that you require fishermen to maximize gear removal before releasing sharks. This doesn't mean they have to use dehookers, but maybe just cutting with the least amount of gear as possible remaining on the shark. Then also consider cooperative research with us to improve estimates of duskies.

We talked a lot about that at the Technical Committee last time, have had some conversations with various states. I think we're moving forward somewhat on that. If you haven't started thinking about it, it would be good. Again, all of these measures we implemented are needed; in order to reduce fishing mortality on dusky sharks by 35 percent. We really need all of the states to help with this; in order to end overfishing and rebuild this species. Thank you.

CHAIRMAN MILLER: Thank you, Karyl. Are there questions or comments relative to Karyl's report; in the back, Pat?

MR. PAT GEER: Karyl, thank you very much for that. I'm just kind of curious. How have the measures that have been in place since June been received by the commercial fishery? I mean they have about four months so far. What are you hearing from the commercial sector?

MS. BREWSTER-GEISZ: The commercial sector has not come back saying that these are unreasonable requests. They are already taking the course in the workshops. They've been doing that since June. For the most part it's good. We've gotten some questions back from the workshop; so we might be making some changes to that presentation that they give. As far as I know things are going well with the commercial fleet and the measures that are already in effect.

CHAIRMAN MILLER: Are there any other questions or comments? David Bush.

MR. DAVID E. BUSH, JR.: Thank you for your presentation. A quick question for you, on the previous slide I think it was where it said these final measures will end overfishing. Is that based on what is already, or what has already been implemented, and anything the states do above and beyond that is additional, or is this with the assumption that the states will have complementary measures?

MS. BREWSTER-GEISZ: To end overfishing we needed a 12 percent reduction in fishing mortality; and we felt that the commercial measures that are already in place, or went into

place on June 5th, would have achieved the 12 percent. We also believe that with the states onboard, we can reach that 35 percent that is needed to rebuild the stock.

CHAIRMAN MILLER: Are there any other questions?

LAW ENFORCEMENT COMMITTEE REPORT

CHAIRMAN MILLER: We'll proceed to the next item; and that is the Law Enforcement Committee Report, and for that I'm going to call on Doug Messeck from Delaware; who is representing the Law Enforcement Committee today. Doug.

MR. DOUG MESSECK: I'll be breezing over real quickly – and thank you for the opportunity to come here and speak to you all today – will be the memo from a conference call that we had several months back. What we reviewed and we discussed were some of the implementations that we're going to go over.

Under the federal waters the LEC did agree that the online training video and questions had merit; but it would provide some difficulty to enforce. What we are recommending at this time is continue using this as an outreach and educational tool, and also extend this over to enforcement officers up and down the coast, so that they also have the training in being able to identify the sharks.

The possession requirement of carrying some certification, if you have that onboard, individual person that would be adequate for enforcement purposes; but it would have to be something that is consistent amongst all the states so that we would know what we're looking for in the federal waters. Discussion of implementation into the state waters on this.

It was our recommendation that this somehow be combined to the HMS permit; so that when you received your HMS permit you took the online training, and then that became part of the general HMS that was distributed. However, we did realize that would not take into account the shore fishermen and the beach anglers and the peer anglers; who do make up a large part of this.

As far as the recreational for the non-offset and non-stainless with the circle hook requirements, that does prove very difficult for enforcement purposes, because it comes down to targeting. It will take a lot of personnel hours to sit there to watch these folks; to know exactly what they're fishing for and being able to ascertain that yes they are targeting sharks, they are catching them, and they are doing this. That will be very time consuming, very hard to enforce. Several states already have circle hook requirements in for striped bass. They are effective; but they are very time consuming, and they are hard to enforce. Once a person leaves that area, if they have the sharks onboard and they have left that area, at that point you're not able to ascertain beyond a reasonable doubt that they did in fact catch those fish under the J hook or the circle hooks.

Once they've left the fishing area then enforcement is going to end at that point. The commercial circle hook requirements would be not a problem for enforcement, because they are in that directed fishery. They're going to be out there and their gear is more concise and more contained, so it would be no problem to the commercial end of it.

The gear removal, the LEC had very strong recommendations for the potential safety of the fishermen; that they be granted leeway with personal safety being the biggest factor. We feel that the use of certain gear should not be required, but to require having the gear onboard is easily enforceable, but you have to have the leeway, as far as those persons using that whether or not it is safe for that fisherman to release that fish.

CHAIRMAN MILLER: Thank you for those comments, Doug. Are there any questions for Doug? Michelle.

DR. MICHELLE DUVAL: Thank you for the Law Enforcement Committee report, Doug. I was a little bit confused when the Law Enforcement Committee was discussing the online training course. I was having difficulty understanding if the Law Enforcement Committee was recommending that the states require that the online training course be taken; and that the federal permit, in other words the federal endorsement for recreational fishing be required by the states as well. It just wasn't clear to me if you all were recommending that or not.

MR. MESSECK: For the federal waters with taking the course and the online, and then printing out some type of certificate and having it onboard the boat, we were in support of that; although we wanted to see it more educational based with going out there rather than requiring it, because of the enforceability issues.

We have to have something onboard that shows it is unique to that fisherman that they have it, and then a fisherman that comes out of say Maryland, who is fishing off of New Jersey waters. They may encounter different jurisdictions t that we have something that is consistent throughout the states. But it was enforceable that on the federal level, if they were in the federal waters and they had some type of certificate that was printed out to that person that would be easily enforceable.

As far as coming back into the states that is where our recommendation was that an addendum be made to the HMS, so that this way it covered both state and federal waters, rather than each individual state trying to come up with their own regulations that may be different as you go up and down the coast. Our main goal in all this was to have the highest level of consistency.

CHAIRMAN MILLER: Are there any other questions or comments regarding enforcement? Emerson.

MR. EMERSON C. HASBROUCK: My question is looking for some clarification. I thought, and perhaps incorrectly that anybody who had an HMS permit had to abide by those HMS requirements; regardless of the fishery, whether they were fishing in federal or state water under that federal HMS permit. Is that correct or not correct?

MR. MESSECK: For the HMS for the tunas it is requirement that you're in state or federal waters. For the sharks there is that exemption in there. If you're fishing strictly in state waters then you do not have to have the possession of the HMS permit.

CHAIRMAN MILLER: Karyl, did you want to comment on that?

MS. BREWSTER-GEISZ: Yes, thank you. I just wanted to clarify. If you have a HMS permit, yes you are required to follow the federal regulations regardless of whether you are in state waters or federal waters, unless the state has more restrictive regulations. If you are only fishing in state waters, and you never go into the federal waters, then you are correct that you only need that for tunas; which we manage all the way to the shore. But for sharks you do not need a federal permit.

CHAIRMAN MILLER: Eric.

MR. ERIC REID: It is just the comment about being able to get a permit online. I think that's a pretty interesting solution, maybe? I'm a shark dealer. I have to physically go to a class so I can ID sharks. I'm handling them; they're dead when I get them, so maybe it's a handling thing. But I have to physically go to a class.

Every three years when I have to renew, I have to go back to a class. I just think it's interesting that the recreational guys can go online and print out a certificate; and I've got to drag my butt to class every three years. I don't know if you can change that. It doesn't have anything to do with dusky sharks; but it has permitting in

general. I've talked about that before, but I don't seem to get anywhere, Mr. Chairman.

CHAIRMAN MILLER: Do you have any comment to that, Karyl?

MS. BREWSTER-GEISZ: Yes, we do require that all of our shark dealers go to a class every three years; where they have hands-on instructions for seeing the sharks in those, because what the shark dealers are doing, they need to be clear and identify every shark to species on their dealer reports, which is critical for our quota monitoring purposes.

Some of our shark species have pretty small quotas; and we need to make sure we're getting the correct identifications. The shark fishermen, there are thousands of them compared to hundreds of the dealers. We would love to be able to require that all shark fishermen when they go out fishing get that hands on requirement; but it's just not possible for the recreational fishery, where you're talking about 20 or 30,000 people going, some of them just going out once for a weekend.

We are requiring this video now; which shows some of the main features, particularly of the species that are important or critically important at the moment, and those are the ridgebacks. Those of you who will remember, I believe it was the Edisto tournament in South Carolina, where fishermen clearly landed ridgeback sharks. It's because they were not aware of the regulations and how to identify ridgeback shark, let alone whether or not those were duskies or sandbars or silky or any of the other ridgeback sharks. We're trying to, in our endorsement video, trying to point out those indications of what you should not be landing. We do not intend for all the recreational fishermen to become shark experts.

Shark dealers however, they have a commercial stake in this. They should be experts. We are considering other ways. We have heard comment like yours before that it's every three years; shark identification doesn't change that frequently. Maybe we should change it. We're considering things like that; but at the moment this is where we stand.

CHAIRMAN MILLER: Thank you for that clarification, Karyl. Okay, Eric?

MR. REID: Thank you, Mr. Chairman; I won't take any more time.

CHAIRMAN MILLER: Are there any other hands. Tom Fote.

MR. THOMAS P. FOTE: Karyl, have you thought about through the Chair, have you thought about doing a video for the surf fishermen? I've noticed in the last couple years there are a lot of clubs that actually have where they meet at night and they all shark fish. Everything is released, nothing is kept.

But the handling of how you handle sharks in the surf, it would be nice to basically be able to send them to a site, and when I see one of the clubs scheduling some night like this. I say why don't you all go look at the video before you basically do that? It's becoming very popular. I mean guys do it.

They basically have big gear, like they were doing it for the last 30 years they were catching a lot of brown sharks in the bays and things like that. But all those sharks are really released; but it would be nice if you had a handling video that we could basically show to them, because as we tried in New Jersey, as we demonstrated with summer flounder, we're trying to promote how you handle fish and release them carefully.

MS. BREWSTER-GEISZ: Thanks, we would actually love to do a handling and release video. One of the problems we've had with the video we have now for the sharks is some of the anglers, particularly those up off of New England that handle some of our big blue sharks and mako sharks, say that the sharks we're showing in the video are a little too relaxed.

They are not the type of sharks they see. They see sharks that are all over the place; struggling to get out. They are having trouble getting us video of that to put it in. I would urge you that if you have any video that you would like us to do, get us a request. But then also, if you have the video itself, we would love to have it to be able to use.

MR. FOTE: These guys shoot videos of everything they do nowadays. If we put out a release and ask some of the clubs, basically when you're doing this if you shoot a video, please get it into us. We want to use it as a training video to look at. Of course you have to use circle hooks, you've got to be abiding by the laws if you do that. We need some instruction. If you help me write up something like that I can get to a bunch of clubs that do that; and maybe it would help in obtaining footage.
CHAIRMAN MILLER: John.

MR. JOHN MANISCALCO: I would just second the need for that kind of handling video. New York State is also seeing an increase in shore fishing for prohibited species like sandbar, sand tiger and that kind of thing. Any positive outreach would be helpful.

CHAIRMAN MILLER: I would just add that although I'm not aware of a video generated by Delaware, I think they're the only state that has regulations with regard to recreational release of sharks. We'll get into that summary of the states, how the states react to releasing sharks, and what guidance they provide in a minute. But I just thought I would throw that in here now. Are there any further questions or comments on this?

TECHNICAL COMMITTEE REPORT

CHAIRMAN MILLER: Seeing none; I'm going to call on Kirby for a report of the Technical Committee; in their review of these federal measures, Kirby.

MR. KIRBY ROOTES-MURDY: As mentioned, I'm going to go through the Technical Committee report. First is just some brief background. As you all know, the last time the Board met was in May, 2017, and there was a request for the Board to consider cooperative research with NOAA Fisheries to improve the estimates of dusky and other sharks caught in state waters.

The Technical Committee met via conference call on June 2, to discuss the provisions of Amendment 5b. I will note that I was not on that call; Karyl was. She might back me up if I misspeak on any of these points that were raised by the Technical Committee. For Amendment 5b, NOAA Fisheries is interested in trying to collect additional fishery dependent data for future stock assessments; as Karyl mentioned.

Currently the shark dependent data, they are pulling that from five commercial vessels that have 100 percent observer coverage in federal waters. Regarding the gear, they're using bottom line and they're limited to no more than 300 hooks. What that means is that for each trip fishermen can make two sets only; the first no more than 150 hooks can be set, and then on the second set no more than 300 hooks.

Fishermen must keep all dead sharks; that's unless they are prohibited species or the fishing season is closed, and the fishermen are allowed to fish for and sell sandbar sharks. Some of the challenges that the Technical Committee raised regarding extending research into state waters were the following.

Fishing for sandbar sharks is prohibited in state waters for many states; and current bottom line gear length may exceed the requirements of short lines that are used to fish for sharks in state waters. Fishermen many times can keep over their commercial retention limits, as well as fishing for coastal sharks based on a quota other than the aggregated, large, coastal sharks quota is also a problem. What we mean by that is that the season may be closed for other large coastal shark fishermen.

The group discussed the language also in Section 4.3.82 regarding the display and research permits of the coastal sharks FMP. As noted in the document, a state may grant exemptions from the seasonal closure, quota, possession limit, gear restrictions, and prohibited species restrictions contained in the FMP through a state display, or through a research permit system. Then states also required NMFS to apply for a research permit; which is not automatically or always easily obtained. Next we have a couple of state-specific notes. First was from Georgia. Although it's allowed in the coastal sharks FMP, longlines and gillnets are not allowed in state waters. No current, commercial fishery is currently taking place, and therefore there was not a need for fishery independent data collection. Over 17 plus seasons of fishery independent data collection, and no documented dusky sharks have been found in Georgia's territorial waters.

Five species though have been encountered; and those are Atlantic sharpnose, bonnethead, blacknose, blacktip, and sandbar sharks. Other state notes were with regards to North Carolina. There were two main concerns that were raised regarding shark research in state waters. The first is that North Carolina has a scientific permit application that requires applicants to be affiliated with a research institution.

The second is that accurate reporting of research landings versus commercial landings is somewhat of a problem. Currently there is one North Carolina fisherman who participates, and is not affiliated with a research institution. NOAA Fisheries is in turn responsible for the scientific permit, though legally they are not.

From my understanding the application issue would need to be resolved before the landings issue could be addressed. Highly Migratory Species Division of NOAA will have further discussions with the state of North Carolina on this; and maybe Karyl can speak to that if any progress has been made on that.

Then lastly, if there is a potential fix regarding the commercial research landings, HMS could ask the fishermen to sign an agreement that lets HMS forward the landings data to North Carolina. This would then allow North Carolina to accurately depict commercial and research landings on North Carolina's trip ticket system.

Wrapping up additional state notes, we have South Carolina, and Virginia and Florida. For South Carolina that state will allow a research fishery in state waters, if the individual has a South Carolina scientific research permit. Virginia and Florida there was a request made on that call about an allowable gear type in state waters; if they could allow research fishery in state waters. I have not heard word back on that as of yet, maybe Rob can speak to that.

Regarding Florida, they currently have a ban on longline gear and gillnets in state waters. That will not be lifted for shark research. Last, as noted in the TC report, NOAA has a shark tagging program, and there were some questions on angler participation in that program. South Carolina currently has anglers required to have a scientific research permit to tag a fish.

Florida requires a special activity license for all fish tagging. Massachusetts, Maryland, North Carolina and Georgia, do not require anglers participating in a cooperative tagging effort to have a scientific research permit. With that I will take any questions as best I can. Thank you.

REVIEW STATE FEEDBACK

CHAIRMAN MILLER: Are there any questions for Kirby? I'm going to call on Kirby again to provide state feedback on the review. That was through the auspices of a poll, and Kirby will tell us about it.

MR. ROOTES-MURDY: I'll go through this pretty quickly; just as background, as you're aware there were questions posed to the states following the May board meeting. I'm going to

walk through the summary of that feedback that we got from the states. Just to be clear, we received feedback. We set a deadline of May 31, and we got feedback from the states of New York south through Florida. They provided responses to those questions. We didn't hear anything from the states north of New York up through Massachusetts or the state of Maine that I'm aware of. The three questions that were asked were, and a number of them had subcomponents, and I can get into those if there are follow up questions.

But the three questions were; does your state have communication materials currently to address best practices when fishing for sharks from shore or piers? The second question is; does your state require circle hooks when fishing for sharks or other species? The third was; does your state have measures to maximize gear removal before releasing sharks?

That's either release using a dehooker, or cutting the gangion line less than three feet from the hook. Question one; in terms of the responses they were nearly split. Four were yes, five were no, some qualified those answers. Nearly all were in favor of the sub-question of requiring communication materials.

Many are not interested in making it mandatory. Many noted that the Commission and/or NOAA should help with developing those materials, and material information should be consistent if implemented across all the states. Regarding question two, does your state require circle hooks?

Predominantly it was a no for most states. That would be New York through Delaware, North Carolina, and Georgia through Florida. New Jersey, Delaware, North Carolina and Florida all require circle hooks for other specific species. Maryland, Virginia and South Carolina regulate short lines for the commercial fishery.
There was a sub-question about whether the Commission should require circle hooks. This was fairly evenly split, in terms of two were against three were for, and four states either didn't answer or were neutral on the question. The last main question was does your state have measures to maximize gear removal?

A majority of the states do not, only three states currently have these measures or similar measures in place; and that's New York, Delaware, and Virginia. Just to note, the state specific responses were included in your meeting materials, so please look through that if you have specific questions on an individual state. But with that I will take any questions on my summary.

CHAIRMAN MILLER: John then Michelle.

MR. MANISCALCO: Just a note. I believe New York State does have a circle hook requirement for sharks.

MR. ROOTES-MURDY: Thank you, John, I'll make that noted. Sorry.

CHAIRMAN MILLER: Michelle.

DR. DUVAL: In terms of circle hooks, I mean we do require, in addition to what was noted in the survey. I mean we do require the use of circle hooks for the short lines for the coastal shark's fishery for the commercial sector of the coastal shark's fishery. Then also in our proclamation, which has the force and effect of rule. We do have language that is very similar to Delaware's regulation on the books; where it states it is unlawful to fail to return all sharks not meeting harvest requirements to the water in a manner that ensures the highest likelihood of survival, which I think is very similar to what Delaware has on the books right now. I just wanted to make those two notes.

CHAIRMAN MILLER: Thank you for those additions. Are there any other comments or questions on the poll that was distributed and described by Kirby? Jay.

MR. JASON McNAMEE: I will first start by apologizing to Kirby. I have an e-mail crafted up. It's well within the realm of possibility that I

just never hit send. I'm guessing it is past relevance at this point, but if not I would be happy to send it to you. To cut to the chase, I don't think Rhode Island would have tipped the balance in either direction in the poll, for the answers you have already. But I just mostly wanted to apologize for not responding.

MR. ROOTES-MURDY: Thank you, Jay. Just to that. If folks have questions on Rhode Island's requirements or answer to those, then you can direct those to Jay and he can answer them in this meeting.

CHAIRMAN MILLER: Are there any other comments or questions?

CONSIDER COMPLEMENTARY MANAGEMENT MEASURES FOR STATE WATERS

CHAIRMAN MILLER: The last item under this subheading would be to Consider Complementary Management Measures for State Waters. We list possible action for that agenda item. Are there any recommendations from the Board? It doesn't have to be in the form of a motion yet, but any comments or recommendations? Dr. Duval.

DR. DUVAL: It sounds like, just from my reading of all of the survey responses that most states were in favor of or amendable to including links on their websites to educational outreach materials that would link directly to the HMS website, in terms of the educational video online. I think just in terms of making that a requirement.

I'm not so sure we would necessarily support making it a requirement or a compliance requirement. My sense, and other states can speak up is that most folks were amendable to including that information on their website. I do agree with the states that indicated, in terms of providing additional outreach materials for shore or peer-based-recreational fishing for sharks.

We would probably look to the Commission and HMS to take a coordinated approach to developing those materials, just to make sure that there is a consistent educational message going out to all anglers, with regard to best practices and safe handling of those sharks. I do have some other comments on the research fishery, and complementing that in state waters, but I'll hold off and maybe just tackle these things one thing at a time.

CHAIRMAN MILLER: Is there any response either to Michelle's comments or any comments on this particular topic or suggestions? Rob O'Reilly.

MR. ROB O'REILLY: The correspondence here with Michelle is pretty much the same. The outreach is really good. I see from the survey that maybe some states are hoping to be provided the information. But certainly that's supportable, putting as a requirement based on the feedback that I heard from the Advisor, at least the director of the Advisory Committee is that all along most of the states were not looking for that. I think that probably my comments are very similar, and I won't wait to talk about the research part. But I know that Kirby asked me about that earlier and mentioned that I might address that. I think other than longline, Kirby, I think that is probably the gear that is prohibited, so just wanted to add that now if I may.

CHAIRMAN MILLER: In thinking about this prior to the meeting, I decided there are three possible courses of action. Obviously the default is doing nothing additional. A second course of action would be as Michelle suggested, having voluntary access to the educational materials that link on state's websites linking to the federal guidance in this regard.

Then the third option would be some sort of mandatory compliance. Thus far the only comments that I've heard from anyone, and Robert, I'll get to you in just a second, would be for the second alternative, namely voluntary

compliance with perhaps a common message available. Robert.

MR. ROBERT H. BOYLES, JR.: The state of South Carolina has long adopted a policy of complementary management; specifically for sharks in state waters, for a variety of reasons. I must point out to the Board however, that our Legislature has been very, very clear in terms of recreational angling requirements.

I should preface this to say that we have required a saltwater recreational fishing license since the early 1990s. We were one of the first states to do so on the east coast, but I would like to read from the South Carolina Code. "However, no federal recreational angling permit, or federal charterboat headboat permit is required for the taking or possession of sharks in the water of the state."

Our General Assembly has made a very, very strong policy statement with regard to federal permitting requirements in state waters. Insofar as I represent the state of South Carolina, and given South Carolina's history, vis-a-vis federalism, I think it would just be helpful for the Board to make note of that. But having said that I think the idea of complementary management measures, both from ease of the compliance, as well as making accessible those educational materials is very important.

CHAIRMAN MILLER: Are there any other comments or suggestions? Do the states feel they have sufficient guidance at this point to press forward with this issue? Michelle.

DR. DUVAL: Well I'm not shy. Again, we don't have any problem with providing links to the materials that HMS has produced on our website. You know we would be happy to do so. I think perhaps receiving, if that link could be e-mailed directly to us, we just want to make sure that we're providing the appropriate link to those materials. Then as I said, we are absolutely supportive of additional materials that would assist anglers who are fishing from peers or from shore.

Our concern is just that whatever we are linking to everybody is linking to the same information; so that it is a consistent educational message. I think from North Carolina's perspective we have no problem moving forward; and providing links on our website to the videos that the Highly Migratory Species Division has already produced.

CHAIRMAN MILLER: Assuming this is the path forward for us, Karyl. Could you provide the exact links to everyone, to every coastal state to make sure that in our educational materials they reach the right source?

MS. BREWSTER-GEISZ: Yes, we are actually putting the video, along with our questions, up on our permit web page for educational purposes. Anybody can go to the permit web page and see the video and take the questions. That will happen when we make the switch over to issuing 2018 permits; so that should be November timeframe.

Anyone will be able to watch the video, take the questions. The answers to the questions have links to all of our materials. The question that I have for all of you actually is I'm hearing some messages that you would like consistent, or at least some of the states would like consistent shore and peer-based best practices, which I'm all in favor for. The question is more of, is that really what I'm hearing and how do we start that process?

CHAIRMAN MILLER: Yes the question is who will tailor made this advice for shore and peer fishing? Obviously we're not going to resolve that just at this particular juncture. But certainly Karyl can provide the linkage to the federal websites, at least for vessels fishing in internal waters for sharks. It will be up to the states to provide links to that information, provided in our education and outreach materials.

I'm not hearing any consensus or any suggestions even, towards making that mandatory. But it appears to be a voluntary

compliance measure. Are there any differing opinions on that or is everyone pretty much on the same page that it should be voluntary? I'm seeing some heads nod for the voluntary. Does anyone feel otherwise on that? All right thank you. Michelle, I think you wanted to raise another issue as well. Did you not?

DR. DUVAL: Yes, just I think a couple things. I think one of the other questions that was raised was, and I think that NOAA Fisheries has requested complementary measures for is the use of circle hooks when fishing for sharks. As I indicated that is already a requirement for the commercial fishery in North Carolina, when fishing on coastal sharks within state waters.

That is already a requirement of our proclamation. We do have concerns, which for folks who read through the materials would have seen, with regard to having a circle hook requirement for recreational fishermen. I think this is reflective of what the Law Enforcement Committee pointed out, the issue is determining targeting.

Our concern was also that anglers are likely to be much more receptive to a positive encouragement to use circle hooks as part of best handling practices when fishing for certain species, as opposed to making this a mandatory compliance element. I just wanted to reiterate that is where North Carolina stands on the circle hook issue. We would prefer to provide positive encouragement, rather than making that a mandatory requirement within state waters.

I think the folks who are fishing, engaged in directed fishing for sharks in federal waters. Those are folks who are really shark fishermen. That is what they plan to go out and do, and I think for a lot of anglers fishing within state waters, they are not looking necessarily to target sharks. I'm not saying everybody, but they're not necessarily looking to target sharks. If they happen to pull up a shark, and are faced with a compliance of having to use a circle hook. We're just concerned that that is actually going to have a negative impact, in terms of angler attitude. Thank you, it sounds like Robert wants to speak to that point, and then I'll come back to the research permit.

CHAIRMAN MILLER: All right, I'll call on Robert.

MR. BOYLES: Dr. Duval said it very, very well. I mean in addition to sharks there are a number of species that we're watching now that we are developing and have developed best practices for. Circle hooks are a very, very big part of that; leader lengths, fixed weights, those kinds of things, in the red drum fishery for instance.

We already have a very vibrant outreach campaign now, and certainly think that this is in keeping. I agree with Dr. Duval's comments. You are concerned about targeting, specifically recreational fishermen fishing in state waters could be out shark fishing, could be out red drum fishing, it could be flounder fishing.

I think it makes it puts our Law Enforcement Division in a very difficult spot, in terms of looking at those violations. The last thing I would like to say is you know we have found a good success, in terms of engaging the recreational anglers as partners in stewardship and conservation with these voluntarily measures, as opposed to mandatory measures.

CHAIRMAN MILLER: Are there any further comments? I take it, by the fact that no one has additional comments that there is no one that feels that circle hooks, for instance, should be mandatory in state waters for fishing for sharks. But that no one would oppose any given jurisdiction from providing additional outreach materials recommending circle hooks when fishing for sharks. Is that a fair summarization of the general feelings of the Board?

I'm not seeing any negative responses, so I'll take that as a positive. Have we covered everything on this particular agenda item? Is there anything further we need to take care of? There was a public comment, and I think it was

on this agenda item. Would you come forward and identify yourself, Katie? Thank you.

MS. WESTFALL: Good afternoon, my name is Katie Westfall; I'm the Senior Manager of Highly Migratory Species Advocacy at the Environmental Defense Fund, and a member of the Coastal Sharks Advisory Panel. I appreciate the opportunity to provide public comment today on this agenda item, and strongly support the Commission adopting complementary management measures to Highly Migratory Species Amendment 5b, which aims to end the overfishing of dusky sharks, and rebuild their population.

It sounded like there was interest in voluntary measures; but specifically I would like to strongly encourage the Commission to require that anglers fishing for sharks obtain a shark endorsement, including the completion of online shark identification and fishing regulation training course. As you know, at least 19 shark species are prohibited in both the federal fishery and according to the ASMFC Coastal Shark Plan, including dusky sharks.

Unfortunately, many sharks caught intentionally and accidentally in recreational fisheries fall into this prohibited group. Over the past decade on the east coast alone, 1.2 million prohibited sharks were caught in both state and federal waters, along with an additional 17.5 million sharks that were reported as unidentified; because anglers either did not or could not identify at the species level. While some of these sharks will survive after release, many will die after being mistakenly landed or mishandled, because anglers do not know fishing regulations, safe handle and release practices, or how to identify the species. The landing of dusky sharks, for example, has been prohibited since 2000, but overfishing continues.

Recreational fishing in state and federal waters represents the largest source of interactions with dusky sharks by an order of magnitude, highlighting the need for increased stewardship by anglers. For a species like dusky sharks, which is prohibited due to its vulnerable life history characteristics, even low levels of mortality harm that population and hamper recovery efforts.

Recent research suggests that anglers themselves under appreciate the impact they can have with catch and release fishing; and at the same time studies indicate that education efforts that train fishermen to safely handle and release sharks, can reduce the amount of mortality that occurs after release.

It's particularly important that the Commission takes action to adopt complementary measures to this endorsement; because tens of thousands of individuals fish for sharks from boats, peers, and shorelines on the east coast. Indeed, this estimate may be low by an order of magnitude, as these numbers are not currently known.

As noted in a recent study, it's also important to recognize that land-based-shark fishing has the potential to cause more stress to sharks as they're dragged over rough terrain onto the shore without the buoyant support of water. This type of handling makes sharks more susceptible to injury, and less likely to survive if released.

Requiring an endorsement and related training would increase the ability of anglers to correctly identify dusky and other prohibited sharks, comply with regulations, and safely handle and release these sharks. Thus, adopting this measure would aid in the rebuilding of the dusky shark population.

Further, these measures would help to improve the data for the recreational sector in state waters, as it would increase the chances that anglers are correctly identifying shark species. It would also help to identify the universe of fishermen who are targeting sharks, which could provide a population to sample from, in order to improve recreational estimates for dusky and other sharks.

In addition to the shark endorsement, we recommend that states expand outreach and educational efforts to recreational fishermen in state waters, which could include trainings and workshops. In order to implement such an effort, at a minimal cost states could use the NMFS produced outreach materials that we talked about today.

In addition to those materials, it was heartening to hear the support for the development of shore-based fishing best handling practices, as that is currently missing. Thank you very much for the opportunity to comment on this important issue, and for your consideration of the recreational shark endorsement.

SET 2018 SPECIFICATIONS

CHAIRMAN MILLER: Are there any questions or comments to direct to Katie, before she walks back? Seeing none; thank you very much. All right, we'll move on to the next to the last agenda item, and that is set the 2018 Specifications for shark fishing. I'm going to call on Kirby, initially to tee that up for us.

MR. ROOTES-MURDY: I'm going to actually pass it down to Karyl; who has a PowerPoint ready for it.

MS. BREWSTER-GEISZ: I will be really fast on this. This is in regard to our proposed rule for quotas, opening days, retention limits for the 2018 Atlantic shark commercial fishing season. I am focusing only on the Atlantic Region. We issued a proposed rule in August. Real short summary, this proposed rule proposes the exact same thing that we implemented in 2017.

The exact same quotas all around, which means that Atlantic smoothhound sharks, which is essentially smooth dogfish in the Atlantic, has an increase, because they under harvested the quota. Everybody else has the base quota that we have set up. We are proposing opening all shark management groups on January 1.

We are proposing that the large coastal retention limit be 25 sharks other than sandbar per vessel per trip. If the quota is going really fast at the beginning of the year, we would reduce the retention limit, probably to about three. That's what we did this year. Come July 15 or so, we will increase it back up to 36, is what we proposed.

This is pretty much exactly the same that we did this year. Except for a couple modifications in the retention limit, it's the same that we did in 2016; both in 2016 and 2017 the large coastal fishery continued through the entire year. We are not expecting it to close at this point. Comment period ended on September 21. We did not receive any comments opposed to this. We did not receive any comments from any of the states.

We had a couple comments from people generally about shark fishing, some people who don't like shark fishing at all, and wanted us to close all commercial fisheries, and some people who were supportive of having quotas but were concerned about the enforcement. Other than that all the comments we received were in favor of what we proposed for the Atlantic. We are working on the final rule. Here are all the numbers in a really small font, so I'm not going to read it to you. You can look at it on your own.

CHAIRMAN MILLER: Are there any questions for Karyl? Seeing none; I'll look to the Board for a possible motion. Rob O'Reilly.

MR. O'REILLY: Thank you, Karyl, and as I stated last year, it's really important that over time NOAA has been able to allow other states to enjoy the fishery. That's certainly the case in Virginia. We're very happy about that. With the variable possession limits that's made all the difference, and after July 15, we are able to pursue some sharks, which is good.

Thank you again, and my motion is move to approve the 2018 Coastal Shark Specifications via an e-mail vote after the NOAA Fisheries

publishes the final rule for the 2018 Atlantic Shark Commercial Fishery Season. This is not a precedent, this has happened before where we've had the e-mail vote.

CHAIRMAN MILLER: Does anyone care to offer a second? First hand I saw, is that Tom Baum? Tom. **Is there any discussion on the motion? Seeing none; are we ready for a vote? Is there a need to caucus? Is there any opposition to approving this motion? Seeing none; I assume it's approved as offered. Thank you.**

ELECT VICE-CHAIR

CHAIRMAN MILLER: The last agenda item is we need to elect a Vice-Chair. Does anyone have a suggestion? Spud.

MR. A.G. SPUD WOODWARD: I would like to nominate Patrick Geer for Vice-Chair of the Coastal Sharks Board.

CHAIRMAN MILLER: **Is there a second? Robert. Are there any further nominations? Seeing none; congratulations, Pat. You're the new Vice-Chair. (Applause)**

OTHER BUSINESS

CHAIRMAN MILLER: All right, is there any other business to come before the Shark Board? Michelle.

DR. DUVAL: Sorry, not to go back to a previous issue, but I just wanted to make a quick comment on the shark research fishery, and the request by HMS to develop cooperative research opportunities in state waters. I know we struggled with this in North Carolina a little bit, because of our regulations, and it is in regulation that we do require a scientific or academic institution to be the holder of that permit, just so that we do not have individuals applying to do "research".

We just want to make sure that there is valid, scientific research being done. I don't anticipate that those regulations will change, so we're going to have to try to work towards some solution. But because we do want to support those types of research activities in state waters where we can, you know I did note that we do have one individual who participates in that fishery right now.

There was a researcher from the Northeast Fishery Science Center, I think a Mr. Milliken who did obtain one of our Scientific and Educational Collection Permits, in order to work with this individual. Perhaps Karyl and HMS staff can look into that and a similar solution can be found.

CHAIRMAN MILLER: Thank you for that suggestion and the comment, Michelle. Is there anything further for the good of the Shark Board? Toni.

MS. TONI KERNS: Not necessarily for the Shark Board, but I did want to make an introduction, who I haven't even made myself an introduction yet. Some of you may remember Najih Lazar; he used to work for the state of Rhode Island, and now he is at the University of Rhode Island, Coastal Resources Center. He is here with a delegation of folks from Ghana; including their Deputy Minister and their Director of Fisheries. They are here to learn about the Commission and our process.

They too have a fisheries commission that they are working to get together to work on rebuilding their fishery resources. They're here to just learn about our process. They will be here tonight with us at the annual dinner. I don't know if you gentlemen want to stand up so folks can see you, or just say hello. Please make sure folks introduce yourselves, (Applause) and let them know how our Commission works. That is it. I think we'll start Eel on time at 2:30.

ADJOURNMENT

CHAIRMAN MILLER: Welcome, and if there is nothing further, I guess we're adjourned.

(Whereupon the meeting adjourned at 2:10
o'clock p.m. on October 17, 2017)

REPORT OF THE 2017 ICCAT SHORTFIN MAKO ASSESSMENT MEETING

(Madrid, Spain 12-16 June 2017)

1. Opening, adoption of Agenda and meeting arrangements

The meeting was held at the ICCAT Secretariat in Madrid, June 12 to 16, 2017. Dr Enric Cortés (USA), the Species Group ("the Group") rapporteur and meeting Chairman, opened the meeting and welcomed participants. Dr Miguel Neves dos Santos (ICCAT Assistant Executive Secretary) addressed the Group on behalf of the ICCAT Executive Secretary, welcomed the participants and wished them the best for this important assessment. The Chairman proceeded to review the Agenda which was adopted with minor changes (**Appendix 1**).

The List of Participants is included in **Appendix 2**. The List of Documents presented at the meeting is attached as **Appendix 3**. The abstracts of all SCRS documents presented at the meeting are included in **Appendix 4**. The following served as rapporteurs:

Sections	*Rapporteur*
Items 1, 7 and 8	P. de Bruyn
Item 2	J. Fernández Costa, E. Cortés, R. Coelho, D. Macias, M. Byrne, P. De Bruyn
Item 3	D. Courtney, B. Babcock, H. Winker, H. O'Farrell, D. Die, D. Parker
Item 4	D. Courtney, B. Babcock, H. Winker, H. O'Farrell, D. Parker, E. Cortés, M. Kai, P. de Bruyn
Item 5	B. Babcock, H. O'Farrell.
Item 6	E. Cortés, G. Diaz, A. Domingo

2. Summary of available data submitted by the assessment data deadline (30 April 2017)

2.1 Stock identity

No new information was presented on stock structure.

2.2 Catches

The Secretariat stated that very little Task I or II information had been received since the data preparatory meeting in March. The major change was the receipt of Task I catches from South Africa for the southern stock. This submission filled an important gap in the catch series for the southern stock.

Document SCRS/2017/110 provided updates on the alternative hypothesis for the reconstruction of time series of catches for north and south Atlantic stocks of shortfin mako shark. It was noted that the reconstruction of shark catch time series is important for stock assessments, as the nominal catch data on sharks is usually limited. The estimation method is based on ratios of shark catches to catches of the main target species obtained from observer programs, literature reviews, and/or personal communications.

The Group noted that these estimated catches were significantly higher than the official Task I catches (**Figure 1**), particularly for the historic time series. It was acknowledged that the Task I data, particularly in the early part of the time series, are highly uncertain due to the lack of reporting of shark captures during that period. The estimation presented here provides a potentially more realistic representation of the captures for the early years of exploitation. It was thus recommended that these estimations be used in an alternative model run for each of the models.

It was also questioned whether trade data had ever been used to estimate total catches for shortfin makos. It was noted that fin trade data had been used in the past for blue sharks (Anon, 2016), but that these estimates were only valid until 2012 (due to the trade data collected) and also were dependent on the ICCAT Effdis data used in their estimation, which is currently under revision.

2.3 Indices of abundance

Document SCRS/2017/108 provided standardized CPUEs for the shortfin mako shark from the Spanish surface longline fleet targeting swordfish in the North and South Atlantic Ocean over the period 1990-2015. Standardization was based on GLM analysis of trip data. A base case and two sensitivity analyses (GLM and MIXED procedure) were carried out. Area was identified to be the most relevant factor explaining the CPUE variability in all models. The base case explained between 40-46% of CPUE variability. All tested scenarios showed very similar and stable trends in general CPUE over time in the North and South Atlantic stocks during the 26 years analyzed.

The Group discussed the use in the model of the variable "type of trip" (ratio) defined as the percentage of swordfish in relation with the total of swordfish plus blue shark catches. The Group suggested the use of clusters in the analysis instead of the ratio to avoid redundancy in the model. Researchers of EU-Portugal, whose fleet is similar to the EU-Spain fleet, carried out an analysis of clusters in their fleet and, they obtained the same results using clusters as when using ratios. Furthermore, the clusters showed the same redundancy in the model. Taking into account the previous considerations, and the history of the EU-Spain fishery, the authors consider that the ratio is a good indicator for the criteria of the skipper targeting swordfish and/or blue shark during a fishing trip.

A question was raised about the number of zero catches and the authors indicated that there was a low proportion of trips with zero catches (mean values of 2.8% and 4.3% for the North and South Atlantic stocks, respectively). In addition, the zero catch trips showed a stable trend over time. The Group welcomed this update to the EU-Spain North and South LL CPUE series and recommended that they be considered for the assessment models.

SCRS/P/2017/017 presented a new standardized CPUE data time series for shortfin mako shark caught by the South African large pelagic shark longline fleet for the Group to review. The majority of these catches occur in an area that straddles the ICCAT/IOTC 20 degree boundary, which is a known juvenile aggregation area. Given the uncertainty regarding regional assignment of this boundary stock, the Group suggested that the standardized CPUE indices should not be included in the assessment of the South Atlantic shortfin mako shark.

2.4 Biology

Document SCRS/2017/111 presented the results of the age and growth Project for the North Atlantic within the ICCAT-SRDCP - Shark Research and Data Collection Programme. Ageing from vertebrae and growth models were presented for the North Atlantic. A 2-parameter von Bertalanffy growth model provided the most biological reasonable estimates, especially for females. The difference in growth parameters between males and females was noted, with males having almost double the growth rate of females.

Additionally, preliminary plots of the integrated growth analysis using both tag-recapture data and age readings was shown (work done in cooperation between ICCAT and IATTC scientists). For this analysis the ICCAT conventional tag data are being used. It was noted that for this model it is not possible to have sex-specific parameters, because of the current structure of the ICCAT tagging dataset (sex data currently not available). The Group acknowledged the work done so far and encouraged the continuity of this integrated growth analysis.

Document SCRS/2017/126 presented estimates of maximum population growth rate and steepness for shortfin makos in the North and South Atlantic Ocean. A dual life table/Leslie matrix approach was carried out to obtain estimates of productivity (r_{max}), net reproductive rate (R_0), generation time (μ_1), and steepness derived analytically. Natural mortality at age was obtained from the minimum of five estimates obtained through different life history invariant methods to approximate maximum population growth rate.

It was noted that productivity estimates from the North Atlantic are different from those in the South, with the South having higher estimated r_{max}. Regarding mortality, the estimated mortality rates of males and females are very different in the younger ages. It was discussed that mortality should be the same for males and females up to the age at maturity for males, because length at age up to approximately age 8 is similar for males and females and feeding grounds are probably similar. It was further discussed that because the objective is to approximate ideal conditions and a maximum density-dependent response to obtain r_{max}, use of a Lorenzen or similar size-specific life history invariant method to predict mortality results in extremely low or even negative values of r_{max}. Therefore, it was thought that making mortality rates of males equal to those of females as described in the paper was the best approach to produce credible estimates of r_{max}.

SSB_{MSY}/SB_0 and steepness were obtained analytically from the life table/Leslie matrix approach. The inflection point was translated into the shape parameter for the generalised Pella Tomlinson surplus production function by (SCRS/2017/P/020 and SCRS/2017/135):

$$\frac{SB_{MSY}}{SB_0} = m^{\left(-\frac{1}{m-1}\right)}$$

2.5 Length compositions

The results provided at the data preparatory meeting (Coelho *et al.*, in press) were used for the stock assessments. EU-Spain provided additional length composition data (2009-2015) that was also used.

It was noted in presentation SCRS/2017/P/017 that the majority of length-frequency data from South Africa came from the Indian Ocean, and not the Atlantic.

The full description of the use of the size data is in Section 4 of the report.

2.6 Other relevant data

The presentation SCRS/P/2017/022 provided updated results of a study presented at the data preparatory meeting that quantified fishing mortality of satellite-tagged shortfin makos in the western North Atlantic. The update included 11 additional individuals and an additional year of tracking data. The updated results were similar to those reported previously, with ca. 28% of tagged sharks harvested and F = 0.32 (0.19 – 0.53). It was noted that results may not be representative of the entire stock because the study was limited to immature sharks only tracked within the western North Atlantic. It was suggested to compare fishing mortality rates from stock synthesis over the ages of the sharks that were tagged. The presentation also included movement and behavior data for satellite-tagged sharks which highlighted low spatial overlap of sharks tagged off the northeast coast of the U.S., and off the Yucatán Peninsula in Mexico. Behavioral analysis of these sharks indicated two distinct core areas of intensive use corresponding to the mid-Atlantic Bight and the western edge of the Yucatán Channel.

Document SCRS/2017/129 reported on anomalously high landings of mako sharks relative to blue sharks reported by 21 E.U. longline fishing vessels in 2008. The authors suggested that the high mako landings may have been a result of misreporting where swordfish were reported as makos.

The Group raised a number of concerns with this hypothesis. Firstly, it was noted that swordfish quotas were not reached in 2008, and it was therefore unlikely that fishers would disguise swordfish landings as makos. Secondly, available ICCAT landing data did not indicate a noticeable spike in mako landings during this time period. It was therefore suggested by the Group that these perceived anomalies are likely artefacts of data reporting and fleet behavior. Reasons for this include that landings were reported in weight (kg) which may not be a reasonable proxy for numbers of individuals landed (i.e. several large makos would weigh more than many small blue sharks). The Group advised caution when interpreting landing data as long-range boats may employ strategies that do not allow the direct relation of landings to trips.

Document SCRS/2017/130 reported spatially explicit mako shark landings of two longline vessels during a 16 year period (1997-2012). The presentation described CPUE changed over time for the two vessels, as well as where the vessels fished in relation to shark densities described by satellite tagging data.

The possibility of using habitat selection results derived from satellite tracking data in the North Atlantic to predict distributions of sharks in the data-poor South Atlantic was discussed, to which the Group noted that ICCAT is currently engaged in several satellite tagging studies. The Group suggested that interpreting any change in CPUE should be considered in relation to changes in gear and fishing methodology.

3. Methods and other data relevant to the assessment

3.1 Production models

Bayesian Surplus Production Model (BSP)

Babcock and Cortés (in press) (which updated the same document presented at the data preparatory meeting) presented a comparison of Bayesian Surplus Production (BSP) model software applications. The paper applied both the BSP1 software (without process error) and the BSP2 software (with process error), and two independent MCMC software packages, JAGS and Stan, to the data from the 2012 mako shark assessment for the North Atlantic to determine whether the results are consistent. The authors also used the SIR and MCMC algorithms from the LearnBayes R library to fit the same function with both algorithms. Although all the modeling approaches give fairly consistent posteriors for r, the posteriors of K were somewhat different. This may be because there is a long period of catches with no CPUE data, or because the catch and CPUE data are not consistent with each other. The lack of information in the data may cause the model to be sensitive to minor differences in how the model is configured.

The 2012 shortfin mako assessment used the BSP VisualBASIC software that does not include process error (BSP1, Babcock and Cortés (in press)). As a continuity run, the same software was used with similar settings, applied to the updated data for both the North and South Atlantic (**Appendix 5**). Because the models did not adequately capture the trends in the CPUE indices, the version of the VisualBASIC software that includes process error (BSP2) was also applied. Finally, a model was coded with similar priors and assumptions to the BSP models in JAGS; this model will be referred to as JAGS2-BSP.

For the BSP1, BSP2, and BSP2-JAGS runs, catches were either the catches from the data preparatory meeting (C1), starting in 1950 in the north and 1971 in the south, or the alternative estimated catch series (C2) based on ratios (SCRS/2017/110), starting in 1971. The prior for the starting biomass ratio B0/K was lognormal with a mean of 1 and log-sd of 0.2 for the southern runs, and for the northern runs starting in 1950. For the northern runs starting in 1971, the mean was 0.85, with the same log-sd. The CPUE series in the north were US-Log, JPLL-N, POR-LL-N, ESP-LL-N, and CH-TA-LLN. In the south the CPUE series were UR-LL-Log, JPLL-S, BR-LL, UR-LL-Obs, ESP-LL-S, and CH-TA-LLS. The observation error standard deviation was estimated as a single parameter for the BSP1 runs (equal weighting). It was estimated separately for each series in the BSP2 and BSP2-JAGS runs. In all cases, the prior for K was uniform on log(K) between 0.001 and 5 million. The prior for r was calculated by converting updated ranges for r (SCRS/2017/126) into informative lognormal distributions following the approach outlined in (SCRS/2017/135), which resulted in a mean of 0.0254 and log-sd of 0.434 in the North Atlantic and a mean of 0.052 and log-sd of 0.275 in the South Atlantic. For the North Atlantic, we used either the Schaefer model, or the generalized production model as implemented in BSP1 with a shape parameter of 5 ($B_{MSY}/K=0.67$) (McAllister *et al.*, 2000). For the South Atlantic, only the Schaefer model was used.

To evaluate the relative impact of the priors, catches and CPUE data on the model outputs, a post-model pre-data run was conducted with BSP2-JAGS (model with priors and catch data but without CPUEs), and also fitted the model to each index separately.

Projections were implemented within the BSP2-JAGS model with fixed TACS from 0 to 4,000 t in increments of 500 t, with a time horizon of 50 years (approximately 2 generations; SCRS/2017/126). The projections set the catch in 2016 and 2017 equal to the catch in 2015, and catches from 2018 forward were equal to the TAC. The biomass relative to K was projected forward using random draws from the process error equation within the JAGS MCMC algorithm.

Just Another Bayesian Biomass Assessment (JABBA) model

In addition to BSP1, BSP2, and BSP2-JAGS runs, the recently developed Bayesian State-Space Surplus Production Model R to JAGS interface framework, JABBA, was applied to the North Atlantic (NA) and South Atlantic (SA) shortfin mako shark catch and CPUE data series (SCRS/2017/135). JABBA represents a further development of the modeling framework applied in the 2016 ICCAT South Atlantic blue shark assessment (Carvalho and Winker, 2015), the 2017 North Pacific blue shark assessment (Kai *et al.*, 2017) and the 2017 Mediterranean Albacore assessment. The inbuilt options include: (1) automatic fitting of multiple CPUE time series and associated standard errors, (2) estimating or fixing the process variance, (3) optional estimation of additional observation variance for individual or grouped CPUE time series and (4) specifying a Fox, Schaefer or Pella-Tomlinson production function by setting the inflection point B_{MSY}/K and converting this ratio into a shape parameter m.

For the JABBA runs, the same lognormal r and intitial biomass depletion ($\varphi = B_1/K$) priors as for the other BSP model versions were used. All catchability parameters were formulated as uninformative uniform priors, while the process variance and observation variance were implemented by assuming inverse-gamma priors (SCRS/2017/135). To incorporate available standard errors of the year-effect estimated from the standardization models, an additional variance approach for the observation error variance was adopted.

Monitoring the trace and applying Gelman and Rubin (1992) and Heidelberger and Welch (1983) diagnostics suggested that convergence of the MCMC samples to the posterior distribution was achieved after only 100,000 iterations, sampled with a thinning rate of 10 with a burn-in period of 20,000 for each of the two chains.

As additional model performance diagnostics, a jackknife procedure and prediction-validation was applied, including a visual inspection of the retrospective patterns for the C1 catch series runs for the North and South Atlantic. For the jackknife, the Group focused on the relative influence of individual CPUE series by dropping one CPUE at a time and predicting CPUE and the stock status (B / B_{MSY} and H / H_{MSY}) trajectories where H = C/B as defined in SCRS/2017/135. It is used interchangeably in this case with F for surplus production models. For the prediction-validation, the last ten years of CPUE observations were iteratively excluded, the model was refitted and projected forward until the final year 2015. During each backward-iteration, all CPUE observations were removed simultaneously for the respective year. The retrospectives were visualized by only showing projections for the next year instead of projecting all the way forward to the final year 2015.

3.2 Other methods

Catch-only Monte-Carlo method CMSY

Typical production models use time series of catch and fitting of abundance indices to estimate productivity. Instead, the CMSY method uses catch and productivity to estimate biomass, exploitation rate, MSY, and related fisheries reference points as well as the resilience of the species from catch data. In doing so, CMSY provides an alternative assessment tool for situations where CPUE indices are not available or potentially unreliable. Assuming underlying population dynamics of the Schaefer Model, probable ranges of parameters r and K are filtered with a Monte-Carlo algorithm to detect 'viable' r-K pairs. As such, CMSY builds on the concepts of the Catch-MSY method of Martell and Froese (2013), but the main achievement of CMSY compared with the Catch-MSY method lies in overcoming the problems created by a triangular, rather than ellipsoid, distribution of the viable r-k pairs as a result of the Monte-Carlo filtering procedure. Other improvements include adding estimation of biomass and exploitation rates as standard CMSY output and the implementation of a Bayesian state-space Schaefer surplus production model (CMSY.BSM) as a routine tool within the CMSY software (Froese *et al.*, 2016).

For the purpose of this assessment, an "ICCAT-friendly" version (CMSY_ICCATv2.R) was developed for the original CMSY R code by Froese *et al.* (2016) to facilitate comparison of CMSY results with outputs of conventionally used Bayesian surplus production models. Among the newly implemented features are: (1) a plot comparing normalized trends of CMSY biomass projection to observed and predicted CPUE from the CMSY.BSM, (2) plots comparing CMSY distributions for K, r, $Bcur/B_{MSY}$ and $Fcur/F_{MSY}$ to the corresponding posteriors from the CMSY.BSM, as well as priors for K an r and (3) a Kobe-type biplot that allows comparing the CMSY and CMSY.BSM trajectories of the ratios F/F_{MSY} (y-axis) over B/B_{MSY} (x-axis).

For the purpose of comparability, the same r ranges as for the BSP models were used. The CMSY framework allows setting depletion priors (B/K) for the start, middle and end of the time series, which are mainly required for CMSY. The same informative B / K uniform prior range for the first year as Bstart / K = 0.85-0.99 was assumed and vaguely to moderately informative prior ranges for the intermediate Bint / K = 0.3 - 0.9 and final year 2015 Bend / K = 0.1 - 0.8. The only difference between the North and South Atlantic was the setting of the intermediate year to 1990 and 1995, respectively. For the C2 catch time series the authors only adjusted Bstart / K = 0.6-0.99 to allow more flexibility.

3.3 Length-based age-structured models: Stock Synthesis

A length-based age-structured statistical model was implemented with Stock Synthesis (Methot and Wetzel, 2013) version 3.24U (SS3; e.g. Methot, 2015) for the North Atlantic shortfin mako stock. A sex-specific model was implemented to allow for observed sex-specific differences in length and maturity at age. A two-stage data weighting approach was implemented (Francis 2011) to iteratively tune (re-weight) variance adjustment factors for the different fleet-specific data sets (relative abundance indices and length frequency distributions of the

catch) used in the model. This approach was previously investigated for North Atlantic blue shark (Courtney *et al.*, 2017). Available time series for 1950-2015 of catch, relative abundance, relative abundance coefficients of variation, and length composition data considered for use in the SS3 model runs were assigned to twelve modelled fleets of catch and six modelled surveys of relative abundance. The catch series used corresponds to C1. During the meeting C2 was used as a sensitivity. Length composition data by sex in 10 cm bins were available for four modelled fleets (Japan LL, Chinse Taipei LL, USA LL, and Venezuela LL) and a length composition for combined sexes was used for one modelled fleet (EU España + Portugal LL). Catch for the remaining five fleets and relative abundance for all surveys were assigned to one of the available length compositions indentified above. Life history inputs were obtained from data first assembled at the 2014 Intersessional meeting of the Shark Species Group (Anon., 2015), and revised during the 2016 Intersessional Meeting of the Shark Species Group (Anon., 2017) and the 2017 Shortfin Mako Shark Data Preparatory Meeting (Anon. (in press)). The model considered age groups zero to 30+. Mean length at each age was assumed to follow a normal distribution and the CV of the mean length at age was assumed to be a linear function of length. Maturity was assumed to change with age. The resulting pup production varied between age groups and was also a function of the length of the mating and gestation cycles. Model convergence was based on whether or not the Hessian inverted, although other convergence diagnostics were also evaluated. Uncertainty in estimated and derived parameters was obtained from asymptotic standard errors calculated from the maximum likelihood estimates of parameter variances at the converged solution. More details of the implementation of SS3 for North Atlantic shortfin mako can be found in SCRS/2017/125.

Natural mortality and stock-recruitment relationship

The Group discussed the plausibility of males having approximately two times higher natural mortality (M) schedules than females at lower ages. The M schedules were assumed, in part, because the estimate of growth completion rate, k, of males was almost double that of females. However, the different M schedules at lower ages are implausible because the length at lower ages of males and females are very similar, especially until both sexes reach maturity. Therefore the Group assumed that males and females have the same M schedules until the age at maturity. The length-at-age of males and females differs after reaching maturity. However, the M schedules of males and females are likely to be only slightly different after reaching maturity because of the large size reached by mature shortfin makos. Furthermore, the original M schedules of females derived from life history invariant methods are almost constant at age and the biological parameters of females are more crucial than those of males in population modeling. Therefore the Group assumed that both males and females have approximately the same M (0.08) for all ages.

The Group discussed the applicability and parameterization of the Low Fecundity Spawner Recruitment (LFSR) developed by Taylor *et al.* (2013) to the stock-recruitment (SR) relationships of shortfin mako in the North Atlantic. The LFSR is a survival based SR function and the equation can produce a variety of SR relationships and pre-recruit survival against pups or spawning biomass. The shape of SR-relationships is governed by two parameters, Sfrac and Beta. The former represents the reduction in mortality as a fraction of –log (unfished recruitment over unfished spawning biomass) and the latter controls the shape of the density-dependent relationship between spawning depletion and pre-recruit survival. The LFSR can produce the same SR relationships as those with the Beverton-Holt (BH) model and the two parameters of the LFSR from the value of steepness (Taylor *et al.* 2013) can be compared. Document SCRS/2017/132 concluded that the LFSR is more suitable for shortfin mako sharks than the BH model because the LFSR can produce a pre-recruit survival against pups or spawning biomass with an increase in survival occurring fastest closer to the unfished equilibrium (convex decreasing survival). In contrast, the pre-recruit survival of the BH model increases fastest at low spawning output (concave decreasing survival). After discussions, the Group decided, although not unanimously, that the concave decreasing survival is less likely for shortfin mako (with survival decreasing fastest at low stock size) and it may be more reasonable for shortfin mako to expect that offspring survival would decrease fastest due to competition when the population approaches unfished biomass level (Beta > 1). The Group then selected parameters of the LFSR (Sfrac=0.171, Beta=3) from two convex decreasing survival curves (Beta=2 and 3) proposed by Document SCRS/2017/132. Based on the comparisons of the likelihood computed by the SS model, the fitting of the model (Beta=3) to the data was slightly better.

4. Stock status results

4.1 Production models

North Atlantic

BSP

For the North Atlantic, all the continuity analysis models in BSP1 converged adequately with percent maximum weight less than 0.5% and similar values of the log(weights) and log(likelihood*priors). All BSP1 results had high K values and were fairly optimistic about current status (**Appendix 5**). However, this model did not fit the abundance trends and was therefore not considered reliable to provide management advice.

When process error was added to the models for the North Atlantic using the BSP2 model, the mode of the posterior distribution was able to track the changes in CPUE indices throughout the time series (**Appendix 5**). These models were not able to converge on the complete posterior distribution, as the percent maximum weight was greater than 0.5% even after 36 million SIR draws. Therefore this model was not considered reliable to provide management advice either.

The North Atlantic BSP2-JAGS model runs all converged adequately, with Gelman-Rubin diagnostics near 1 and effective number of parameters greater than 100 (**Table 1**). The four models were consistent in finding that the mean of current biomass is below B_{MSY} and mean H is above H_{MSY} (**Table 1, Figure 2**). These models all closely tracked the trend in the CPUE series. Although the CVs are wide, current stock status is mostly predicted to be overfished with overfishing occurring (**Figure 3**).

In the diagnostic runs (**Table 2, Figure 4**), the post-model pre-data run caused the population to crash implying that the priors were somewhat pessimistic given the amount of catch that has been removed. When the indices were fitted separately, they were fairly consistent in finding a biomass decline in the 1990s, followed by an increase, but they varied in their estimate of current stock status.

Additional sensitivity analyses done with BSP2-JAGS are presented in **Appendix 5**.

JABBA

Stock depletion (B/K) and status estimates (B / B_{MSY} and H / H_{MSY}) are provided together with the model parameter estimates in **Table 3**. All scenarios consistently predict biomass depletion at close to 50% below B_{MSY} for the final assessment year, 2015, with the range of associated 95% credibility intervals falling entirely below B_{MSY}. The results are therefore similar to the BSP2-JAGS results for the North Atlantic. The estimated H / H_{MSY} trajectories would imply that sustainable harvest rates were already exceeded prior to the 1990s and in 2015 are approximately three to four times higher than sustainable levels.

The jackknife procedure demonstrated that the Schaefer C1 catch run for the North Atlantic (SCRS/2017/135) was fairly insensitive to dropping any one CPUE series at a time as this resulted in hardly discernable effects on the predicted CPUE and stock status trajectories of B / B_{MSY} and H / H_{MSY} (**Figure 5**). The retrospective pattern for the North Atlantic model appeared robust and indicates that the JABBA would have been able to accurately determine the current stock status based on CPUE from 2010 (**Figure 6**).

The prediction validation for the North Atlantic C1 catch scenario suggests that the prediction capacity of JABBA is sufficiently robust to adequately forecast the stock status over time periods of up to eight years, with high accuracy possible over a period of three years (**Figure 7**).

South Atlantic

BSP

The BSP1 continuity runs in the South Atlantic estimated a trajectory where the biomass increased with increasing CPUE (**Appendix 5**). These results are similar to what was found in the 2012 Shortfin Mako Stock Assessment and Ecological Risk Assessment Meeting (Anon., 2013). The BSP2 runs were unable to converge. As the BSP1 model did not fit the abundance trends and the BSP2 model did not converge, neither of these models were considered reliable to provide management advice.

The BSP2-JAGS runs estimated a slightly decreasing biomass trend in the 1970s, before increasing to track the increasing trend in the indices (**Table 4, Figure 8**). The informative prior on B_0/K is probably preventing the model from estimating a lower value of B_0/K. However, the credible intervals are very wide, implying that the trend is very uncertain. At the mean, the population is above B_{MSY}, but the two models disagree on whether the mean harvest rate relative to H_{MSY} is above 1 (**Table 4**).

JABBA

South Atlantic CPUE data were highly variable, and the model was unable to accurately fit the Japanese and Brazilian indices for the South Atlantic shortfin mako stock resulting in considerable noise for the C1 catch series fit (**Figure 9**). In general, the estimated H/H_{MSY} trajectories for South Atlantic JABBA runs show a steadily increasing but fluctuating trend, which started to become unsustainable in the 1990s, peaked around 2005, and then showed a slight decline, but remained unsustainable, in the final year 2015 (**Figure 10**).

The B/B_{MSY} and H/H_{MSY} trajectories for the JABBA model are illustrated by means of Kobe plots for the South Atlantic C1 scenario (**Figure 10**). Contrary to population theory, the trajectory of the South Atlantic stock reveals a clockwise pattern (**Figure 11**) moving from an underexploited state to a recovery as a result of decreasing biomass under sustainable fishing, which is followed by a short period of overfishing before a biomass rebuilding phase during the recent period of unsustainable harvest rate above H_{MSY}. The resulting stock status posterior for 2015 is therefore implausible, with 8% support for an overfished state (red), 3.7% for a sustainable stock (green) and 88.3% (yellow) of the posterior pairs falling within the area of unsustainable harvesting ($H / H_{MSY} > 1$ and $B / B_{MSY} > 1$), despite an extended recent period of biomass increase. This pattern points towards a severe contradiction between the state process in the form of catch and resilience (r) information and the observation process in the form of CPUE data.

The jackknife validation procedure applied to the C1 run for the South Atlantic indicated that removing the Uruguay LL Obs data had the strongest effect on the estimate of B / B_{MSY} with the results being more pessimistic. H / H_{MSY} was fairly insensitive to dropping any of the available CPUE time series (**Figure 12**). The diagnostics revealed a strong retrospective pattern that affected B / B_{MSY}, but again to a lesser extent, H / H_{MSY} (**Figure 13**). Such patterns are undesirable, and the South Atlantic diagnostics highlight the poor performance with regards to the robustness of estimates and forward projections of B / B_{MSY} and H / H_{MSY} estimates in the JABBA model.

4.2 Other methods

South Atlantic

CMSY

The Group first explored the performance of CMSY for the North Atlantic as a proof of concept to be applied to the South Atlantic. Comparisons between CMSY and the CMSY.BSM fitted to U.S. logbook LL CPUE and North Atlantic catch data (1950-2015) showed general agreement for the 2015 estimates of H/H_{MSY} and B/B_{MSY} (**Figure 14**). The estimated trajectories also showed similar trends, albeit with some intermittent divergences in the B/B_{MSY} trajectory. The similarity between CMSY, CMSY.BSM and JABBA for the C1 catch series further corroborates that the North Atlantic CPUE indices can be consistently described by these three modelling frameworks.

Although the CMSY and CMSY.BSM estimates of r and K are more similar for the South Atlantic (**Figure 10**) than for the North Atlantic, the 2015 estimates of H / H_{MSY} and B / B_{MSY} were in poor agreement. The CMSY results suggest that the South Atlantic stock status is as pessimistic as that of the North Atlantic. The strong discrepancy between the fitted models and CMSY, which is independent of CPUE, further highlights that the CPUE-driven stock status estimates for the South Atlantic should be treated with caution. There was agreement between the process error model stock estimates for North Atlantic and the catch-only method CMSY, but strong discrepancies between CMSY and fitted models for South Atlantic. It is therefore likely that the poor fit in the South Atlantic can be attributed to the apparent contradiction between the observation process (i.e. CPUE) and process equation, which is informed by the catch and resilience (*r*).

The CMSY model B/B_{MSY} and H/H_{MSY} trajectories are illustrated by means of Kobe plots for the South Atlantic. C1 and C2 scenarios are illustrated in **Figures 15 and 16**, as well as **Table 5**. The results for CMSY scenario 1 is more pessimistic than that of scenario 2, with scenario 1 indicating that the South Atlantic shortfin mako stock is in an overfished state whereas scenario 2 indicates it is a little above MSY. Both scenarios indicate the stock is currently experiencing overfishing, with scenario 1 indicating strong overfishing and scenario 2 indicating that H is just above H_{MSY}.

4.3 Stock Synthesis

North Atlantic

Three Stock Synthesis model runs were evaluated. Comparisons of stock status indicator trajectories between the three model runs are provided in **Figure 17**. Stock Synthesis model run 1 represented the original model presented to the Group as described in (SCRS/2017/125). The Kobe plot for this model is presented in **Figure 18**. The Stock Synthesis model was updated (Stock Synthesis model run 2) to set natural mortality for males equal to that for females (**Figure 19**). The Group recommended evaluating four Stock Synthesis model runs using the LFSR relationship. Three Stock Synthesis model runs using the LFSR relationship were developed by fixing the Beta parameter at values of 1, 2, and 3, and then solving analytically for the LFSR sfrac parameter values (0.212, 0.176, and 0.171, respectively) which correspond to the original steepness value (0.345) of the BH stock-recruitment relationship used in Stock Synthesis. An additional model run was developed by solving for the LFSR Beta (0.642) and sfrac (0.263) parameter values simultaneously with an optimization routine which correspond to the original steepness value (0.345) of the BH stock-recruitment relationship used in Stock Synthesis. Based on a Group recommendation, the Stock Synthesis model was updated (Stock Synthesis model run 3) to replace the BH stock recruitment relationship with the LFSR relationship using Beta = 3 and sfrac = 0.171 (**Figure 20**). Model results are presented below for model run 3, which the Group considered to be the base run for Stock Synthesis (**Tables 6-8**).

Five model sensitivities were also evaluated as summarized below. Model sensitivity 1 evaluated model sensitivity to uncertainty in *catch* data. Model run 1 was modified by replacing the catch data series (C1:1950-2015) in the model with an alternative catch data series (C2: 1971-2015). Initial fishing mortality was estimated in 1971 by assuming that catch prior to 1971 was equal to the average total alternative catch for the years 1971-1980, and estimating one additional parameter in the model for the initial fishing mortality necessary to remove the historic catch annually. It was noted that the same Stock Synthesis model (model run 1) was not able to estimate initial fishing mortality with the original catch series (C1) when truncated from 1971-2015. It was noted that the ability to estimate initial fishing mortality with the alternative catch data (C2) indicates that the higher alternative catch data early in the time series may be consistent with the other data in the model. In other words, the model sensitivity analysis provided support for higher historic catch. However, the Group discussed that the alternative catch data may not be appropriate at this time for use in the model because of insufficient time to evaluate the SS3 fits to this alternate catch series.

Model sensitivity 2 evaluated model sensitivity to uncertainty in *length-based selectivity*. Model run 2 was modified by replacing the double normal length-based selectivity curves estimated in the model with logistic selectivity consistent with the previous assessment conducted for North Atlantic shortfin mako (Anon., 2013). The previous assessment used empirically derived logistic selectivity at age for roughly the same fleets using available length composition data.

It was noted that results from the sensitivity run 2 showed a different pattern in the modelled population's response to fishing pressure than the results obtained from model runs 1, 2, and 3. In particular, under the sensitivity analysis, the annual spawning stock size appeared to fluctuate slightly over time in response to changes in stock size which resulted from observed changes in fishing pressure and estimated recruitment. In contrast, under model runs 1, 2, and 3 (**Figure 17**) the annual spawning stock size appeared to decrease monotonically over time as if under equilibrium and did not fluctuate in response to observed changes in fishing pressure and estimated recruitment. It was noted that because of the combination of low natural mortality and dome-shaped selectivity in model run 2, there was a large proportion of the modelled population numbers at higher ages (both mature male and mature female) present, in particular the age 30+ age bin. That is consistent with the observation that the body weight of the mature sharks is much higher than that of most of the sharks available to the fishery. Mature sharks are not harvested due to the assumptions of the selectivity curves and the length data. Consequently, the mature biomass at older ages and the 30+ age sharks declined gradually over time only in response to natural mortality and most of the mature fish including the spawner biomass remained, contributing to the recruitment.

It was noted that the model runs 1, 2, and 3 with dome-shaped selectivity appeared to result in hyper stability of spawning stock size (e.g. **Figures 18-20**), i.e. under fishing mortality with dome-shaped selectivity on immature animals, few recruits reach reproductive age and growth overfishing is occurring. The spawning stock then only appears to be stable because the mature sharks are not selected. The Group noted that this is problematic for the management implementation because under this scenario the spawning stock size would not be expected to respond to a reduction in fishing mortality on immature sized animals until after those immature animals mature and contribute to the reproduction, which could be many years.

In contrast, model sensitivity 2, which assumed asymptotic selectivity, did not appear to have a hyper stable spawning stock size, which is more consistent with the expectation of a stock that responds directly to fishing pressure. However, it was noted that the asymptotic selectivity scenario fits to both relative abundance and length composition were very poor. Consequently a lot of work would be needed to identify plausible causes of the poor fit to each data set and to recommend ways of addressing them either in the model, by adding more structure to the model or externally to the model, for example by reformulating the data as was proposed for the bluefin shark assessment (Anon., 2016). It was noted that in an effort to fit the available data expediently for the current assessment, dome-shaped selectivity was allowed based on estimation of the selectivity parameters, which allowed the shape of the selectivity curve at lengths greater than the peak in selectivity to be estimated based on fits to the length composition data.

Model sensitivity 3 continued the evaluation of model sensitivity to uncertainty in *length-based selectivity*. Model sensitivity 3 modified the selectivity for fleet 4 (U.S. LL) to allow the shape of the selectivity curve at lengths greater than the peak in selectivity to be estimated based on fits to the length composition data. The length frequency of sharks caught by the U.S. LL is centered at a smaller size than the other fleets, and this scenario resulted in dome-shaped selectivity for fleet 4 (and all fleets which mirrored the selectivity of fleet 4) and imposed asymptotic selectivity for all other fleets. However, the results of this scenario were similar to the poor fits to relative abundance and length composition as obtained in model sensitivity 2, and was therefore not pursued further.

Model sensitivity 4 evaluated model sensitivity to the *CV in the distribution of length at age*. Model run 2 was modified to estimate the CV for L_{Amin} (female and male). A concern raised by the Group was that the current CVs were based only on uncertainty in the length at age data and did not account for other sources of uncertainty especially for the youngest ages. The Group suggested that the CV for L_{Amin} (female and male) should probably be larger in order to account for this uncertainty in the model. However, the estimated values for the CV of L_{Amin} (0.034 for young females and 0.095 for young males) were smaller than those obtained from the data (0.093 for females and 0.097 for males). This did not seem plausible and was not pursued further.

Model sensitivity 5 evaluated model sensitivity to *stage 2 estimation of effective sample size (effN) for length composition data*. Model run 2 was modified by replacing the eff*N* for length composition obtained with the Francis method with the eff*N* for length composition obtained with the McAllister and Ianelli method. Both methods are defined in the cited references provided in SCRS/2017/125 and were presented and discussed in detail at the 2016 Intersessional Meeting of the Shark Species Group (Anon., 2017), and based on the material presented at that meeting both methods appear reasonable. However, because the two approaches use different methods to arrive at the eff*N*, the resulting values for eff*N* differ. In this case, the eff*N* values obtained from the McAllister and Ianelli method (using the harmonic mean) were higher than those obtained using the Francis method (gave more weight to the length data in the model likelihood). An evaluation of the model likelihood indicated that this also resulted in a relatively worse fit to the abundance indices. This result suggests that there is conflict in the data when used in the assessment (i.e. increasing the weight given to one data set in the model likelihood resulted in worse fit to another data set). The Group suggested that when there is data conflict in an assessment model, then it is important not to let the fit to length composition reduce the fit to the indices. Consequently the Group recommended using the relatively lower eff*N* provided by the Francis method.

General comments on the Stock Synthesis model

Although several misspecifications and uncertainties might be included in the current model setting, the current base model of SS3 converged reasonably well and produced reasonable results for the available fishery and biological data. In consideration of the biological and fisheries characteristics (i.e. age- and sex-specific growth, sex-specific mature size, fecundity proportional to body length, low-fecundity stock recruitment relationship, lower natural mortality through all the age classes, and all fleets are only selecting immature sharks and the availability and vulnerability is different by sexes) of shortfin makos, the results of the sex- and age-specific structured model (SS) may in the future be more suitable to provide the management advice than production type models (BSPM) once the model has been fully explored.

It is worth noting that high values of F (>0.20) were obtained with SS3 starting in 1993. These values are consistent with those estimated from satellite tagging data for shortfin makos of similar lengths and ages. Specifically, the F value derived from tagging (SCRS/P/2017/022) for the period 2013-2016 was 0.33 (0.19-0.56 95% CI) and the F values estimated in SS3 for 2013-2015 ranged from 0.21 to 0.25.

4.4 Synthesis of assessment results

Considerable progress was made since the last assessment on the integration of new data sources (in particular size data and sex-specific information) and modelling approaches (in particular model structure). Uncertainty in data inputs and model configuration were explored through sensitivity analysis. The production models in the South had difficulty fitting the increasing trends in the CPUE series combined with increasing catches. The results obtained from these models for this region were implausible as there is conflict between the data and the model assumptions. Management advice was thus based on the CMSY model in the South. The results are summarized below.

North Atlantic

For the North Atlantic stock, scenarios with the BSP2-JAGS estimated that the stock was both overfished (B_{2015}/B_{MSY}=0.63 to 0.85) and that overfishing was occurring (H_{2015}/H_{MSY}=1.93 to 3.58). The probability of the stock being overfished and experiencing overfishing was 82.1 – 97.8% (Kobe red zone: **Figure 21**). The JABBA model indicated that the stock was both overfished (B_{2015}/B_{MSY}=0.57 to 0.76) and that overfishing was occurring (H_{2015}/H_{MSY}=3.75 to 4.37), resulting in a 92.6 – 99.9% probability of being in an overfished state and still experiencing overfishing (**Figure 21**). Estimates obtained with the final SS3 run predicted that the stock was probably overfished (SSF_{2015}/SSF_{MSY}=0.95, where SSF is spawning stock fecundity) and that overfishing was occurring (F_{2015}/F_{MSY}=4.38, CV=0.11) with a probability of 56.1% of being overfished and experiencing overfishing (**Figure 21**). The Kobe phase plots for the individual model runs in the North Atlantic are provided in **Figure 22**, while the combined Kobe phase plot is provided in **Figure 23**. The combined probability from all the models of being in an overfished state while still experiencing overfishing was 90% (**Figure 24**). CMSY was only used as a proof of concept in the North (and the results were similar to the production models) and so the results are not presented here.

The models agree that the northern stock was overfished and was undergoing overfishing. The results obtained in this evaluation are not comparable with those obtained in the last assessment in 2012 because the input data and model structures have changed significantly. The catch time series are different (they now start in 1950 vs. 1971 in the 2012 assessment) and were derived using different assumptions; the CPUE series have been decreasing since 2010 (the last year in the 2012 assessment models)); some of the biological inputs have changed and are now sex specific; and additional length composition data became available. Additionally, in 2012 only the BSP1 production model and a catch-free age-structured production model were used. This updated assessment represents a significant improvement in our understanding of current stock status for North Atlantic shortfin mako.

South Atlantic

For the South Atlantic stock, scenarios with the BSP2-JAGS estimated that the stock was not overfished (B_{2015}/B_{MSY}=1.69 to 1.75) but that overfishing may be occurring (F_{2015}/F_{MSY}=0.86 to 1.07). For the BSP2-JAGS model, estimates from the 2 runs indicated a 0.3-1.4% probability of the stock being overfished and overfishing occurring (red quadrant in Kobe plot), a 29-47.4% probability of the stock not being overfished but overfishing occurring, or alternatively, the stock being overfished but overfishing not occurring (yellow quadrants in Kobe plot), and a 52.3-69.6% probability of the stock not being overfished and overfishing not occurring (green quadrant in Kobe plot) (**Figure 25**). In the JABBA model Kobe plot the South Atlantic stock trajectory reveals a clockwise pattern moving from an underexploited state to a recovery as a result of decreasing biomass under sustainable fishing, which is followed by a short period of overfishing, which is implausible. The model results were therefore not considered for management advice. Model estimates obtained for the CMSY model indicate that the stock could be overfished (B_{2015}/B_{MSY}= 0.65 to 1.12) and that overfishing is likely occurring (F_{2015}/F_{MSY}=1.02 to 3.67). Considering catch scenarios C1 and C2, model estimates from the CMSY model indicated a 23-89% probability of the stock being overfished and overfishing occurring (red quadrant in Kobe plot), a 11-48% probability of the stock not being overfished but overfishing occurring, or alternatively, the stock being overfished but overfishing not occurring (yellow quadrants in Kobe plot), and only a 0-29% probability of the stock not being overfished and overfishing not occurring (green quadrant in Kobe plot) (**Figure 25**). The combined model results indicate a probability of 19% that the stock is both overfished and experiencing

overfishing (**Figure 26**). The Group considers the stock status results for the South Atlantic to be highly uncertain. Despite this uncertainty, it is not possible to discount that in recent years the stock may have been at, or already below, B_{MSY} and that fishing mortality is already exceeding F_{MSY}. The Kobe phase plots for the individual model runs in the South Atlantic are provided in **Figure 27**, while the combined Kobe phase plot is provided in **Figure 28**.

5. Projections

Projections were only carried out for BSP2-JAGS models in the North Atlantic. No projections were conducted for the South Atlantic due to the uncertainty of stock status explained above.

The BSP2-JAGS model projections indicated that current catch levels (C1 = 3,600 t, and C2 = 4,750 t, mean of the last 5 years) in the North Atlantic will cause continued population decline. According to the more optimistic C1 and C2 catch series Schaefer model projections, catches would need to be 1000 t or lower to prevent further population declines (**Figure 29 a and b**). For the corresponding generalized production models, catches would also have to be reduced to below 1000 t to prevent further population declines (**Figure 29 c and d**). Overall, this implies reductions in catches in the order of 72-79%. Kobe II matrices showing the probabilities of $F<F_{MSY}$, $B>B_{MSY}$, and $B>B_{MSY}$ + $F<F_{MSY}$ (green quadrant of the Kobe plot) under different constant catch levels are shown in **Table 9**.

Although in terms of SSF the current stock size for SS3 appears more optimistic than the aggregated biomass dynamic models, the future outlook is probably more pessimistic. This is because the juveniles are being removed beginning at age at first capture and so are not reaching maturity. It can be anticipated that spawning stock size will decline for many years after fishing pressure has been reduced until the recruits reach maturity.

6. Recommendations

6.1 Research and statistics

- The Group noted the importance of having the sex information on the conventional tagging database. Such data are usually reported for sharks, but currently are not available in the ICCAT database. Therefore, the Group recommends that the Secretariat revises the conventional tagging database to include this field and make it available in the cases where such information was reported.
- The Group recommends to focus research efforts on identifying pupping grounds to increase our knowledge of shortfin mako reproductive behaviour which could lead to improved scientific advice.
- The Group recommends further research on the implications of priors and error structure in Bayesian surplus production models.
- The Group reiterates the recommendations from the Data Preparatory Meeting http://iccat.int/Documents/Meetings/Docs/2017_SMA_DATA_PREP_ENG.pdf
- The Group emphasizes that identification of a robust TAC in the future will require developing projections in SS3 in addition to those undertaken using production models.

6.2 Management

- For the North Atlantic stock, projections were based on the production modelling approach only (BSP2-JAGS), which indicated that catches would need to be reduced to 1,000 t or lower to prevent further population declines. However, taking into consideration the timeline for stock rebuilding based on this approach, it should be noted that for a TAC of 1,000 t the probability of being in the Kobe plot green zone ($F<F_{MSY}$ and $B>B_{MSY}$) (**Table 9**) is estimated to be only 25% by 2040.
- The Group indicated that releasing animals brought to the vessel alive could be a potentially effective measure to reduce fishing mortality as studies indicate post-release survival is likely to be about 70%. Following best practices to correctly handle and release live specimens could therefore further increase post-release survival. However, at this time the Group does not have enough information to assess if the adoption of live releases alone will be enough to reduce landings to 1,000 t or less and stop further stock decline.

- For the South Atlantic stock, given the uncertainty in stock status and considering the large fluctuations in catch, the Group recommends that until this uncertainty is reduced, catch levels should not exceed the average catch in the last five years (2,854 t with scenario C1 or 2,933 t with scenario C2), or about 2,900 t.
- Given the limited time available for discussing management recommendations, the Group decided to continue discussing them at the Shark Species Group meeting in September.

7. Other matters

There were no other matters.

8. Adoption of the report and closure

The report was partially adopted by the Group and the meeting was adjourned. Sections 4.1, 4.4, and 6.2 of the report were later adopted by correspondence.

References

Anonymous. 2013. Report of the 2012 Shortfin Mako Stock Assessment and Ecological Risk Assessment Meeting (*Olhão, Portugal - June 11-18, 2012*). ICCAT. Col. Vol. Sci. Papers. 69 (4): 1427-1570.

Anonymous. 2015. 2014 Intersessional Meeting of the Sharks Species Group (*Piriapolis, Uruguay, 10-1 March 2014*) Col. Vol. Sci. Pap. 71(6): 2458-2550.

Anonymous. 2016. Report of the 2015 Bluefin Shark Stock Assessment (*Oceanário de Lisboa, Lisbon, Portugal – 27-31 July 2015*). Col. Vol. Sci. Pap. 72(4): 866-1019.

Anonymous. 2017. Report of the 2016 Intersessional Meeting of the Shark Species Group (*Madeira, Portugal – April 25 to 29, 2016*). ICCAT. Col. Vol. Sci. Pap. 73(8): 2759-2809.

Anonymous. (in press). Report of the 2017 Shortfin Mako Shark Data Preparatory Meeting (*Madrid, Spain – March 28 to 31, 2017*). Document SCRS/2017/002: p 52.

Babcock, E. and Cortes, E. (in press). Bayesian surplus production models for shortfin mako sharks: are the results consistent when using different software packages? SCRS/2017/055: 9 p.

Coelho R., Domingo A., Courtney D., Cortés E., Arocha F., Liu K-M., Yokawa K., Yasuko S., Hazin F., Rosa D. and Lino P.G. (in press). A revision of the shortfin mako shark size distribution in the Atlantic using observer data from the main pelagic longline fleets. Document SCRS/2017/048: 17 p.

Courtney, D., Cortés, E., Zhang, X. and Carvalho, F. 2017. Stock synthesis model sensitivity to data weighting: an example from preliminary model runs previously conducted for north Atlantic blue shark. ICCAT. Col. Vol. Sci. Papers. 73(8): 2860-2890.

Francis, R.I.C.C. 2011. Data weighting in statistical fisheries stock assessment models. Can. J. Fish. Aquat. Sci. 68:1124-138.

Froese, R., Demirel, N., Coro, G., Kleisner, K.M. and Winker, H. 2016. Estimating fisheries reference points from catch and resilience. Fish 83: 506–526, doi:10.1111/faf.12190.

Gelman, A. and Rubin, D.B. 1992. Inference from Iterative Simulation Using Multiple Sequences. Statistical Science 7: 457-472.

Heidelberger, P. and Welch, P.D. 1983. Simulation Run Length Control in the Presence of an Initial Transient.

Kai, M., Carvalho, F., Yokoi, H., Kanaiwa, M., Takahashi, N., Brodziak, J., Sippel, T., Kohin, S., 2017. Stock assessment for the north Pacific blue shark (*Prionace glauca*) using Bayesian State-space Surplus Production Model (No. ISC/17/SHARKWG-1/4).

Martell, S., and Froese, R. 2013. A simple method for estimating MSY from catch and resilience. 505: 504–514. doi:10.1111/j.1467-2979.2012.00485.x.

McAllister, M.K., Babcock, E.A., Pikitch, E.K. and Prager, M.H. 2000. Application of a non-equilibrium generalized production model to South and North Atlantic swordfish: combining Bayesian and demographic methods for parameter estimation. ICCAT. Col. Vol. Sci. Papers. 51(5): 1523-1550.

Methot, R.D. 2015. User manual for Stock Synthesis model version 3.24s, Updated February 11, 2015. NOAA Fisheries, Seattle, WA.

Methot, R.D. and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fish. Res. 142:86–99.

Taylor, I.G., Gertseva, V., Methot, R.D., Maunder, M.N. 2013. A stock- recruitment relationship based on pre-recruit survival, illustrated with application to spiny dogfish shark. Fish. Res. 142, 15–21.

Table 1. North Atlantic BSP2-JAGS model runs. Rhat is the Gelman-Rubin diagnostic, n.eff is the effective number of parameters (Values are means and CVs are in parentheses).

Parameter	1N C1	2N C2	3N C1 generalized	4N C2 generalized
Rhat	1.02	1.01	1.01	1.01
n.eff	160	230	320	160
K(1000)	154.29(0.29)	246.95(0.32)	125.11(0.37)	214.03(0.35)
r	0.04(0.54)	0.03(0.47)	0.04(0.58)	0.03(0.48)
Bo/BMSY	1.82(0.13)	1.68(0.16)	1.36(0.13)	1.28(0.15)
B2015/BMSY	0.85(0.2)	0.75(0.21)	0.78(0.23)	0.63(0.24)
H2015/HMSY	2.97(0.47)	3.58(0.45)	1.93(0.48)	2.41(0.44)

Table 2. North Atlantic BSP2-JAGS diagnostic runs **(**Values are means and CVs are in parentheses).

Parameter	5N pmpd	6N index 1	7N index 2	8N index 3	9N index 4	10N index 5
Rhat	3.17	1.03	1.01	1.01	1.02	1.01
n.eff	3	74	1200	460	810	330
K(1000)	221.65(2.91)	231.3(0.58)	694.27(1.06)	394.83(1.32)	873.6(0.93)	363.71(1.43)
r	0.03(0.46)	0.03(0.5)	0.03(0.46)	0.03(0.46)	0.03(0.45)	0.03(0.47)
Bo/Bmsy	1.82(0.13)	1.85(0.12)	1.79(0.14)	1.8(0.13)	1.78(0.14)	1.82(0.13)
Bcur/Bmsy	0.29(2.21)	0.95(0.26)	1.58(0.27)	1.13(0.43)	1.92(0.27)	0.98(0.61)
Hcur/Hmsy	14977(0.9)	2.75(0.53)	0.99(0.91)	2.9(1.06)	0.58(0.87)	6.83(2.05)

Table 3. Stock depletion and status estimates, together with model parameters, for the JABBA model applied to the North Atlantic shortfin mako for catch scenarios C1 and C2.

(A) Base-case catch time series (C1)

	NA.Schaefer.C1			NA.Pella.C1		
Estimates	Median	2.50%	97.50%	Median	2.50%	97.50%
K	137365.3	79046.5	247732.8	123223.9	70840.1	260386.8
r	0.032	0.013	0.098	0.074	0.029	0.204
σ	0.09	0.063	0.134	0.089	0.063	0.134
H_{MSY}	0.016	0.006	0.049	0.015	0.006	0.041
B_{MSY}	68682.6	39523.2	123866.4	82558.3	47461.9	174455.6
MSY	1146.8	445.8	2523.1	1287.3	526.3	2863.5
B_{1950}/K	0.746	0.554	0.994	0.781	0.575	0.989
B_{2015}/K	0.381	0.257	0.545	0.414	0.276	0.586
B_{2015}/B_{MSY}	0.763	0.514	1.090	0.618	0.412	0.874
H_{2015}/H_{MSY}	3.749	1.465	10.582	4.128	1.606	11.414

(B) Alternative catch time series (C2)

	NA.Schaefer.C2			NA.Pella.C2		
Estimates	Median	2.50%	97.50%	Median	2.50%	97.50%
K	187530.6	113905.0	351652.0	172713.1	100950.1	348444.0
r	0.030	0.012	0.073	0.076	0.030	0.203
σ	0.10	0.063	0.145	0.095	0.063	0.141
H_{MSY}	0.015	0.006	0.036	0.015	0.006	0.04
B_{MSY}	93765.3	56952.5	175826.0	115715.4	67635.2	233452.7
MSY	1440.3	559.0	3337.5	1831.6	727.9	4193.5
B_{1950}/K	0.834	0.605	1.024	0.844	0.573	1.04
B_{2015}/K	0.344	0.215	0.518	0.384	0.236	0.569
B_{2015}/B_{MSY}	0.689	0.430	1.036	0.573	0.352	0.849
H_{2015}/H_{MSY}	4.379	1.608	12.374	4.167	1.571	11.414

Table 4. South Atlantic BSP2-JAGS model runs (Values are means and CVs are in parentheses).

Parameter	**11S C1**	**12S C2**	**13S pmpd**
Rhat	1.01	1.01	1
n.eff	160	200	1000
K(1000)	121.94(0.39)	139.76(0.38)	137.7(0.36)
r	0.06(0.27)	0.06(0.27)	0.06(0.27)
Bo/Bmsy	1.48(0.18)	1.48(0.18)	1.47(0.18)
Bcur/Bmsy	1.75(0.19)	1.69(0.19)	1.69(0.19)
Hcur/Hmsy	1.07(0.46)	0.86(0.44)	0.86(0.43)

Table 5. Stock depletion and status estimates, together with model parameters, for the C_{MSY} model applied to the South Atlantic shortfin mako for catch scenarios C1 and C2.

	CMSY.SA.C1			CMSY.SA.C2		
Estimates	Median	2.50%	97.50%	Median	2.50%	97.50%
K	66067.715	42003.174	103919.360	129096.863	64563.960	258131.624
r	0.069	0.053	0.089	0.069	0.053	0.089
H_{MSY}	0.034	0.026	0.045	0.034	0.026	0.045
B_{MSY}	33033.857	21001.587	51959.680	64548.431	32281.980	129065.812
MSY	1.132	0.778	1.649	2.213	0.950	5.157
B_{2015}/K	0.324	0.109	0.527	0.562	0.141	0.784
B_{2015}/B_{MSY}	0.647	0.218	1.053	1.125	0.282	1.569
H_{2015}/H_{MSY}	3.666	2.252	10.867	1.024	0.734	4.088

Table 6. Stock Synthesis model run 3 estimates of ending year (2015) stock status relative to maximum sustainable yield (MSY), including spawning stock fecundity (SSF_{2015}), fishing mortality (F_{2015}, calculated as the sum of continuous F obtained for each fleet), and recruits (R_{2015}), along with equilibrium SSF (SSF_0) and R (R_0), maximum sustainable yield (MSY), SSF at MSY (SSF_{MSY}), F at MSY (F_{MSY}) and the ratios SSF_{2015}/SSF_{MSY} and F_{2015}/F_{MSY}. Asymptotic standard errors (SE) calculated from the maximum likelihood estimates of parameter variances at the converged solution and CV based on the SE (where available) are also provided for the parameter estimates.

Ending year (2015) stock status relative to MSY reference points	Estimate	SE	CV
SSF_{2015} (1,000s)	558	50	9%
F_{2015}	0.247	---	---
R_{2015} (1,000s)	140	12	8%
SSF_0	1,126	52	5%
R_0	220	10	5%
MSY (t)	1,004	33.29	3%
SSF_{MSY}	586	27	5%
F_{MSY}	0.056	0.002	4%
SSF_{2015}/SSF_{MSY}	0.952	---	---
F_{2015}/F_{MSY}	4.379	0.49	11%

Table 7. Stock Synthesis model run 3 annual estimates of total biomass (B), spawning stock fecundity (SSF), recruits (R), total fishing mortality (F, calculated as the sum of continuous F obtained for each fleet).

Year	B (t)	SSF ((1,000s)	R (1,000s)	F
Virg		1,126	220	
Init		1,126	220	
1950	277,435	1,126	220	0.004
1951	277,310	1,126	220	0.002
1952	277,212	1,126	220	0.002
1953	277,107	1,126	220	0.003
1954	276,976	1,126	220	0.001
1955	276,915	1,126	220	0.002
1956	276,831	1,126	220	0.001
1957	276,769	1,126	220	0.002
1958	276,656	1,125	220	0.002
1959	276,557	1,125	220	0.003
1960	276,434	1,125	220	0.002
1961	276,343	1,125	220	0.004
1962	276,166	1,125	220	0.006
1963	275,925	1,125	220	0.003
1964	275,790	1,124	220	0.005
1965	275,580	1,124	220	0.004
1966	275,401	1,123	220	0.008
1967	275,090	1,123	220	0.007
1968	274,794	1,122	220	0.009
1969	274,415	1,122	220	0.009
1970	274,025	1,121	220	0.008
1971	273,658	1,120	220	0.012
1972	273,136	1,120	220	0.011
1973	272,622	1,119	220	0.011
1974	272,116	1,118	220	0.015
1975	271,408	1,117	220	0.018
1976	270,577	1,116	220	0.009
1977	270,118	1,115	220	0.014
1978	269,469	1,114	220	0.013
1979	268,894	1,112	220	0.013
1980	268,392	1,111	220	0.019
1981	267,625	1,109	220	0.030
1982	266,213	1,107	220	0.034
1983	264,546	1,104	220	0.038
1984	262,899	1,102	219	0.040
1985	260,775	1,099	182	0.087
1986	255,945	1,095	169	0.120
1987	250,774	1,091	167	0.124
1988	245,659	1,086	170	0.112
1989	240,574	1,081	186	0.083

Table 7. Continued.

Year	B (t)	SSF (1,000s)	R (1,000s)	F
1990	236,134	1,077	179	0.102
1991	231,458	1,071	176	0.106
1992	226,733	1,065	167	0.151
1993	220,930	1,058	166	0.201
1994	213,765	1,050	160	0.200
1995	206,865	1,040	144	0.276
1996	197,888	1,028	143	0.352
1997	188,682	1,014	177	0.273
1998	181,327	1,000	229	0.289
1999	174,051	983	223	0.235
2000	168,455	966	266	0.199
2001	163,695	946	264	0.206
2002	159,188	925	191	0.234
2003	154,592	902	283	0.260
2004	150,071	877	311	0.239
2005	146,061	850	312	0.220
2006	142,810	822	233	0.203
2007	139,983	792	177	0.224
2008	136,671	762	190	0.197
2009	133,790	731	210	0.241
2010	129,881	700	162	0.268
2011	125,502	669	145	0.224
2012	121,963	639	141	0.285
2013	117,478	610	151	0.251
2014	113,706	583	145	0.212
2015	110,638	558	140	0.247

Table 8. Stock Synthesis model run 3 annual estimates of total fishing mortality (F, calculated as the sum of continuous F obtained for each fleet) relative to fishing mortality at MSY (F/F_{MSY}) and spawning stock fecundity (SSF 1,000s) relative to spawning stock fecundity at MSY (SSF/SSF_{MSY}).

Year	F/F_{MSY}	SSF/SSF_{MSY}
1950	0.064	1.921
1951	0.043	1.921
1952	0.043	1.921
1953	0.053	1.921
1954	0.013	1.921
1955	0.027	1.921
1956	0.017	1.921
1957	0.044	1.921
1958	0.037	1.921
1959	0.049	1.921
1960	0.032	1.921
1961	0.078	1.920
1962	0.107	1.920
1963	0.047	1.919
1964	0.087	1.919
1965	0.069	1.918
1966	0.138	1.917
1967	0.124	1.916
1968	0.164	1.915
1969	0.163	1.914
1970	0.148	1.913
1971	0.205	1.912
1972	0.197	1.911
1973	0.202	1.910
1974	0.259	1.908
1975	0.315	1.907
1976	0.167	1.905
1977	0.249	1.903
1978	0.231	1.901
1979	0.222	1.898
1980	0.330	1.896
1981	0.532	1.893
1982	0.598	1.889
1983	0.666	1.885
1984	0.702	1.880
1985	1.549	1.875
1986	2.128	1.868
1987	2.199	1.861
1988	1.979	1.854
1989	1.466	1.846

Table 8. Continued.

Year	F/F_{MSY}	SSF/SSF_{MSY}
1990	1.813	1.838
1991	1.869	1.828
1992	2.670	1.818
1993	3.556	1.806
1994	3.542	1.791
1995	4.887	1.775
1996	6.227	1.755
1997	4.828	1.731
1998	5.126	1.707
1999	4.170	1.679
2000	3.525	1.648
2001	3.653	1.615
2002	4.143	1.579
2003	4.599	1.540
2004	4.228	1.497
2005	3.892	1.451
2006	3.589	1.403
2007	3.964	1.353
2008	3.493	1.301
2009	4.268	1.248
2010	4.748	1.195
2011	3.971	1.142
2012	5.054	1.091
2013	4.444	1.042
2014	3.763	0.995
2015	4.379	0.952

Table 9. Kobe II risk matrix giving the probability that the fishing mortality will be below the fishing mortality rate at MSY (top), the probability that the biomass will exceed the level that will produce MSY (middle), and the two combined (bottom) based on BSP2-JAGS results for North Atlantic shortfin mako.

Probability that $F<F_{MSY}$

TAC (t)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
500	0	0	75	75	74	75	75	74	75	75	74	76	75	75	75	75	76	76	76	74	75	74	75	75	75
1000	0	0	30	31	32	32	32	31	32	33	34	35	35	35	36	35	35	36	38	37	38	38	38	38	38
1500	0	0	11	11	10	11	11	13	13	13	14	14	14	14	14	14	15	14	15	15	16	16	16	16	16
2000	0	0	2	2	3	4	4	4	4	4	4	5	5	4	4	5	5	5	5	6	5	6	6	6	6
2500	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
3500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Probability that $B>B_{MSY}$

TAC (t)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
0	7	7	6	8	10	13	16	19	21	24	27	29	31	33	36	38	41	42	43	45	46	47	50	52	54
500	5.8	5	4	6	9	10	12	14	15	16	19	20	21	23	24	25	27	28	29	31	30	32	33	35	35
1000	6	5	6	7	9	9	10	13	13	14	16	17	18	20	21	21	22	24	23	25	25	25	25	26	27
1500	6	6	6	7	8	8	10	10	11	11	12	12	12	13	13	14	15	15	16	16	17	17	16	16	16
2000	6	5	5	6	7	7	7	8	8	8	9	9	9	8	8	9	9	9	8	9	9	9	9	9	9
2500	6	6	6	6	7	7	7	6	6	6	7	6	6	7	7	6	7	6	6	6	6	6	6	6	6
3000	6	6	5	7	6	5	5	6	5	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3
3500	6	5	6	6	6	5	5	5	5	5	5	3	3	3	3	2	2	2	2	2	2	2	2	2	2
4000	6	5	6	5	4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0

Probability of being in the green zone ($F<F_{MSY}$ and $B>B_{MSY}$)

TAC (t)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
0	0	0	6	8	11	13	16	19	21	24	27	29	31	33	36	38	41	42	43	45	46	47	50	52	54
500	0	0	4	6	9	10	12	14	15	16	19	20	21	23	24	25	27	27	29	31	30	32	33	35	35
1000	0	0	5	6	8	8	9	10	11	12	15	15	15	17	19	19	20	22	21	23	23	23	23	24	25
1500	0	0	3	3	4	5	5	6	7	7	7	8	8	9	9	10	10	10	11	11	12	12	12	12	12
2000	0	0	0	1	2	2	2	3	3	2	3	3	3	3	3	4	4	4	4	5	4	5	5	5	5
2500	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
3500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

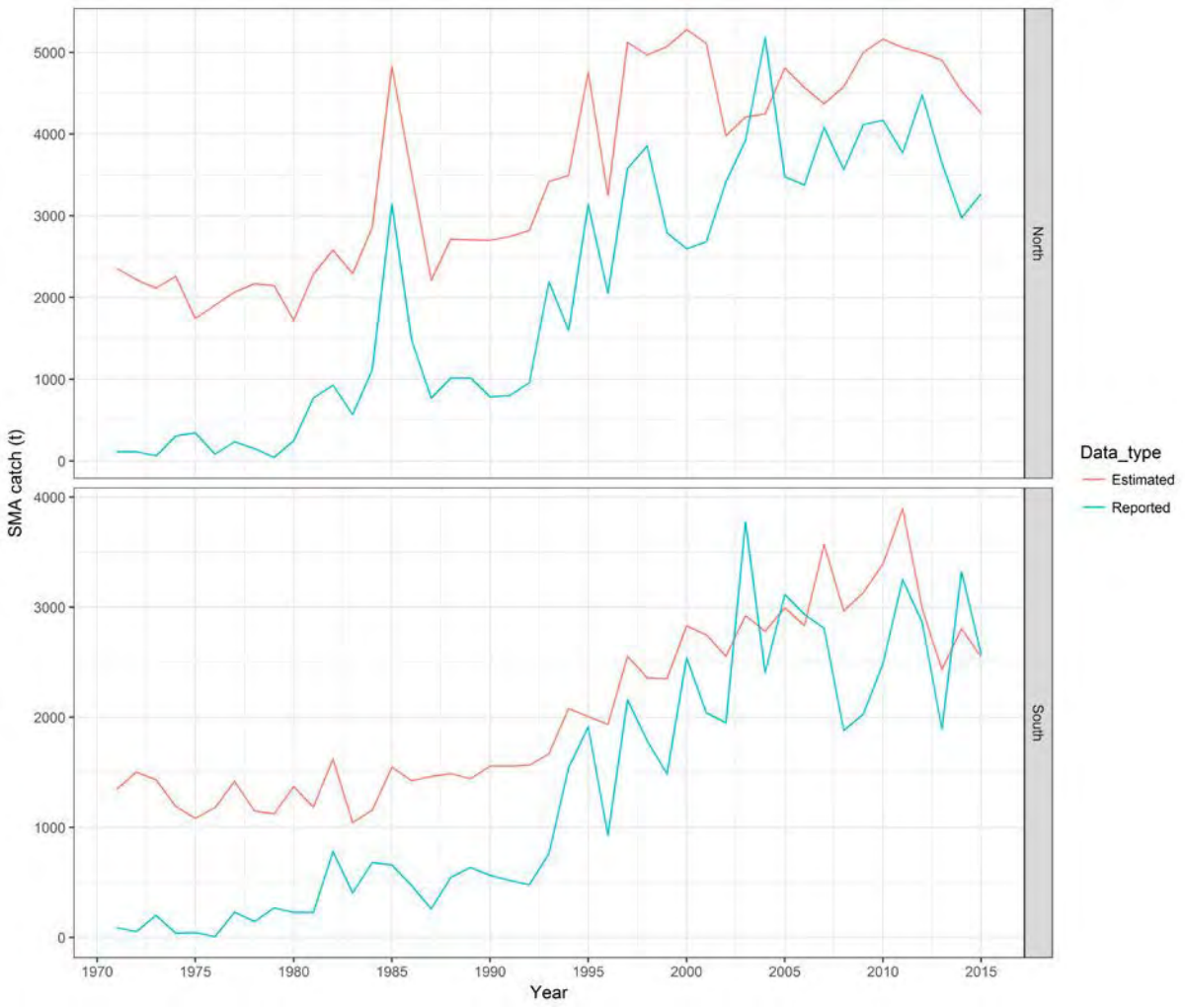


Figure 1. Time series of reported (Task I) and estimated shortfin mako shark (SMA) catches, between 1971 and 2015, for the North and South Atlantic stocks.

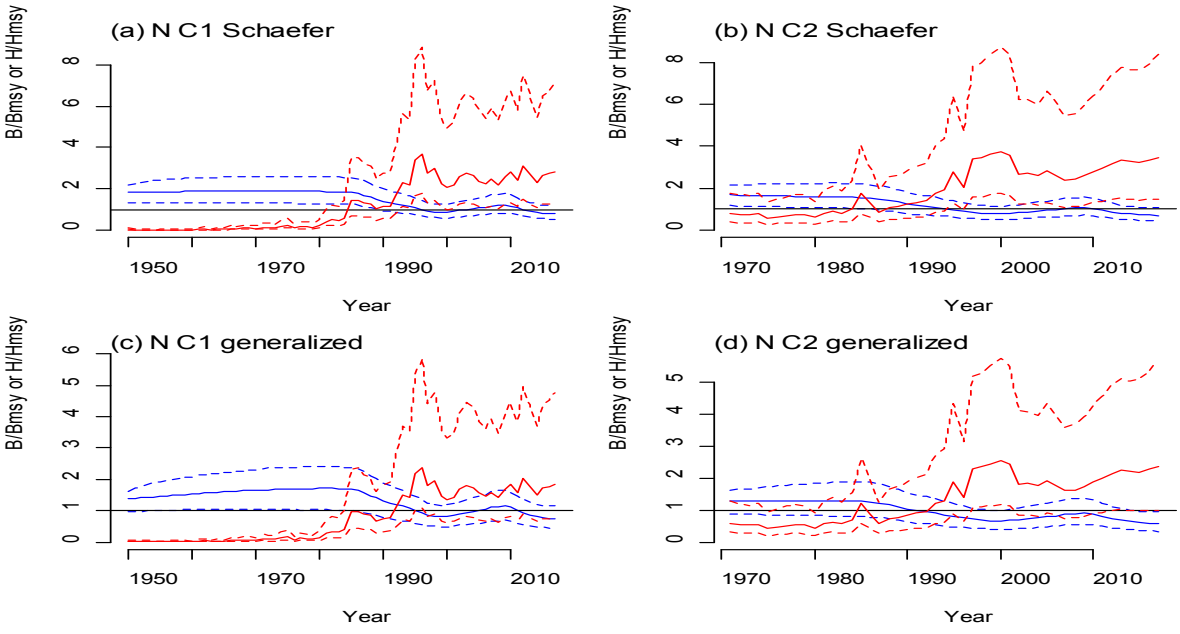


Figure 2. North Atlantic BSP2-JAGS biomass (blue) and harvest rate (red) histories for (a) C1 Schaefer, (b) C2 Schaefer, (c) C1 generalized production model, and (d) C2 generalized production model.

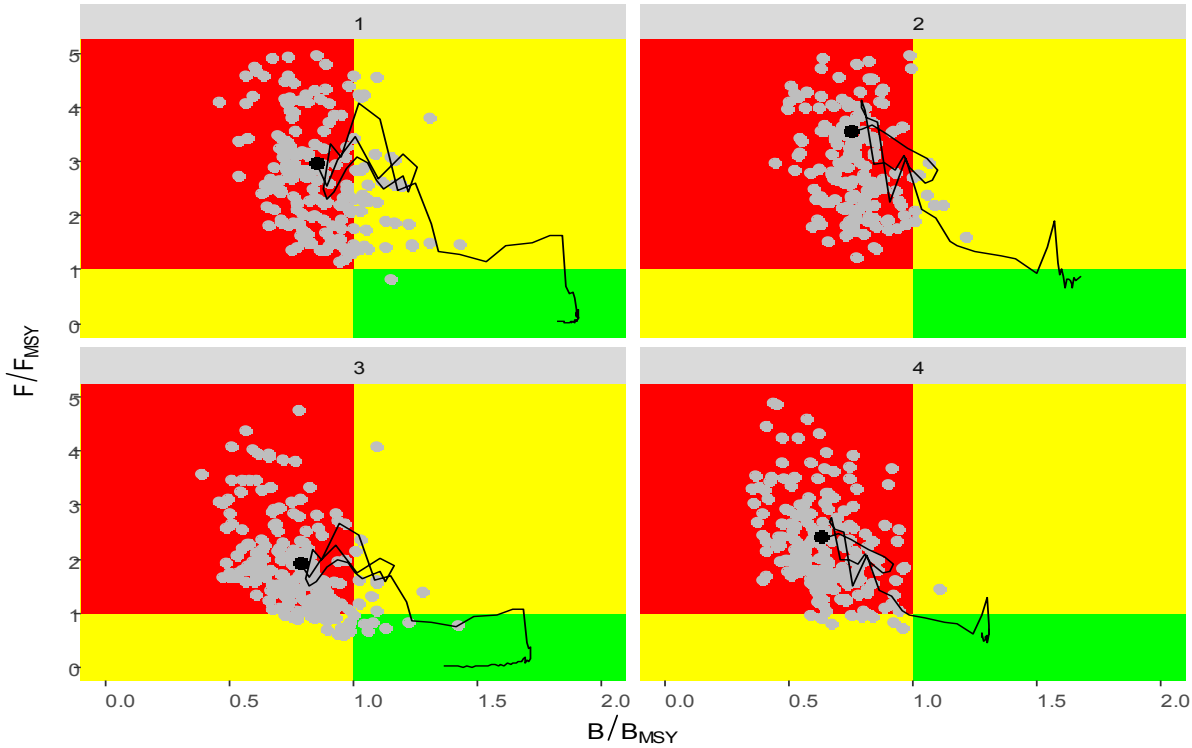


Figure 3. Kobe plots for BSP2-JAGS in the North Atlantic, for (a) C1 Schaefer, (b) C2 Schaefer, (c) C1 generalized production model, and (d) C2 generalized production model. Each point represents an MCMC draw. The solid black dot denotes current (2015) stock status.

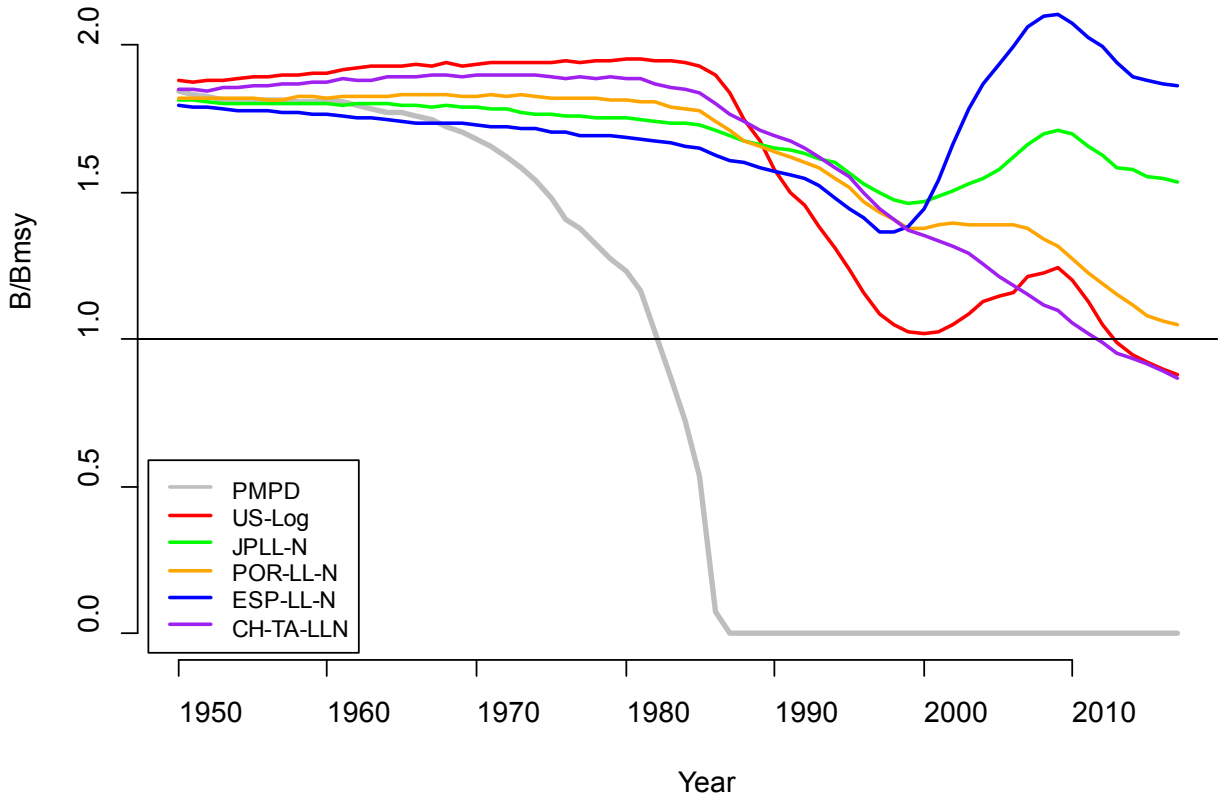


Figure 4. North Atlantic BSP2-JAGS diagnostic model runs, including post-model pre-data (PMPD), and each index of abundance fitted separately.

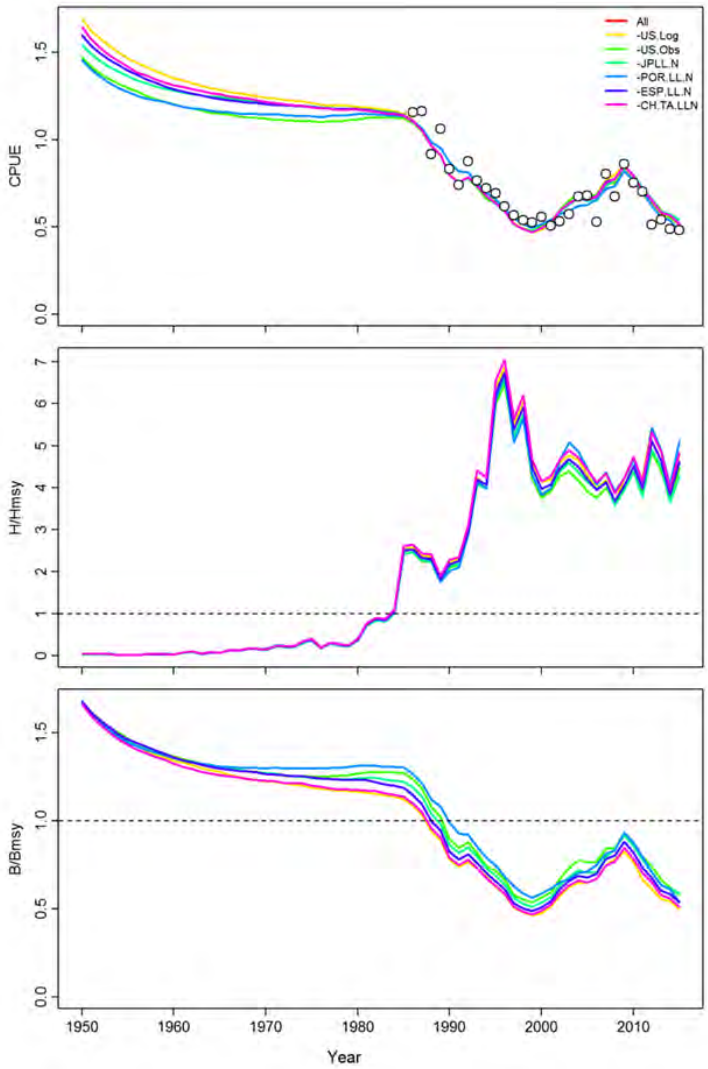


Figure 5. Jackknife diagnostics with respect to the CPUE series, F/F_{MSY} and B/B_{MSY} over time for the North Atlantic C1 scenario, with open circles illustrating the US LL CPUE.

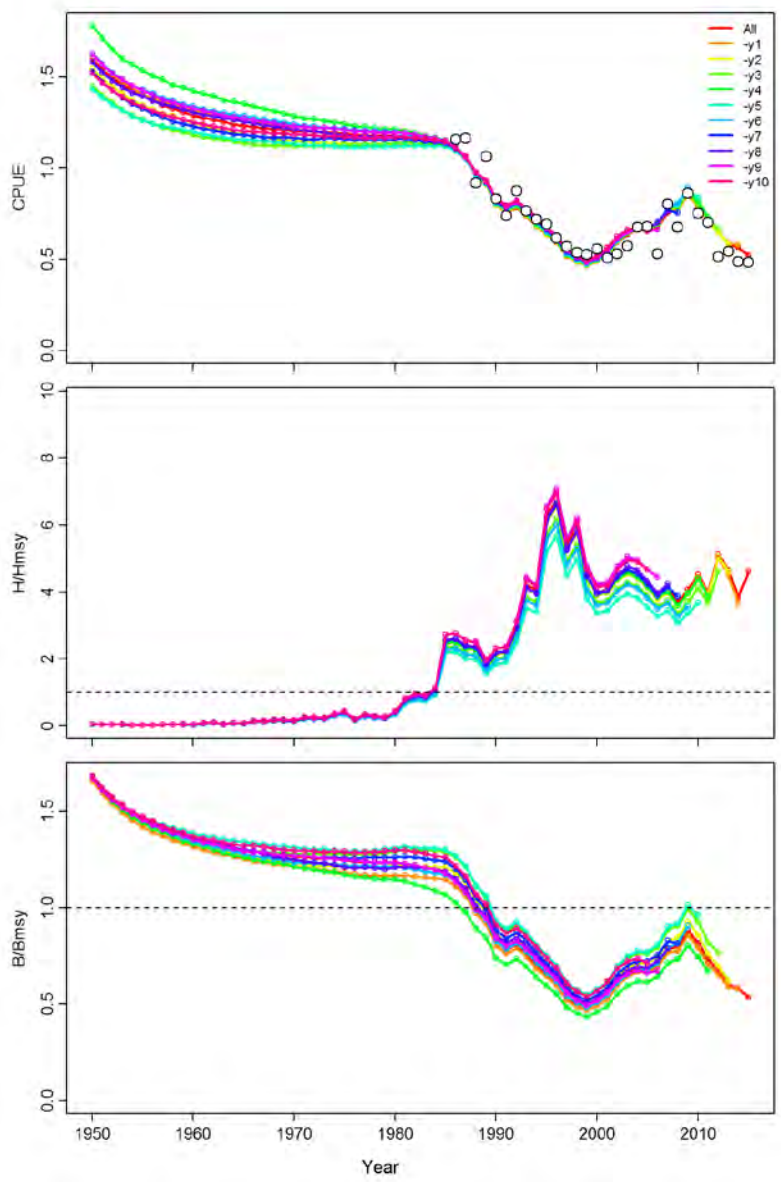


Figure 6. Retrospective diagnostics with respect to the CPUE series, F/F_{MSY} and B/B_{MSY} over time for the North Atlantic C1 scenario, with open circles illustrating the US LL CPUE.

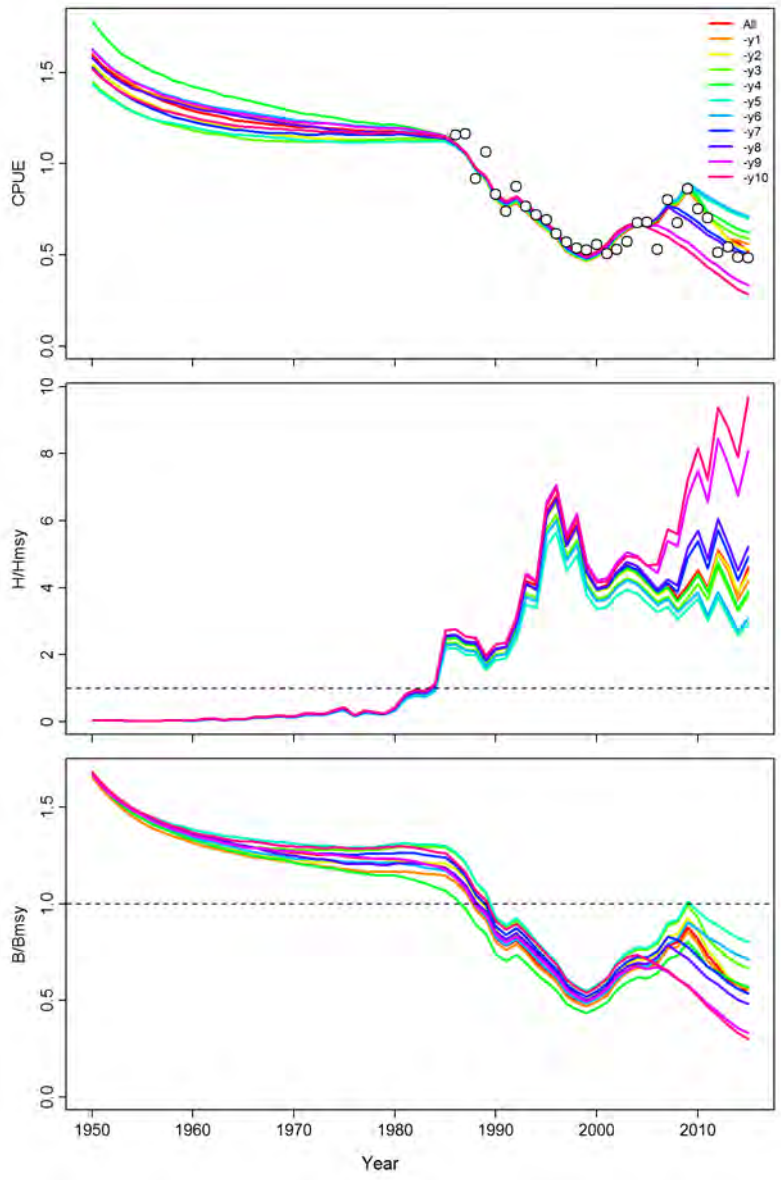


Figure 7. Cross-validation prediction diagnostics with respect to the CPUE series, F/F_{MSY} and B/B_{MSY} over time for the North Atlantic C1 scenario, with open circles illustrating the US LL CPUE.

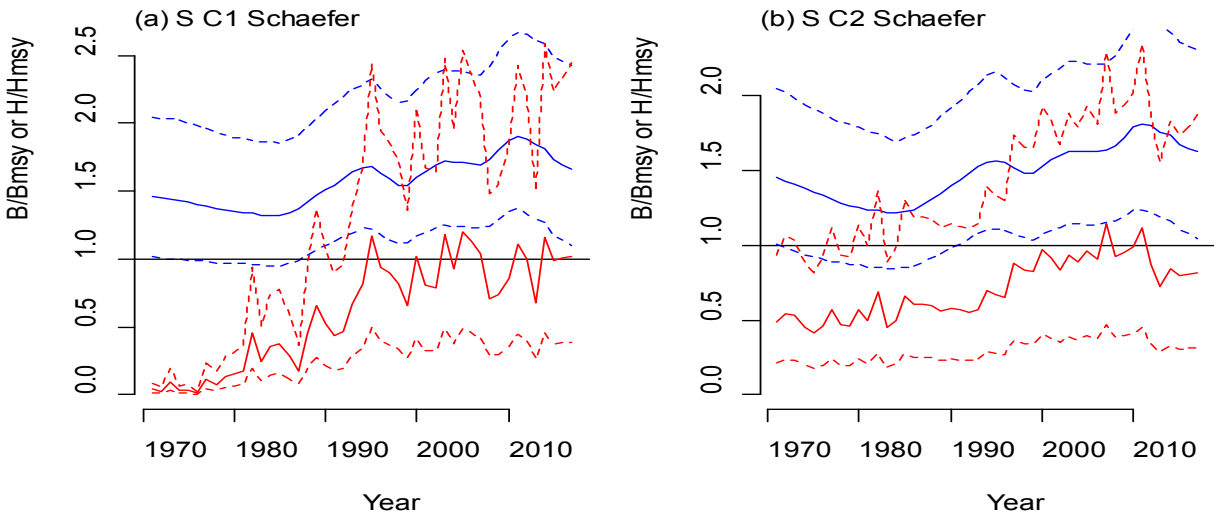


Figure 8. South Atlantic BSP2-JAGS biomass (blue) and harvest rate (red) histories for (a) C1 catch Schaefer, and (b) C2 catch Schaefer.

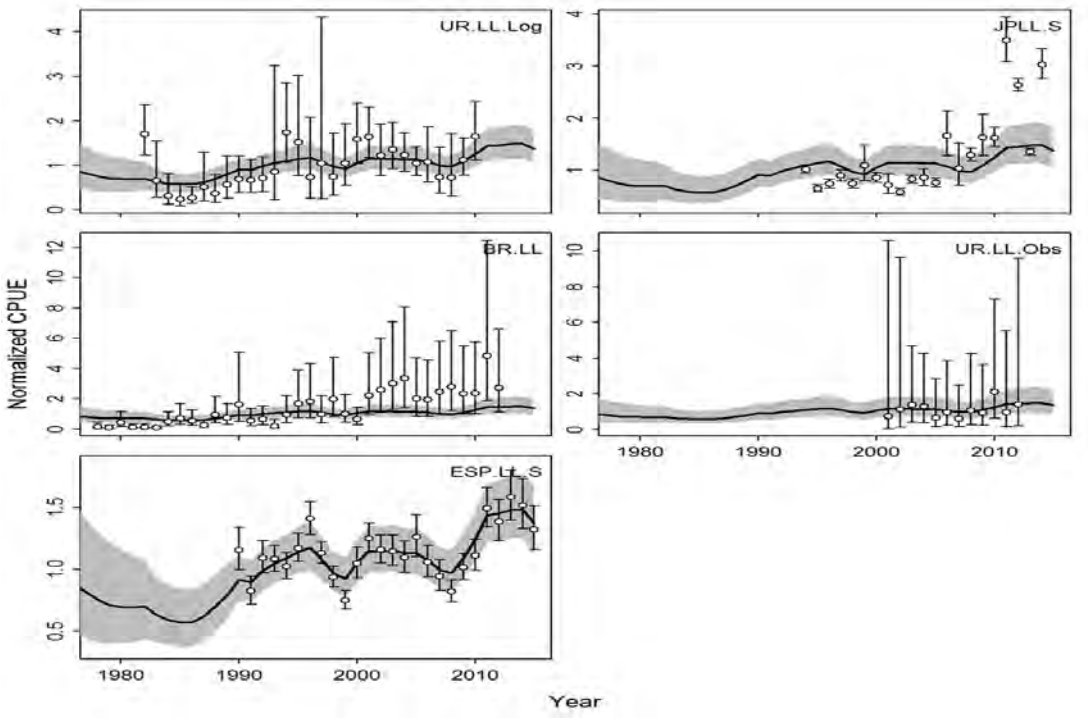


Figure 9. Time-series of observed (circle) and predicted (solid line) catch per unit effort (CPUE) for the shortfin mako shark in the South Atlantic C1 scenario using JABBA. Shaded grey area indicates 95% C.I.

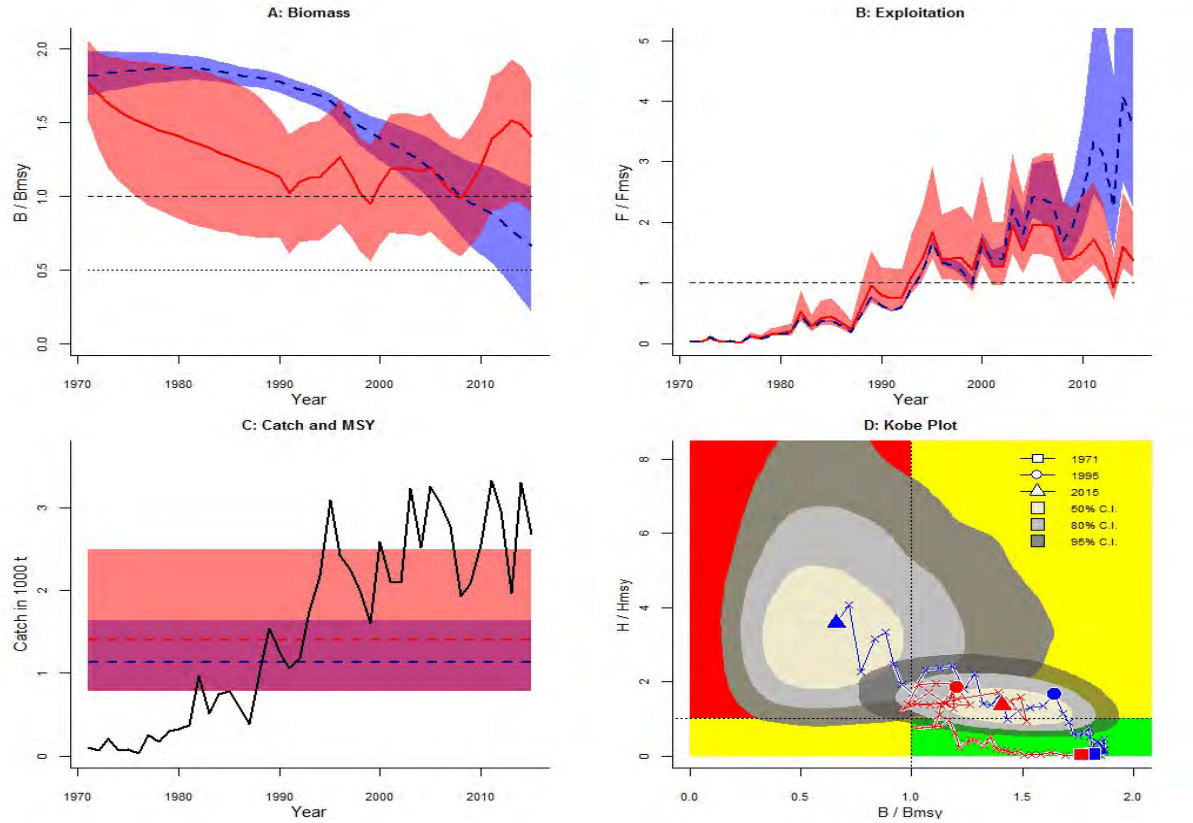


Figure 10. Comparison of CMSY (blue) and CMSY_BSM (red) for South Atlantic SMA scenario C1 showing the trajectories of (A) predicted B / B_{MSY}, (B) predicted F / F_{MSY}, (C) catches superimposing the MSY region (95% CIs), and (D) Kobe plot with uncertainty for the final year illustrated by kernel densities. Note that F is used here interchangeably with harvest rate H = C/B.

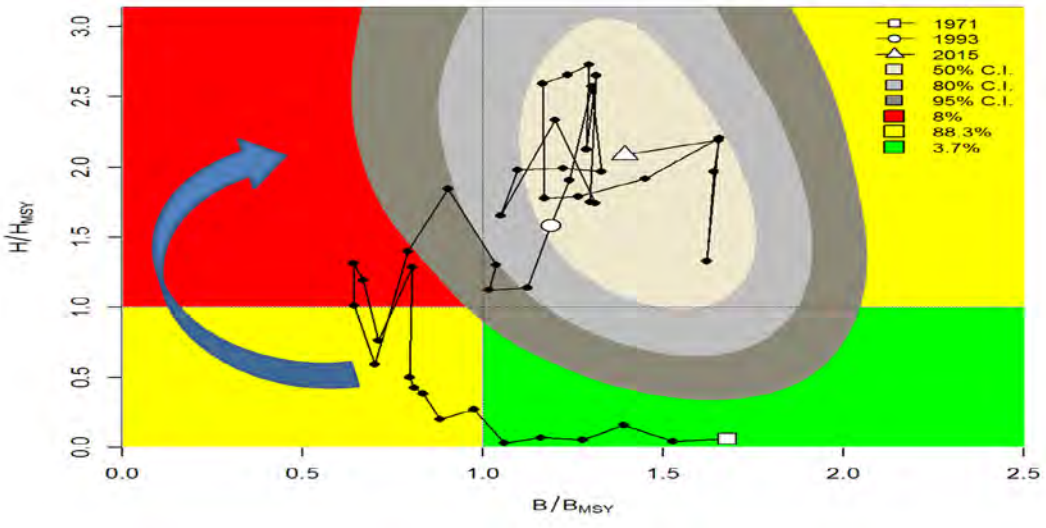


Figure 11. Kobe diagram showing the estimated trajectories (1971-2015) of B/B_{MSY} and H/H_{MSY} for the C1 scenario for the South Atlantic shortfin mako shark stock assessment with the JABBA model. The South Atlantic stock reveals a clockwise pattern moving from an underexploited state to a recovery as result of decreasing biomass under sustainable fishing, which is followed by a short period of overfishing, which is somewhat biologically implausible and ambiguous. This erroneous trend can be attributed to the apparent contradiction between the observation process (i.e. CPUE) and process equation, as both CPUE and biomass trends increase.

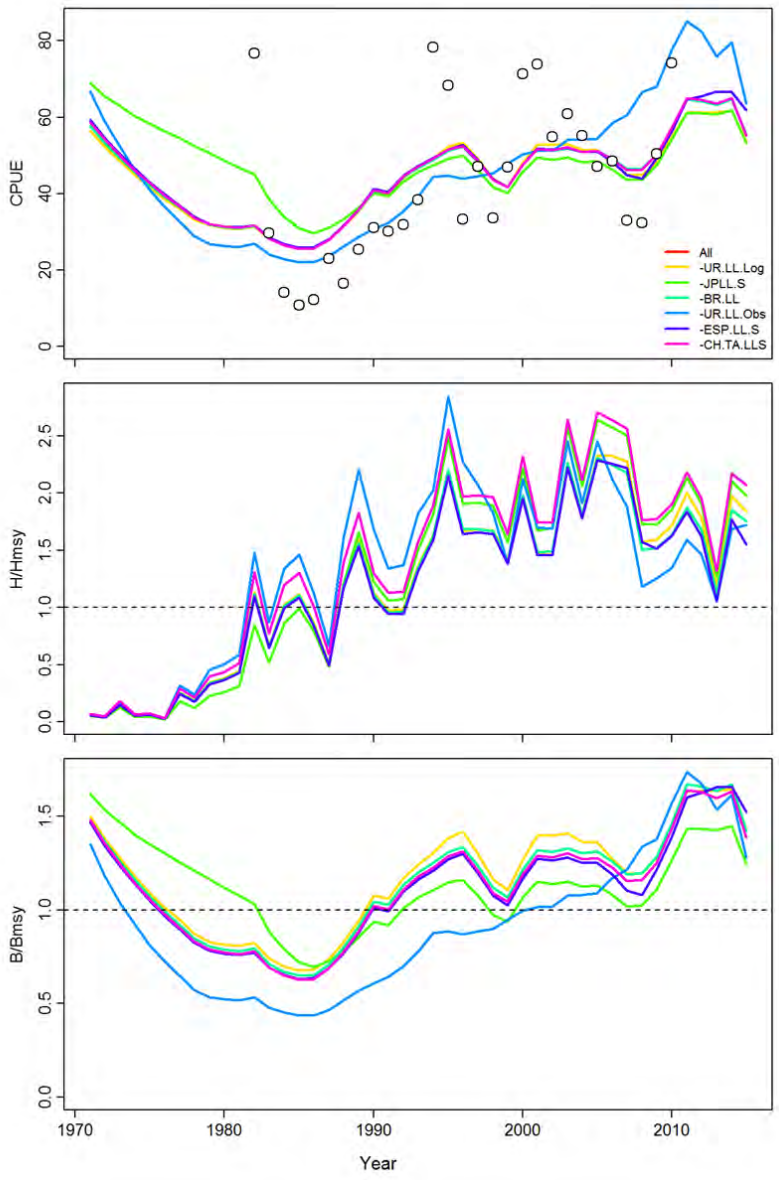


Figure 12. Jackknife diagnostics of the JABBA model with respect to the CPUE series, F/F_{MSY} and B/B_{MSY} over time for the South Atlantic C1 scenario, with open circles illustrating the Brazilian LL CPUE.

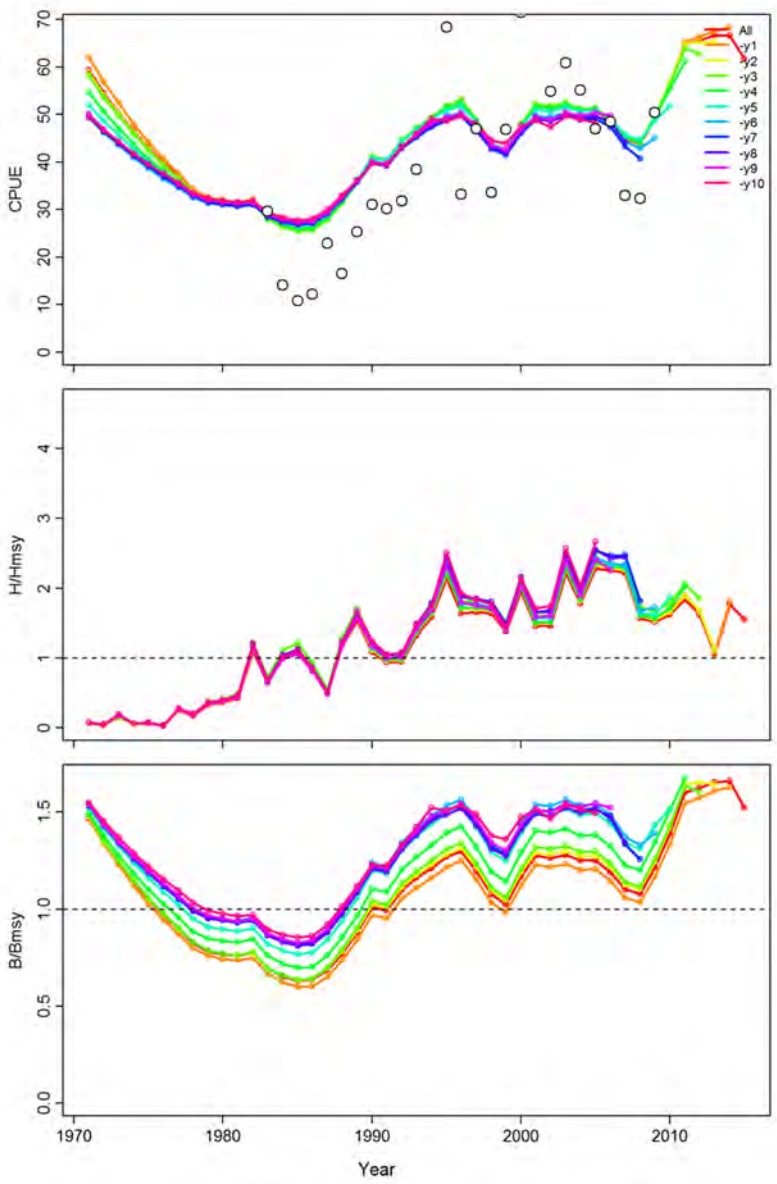


Figure 13. Retrospective diagnostics of the JABBA model with respect to the CPUE series, F/F_{MSY} and B/B_{MSY} over time for the South Atlantic C1 scenario, with open circles illustrating the Brazilian LL CPUE.

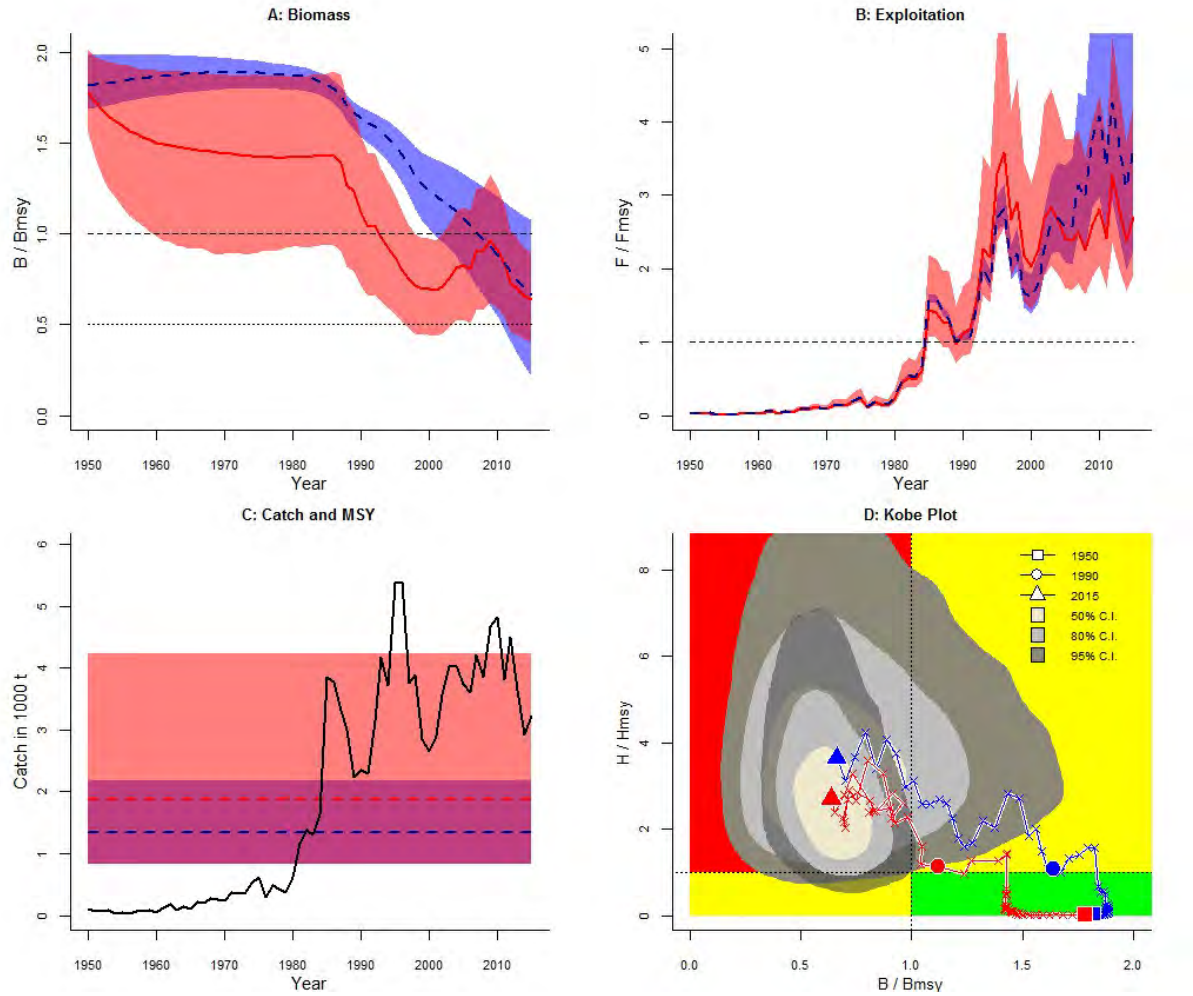


Figure 14. Comparison of CMSY (blue) and CMSY_BSM (red) for North Atlantic SMA scenario C1 showing the trajectories of (A) predicted B / B_{MSY}, (B) predicted F / F_{MSY}, (C) catches superimposing the MSY region (95% CIs), and (D) Kobe plot with uncertainty for the final year illustrated by kernel densities. Note that F is used here interchangeably with harvest rate H = C/B.

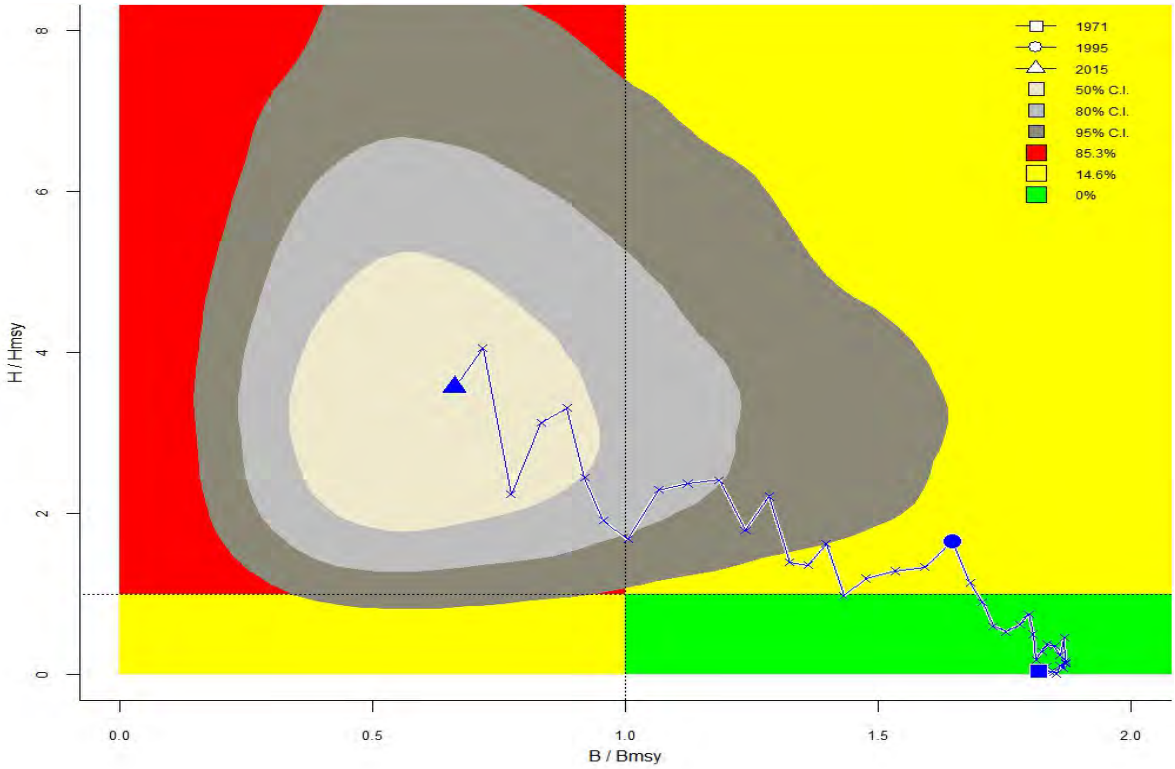


Figure 15. Kobe plot for C_{MSY} assessment results for South Atlantic SMA scenario C1 with uncertainty for the final year illustrated by kernel densities.

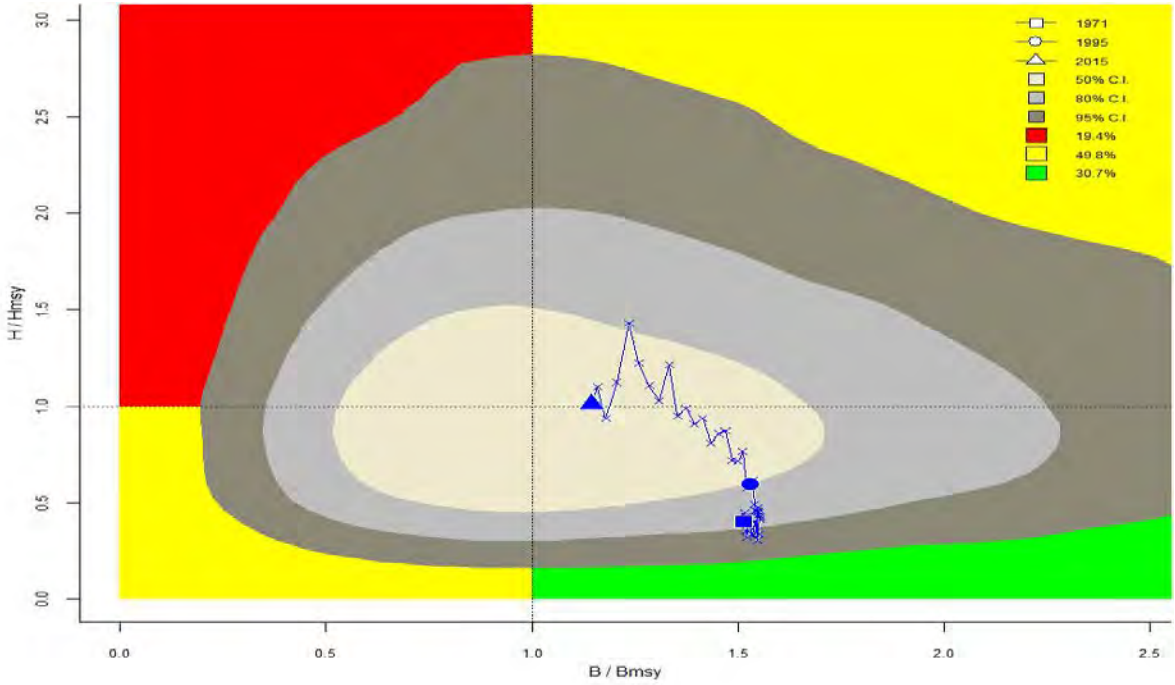


Figure 16. Kobe plot for CMSY assessment results for South Atlantic SMA scenario C2 with uncertainty for the final year illustrated by kernel densities.

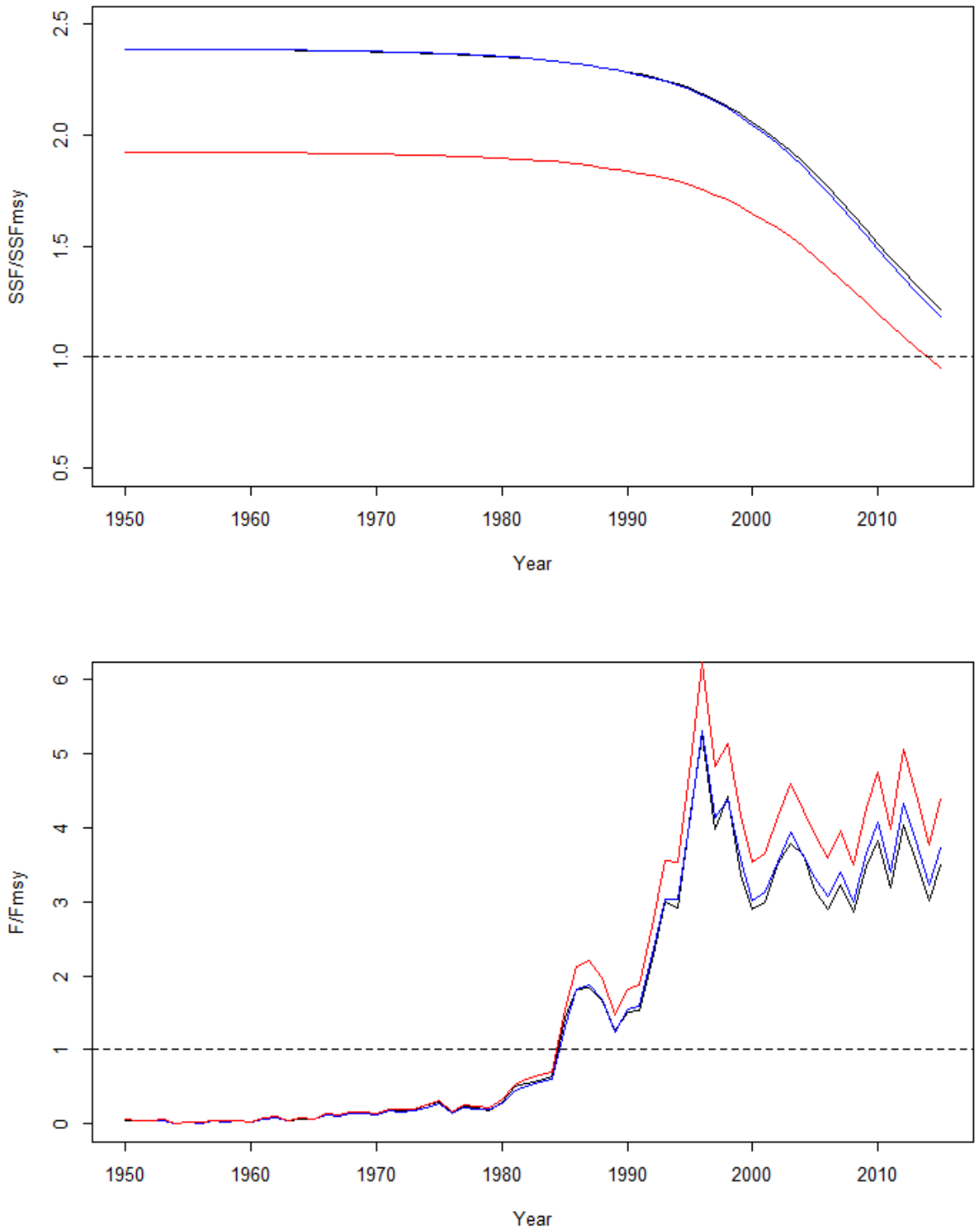


Figure 17. SSF/SSF_{MSY} and F/F_{MSY} for Stock Synthesis model run 1 (black), model run 2 (blue), and model run 3 (red) relative to the values at MSY (stippled line).

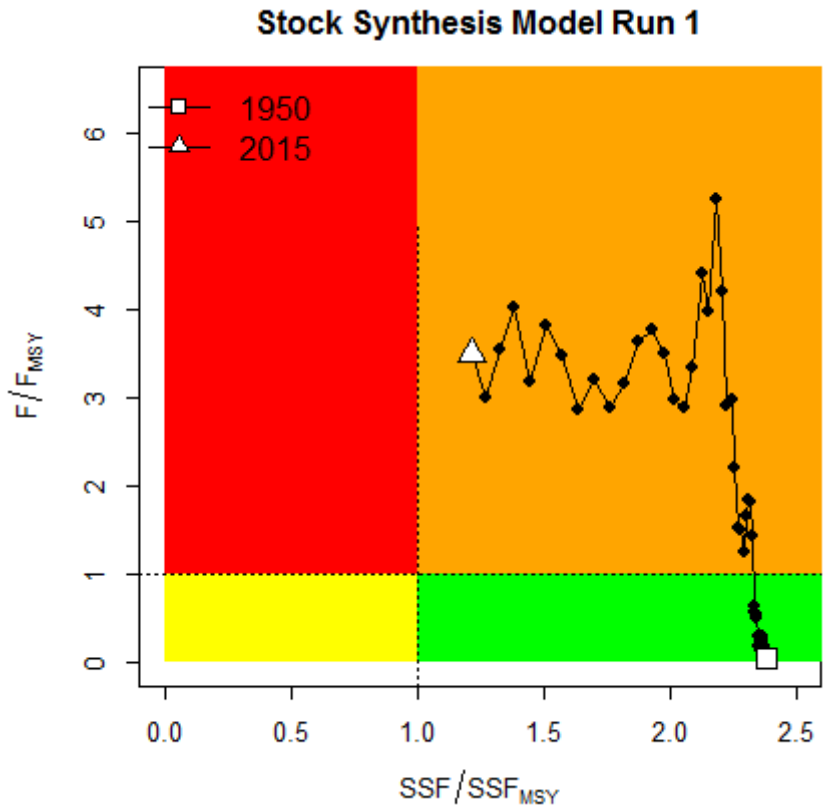


Figure 18. Kobe plot (SSF/SSF_{MSY} and F/F_{MSY}) for Stock Synthesis model run 1 relative to the values at MSY (stippled lines).

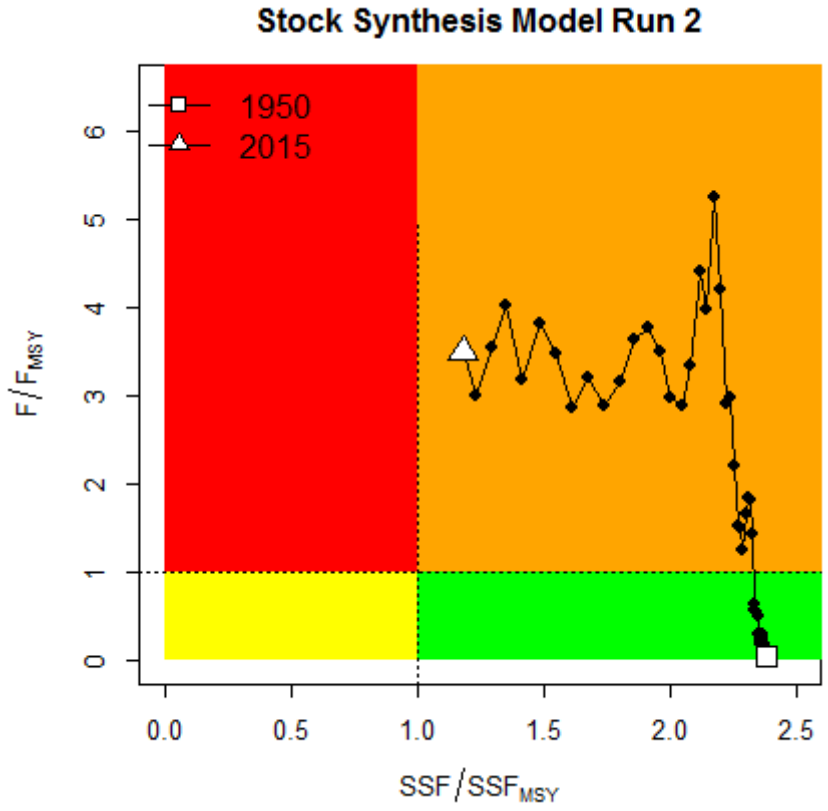


Figure 19. Kobe plot (SSF/SSF_{MSY} and F/F_{MSY}) for Stock Synthesis model run 2 relative to the values at MSY (stippled lines).

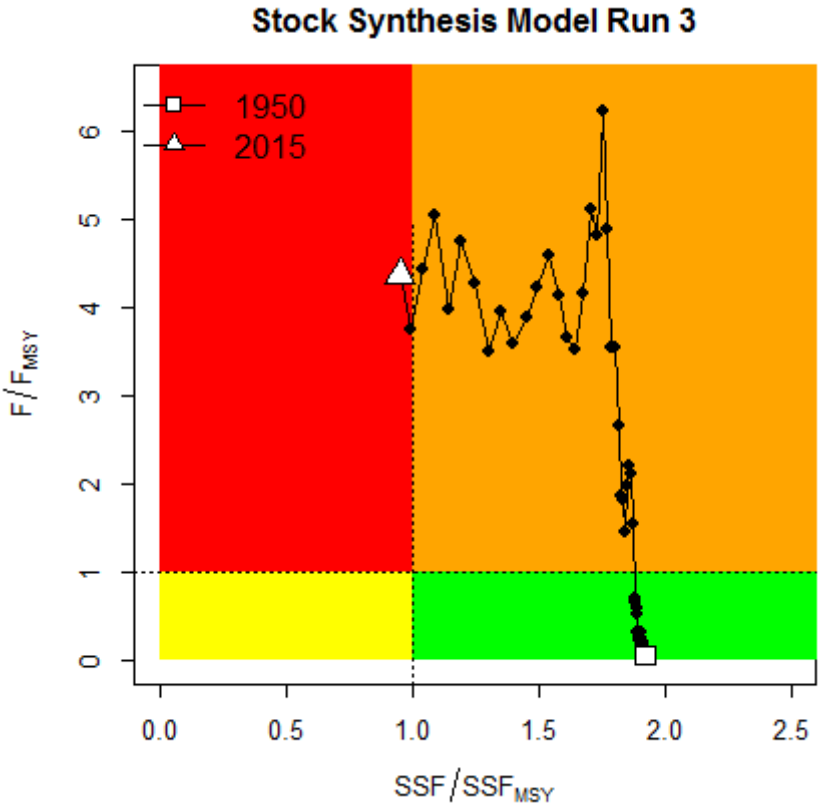
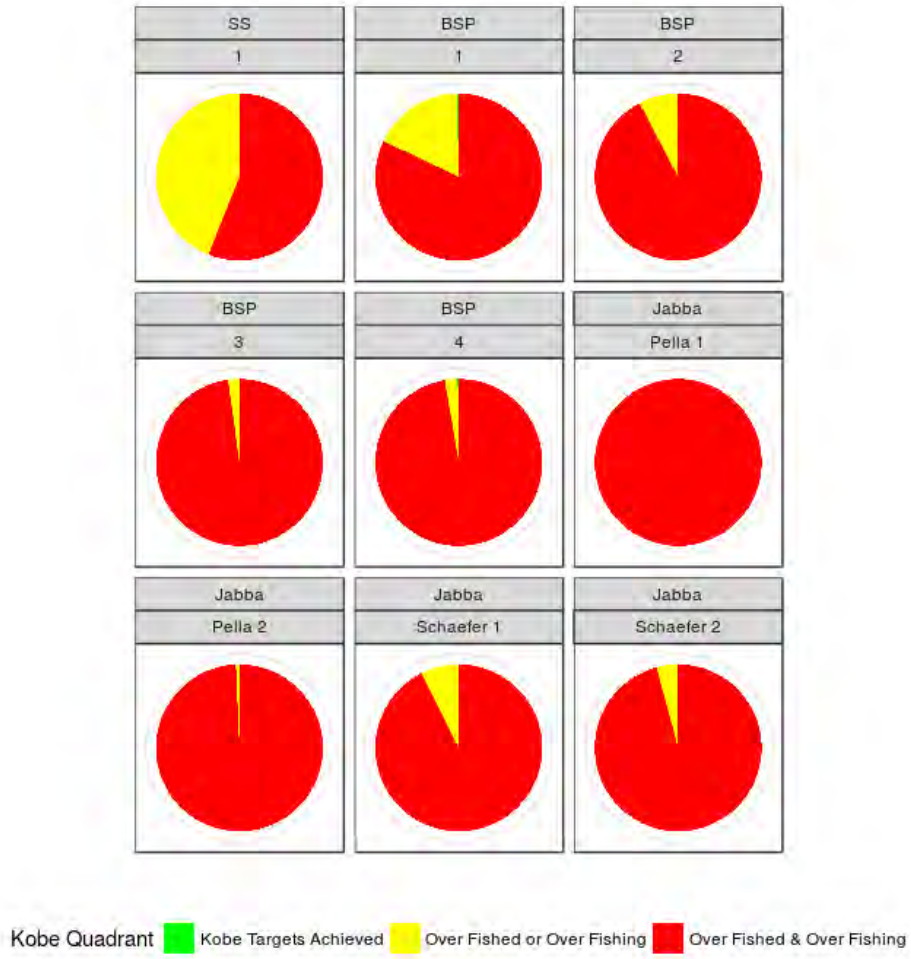


Figure 20. Kobe plot (SSF/SSF_{MSY} and F/F_{MSY}) for Stock Synthesis model run 3 relative to the values at MSY (stippled lines).



	Method	Run	red	yellow	green
1	SS	1	56.07287	43.92713	0.0
2	BSP	1	82.10000	17.50000	0.4
3	BSP	2	92.30000	7.70000	0.0
4	BSP	3	97.80000	2.20000	0.0
5	BSP	4	97.30000	2.50000	0.2
6	Jabba	Pella 1	99.90000	0.10000	0.0
7	Jabba	Pella 2	99.30000	0.60000	0.1
8	Jabba	Schaefer 1	92.60000	7.40000	0.0
9	Jabba	Schaefer 2	95.80000	4.20000	0.0

Figure 21. Kobe Pie Chart for the individual runs in the North Atlantic. From left to right, models are: SS=Stock Synthesis; BSP1=BSP2JAGS, Catch 1, Schaefer; BSP2= BSP2JAGS, Catch 1, Schaefer; BSP3= BSP2JAGS, Catch2, Generalized; BSP4=BSP2JAGS, Catch 2, Generalized; JABBA Pella, with Catch 1; JABBA Pella with Catch 2; JABBA Schaefer with Catch 1; JABBA Schaefer with Catch 2.

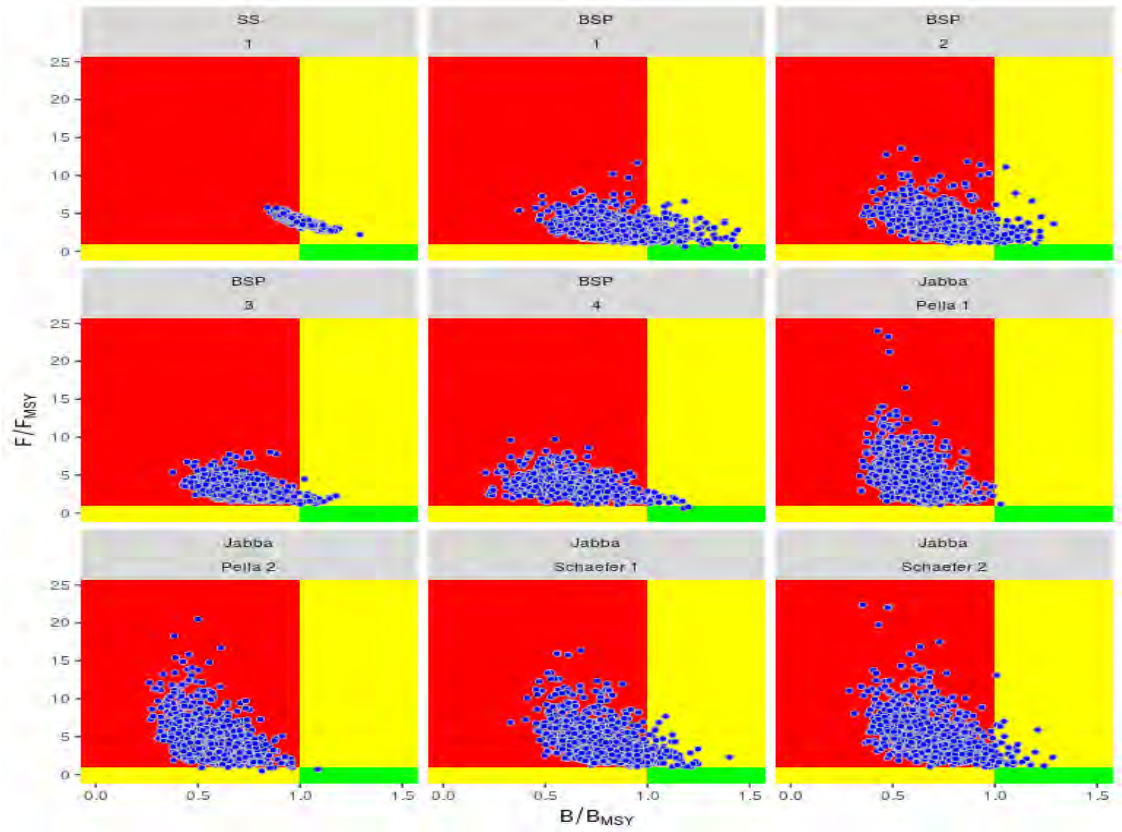


Figure 22. Kobe phase plots for the individual model runs in the North Atlantic. See Figure 21 caption for a description of the models.

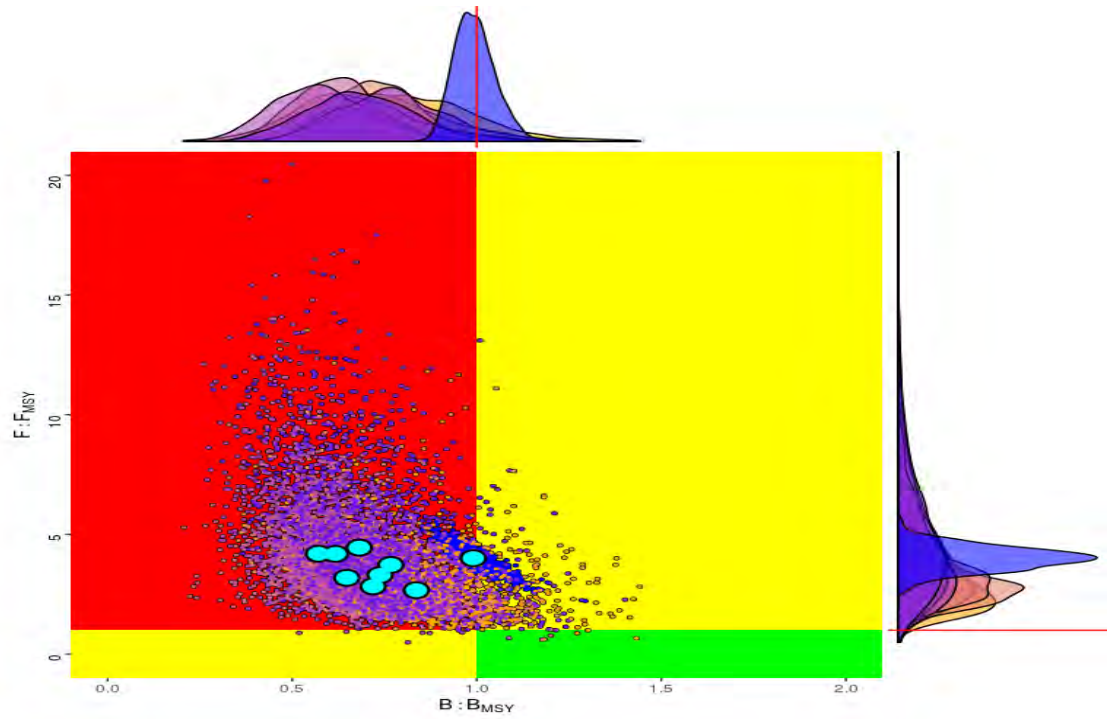


Figure 23. Kobe phase plot for North Atlantic shortfin mako showing current status (2015) based on all assessment models used. Large points show the medians for each assessment scenario; small points show the individual simulations. Marginal distributions are also shown.

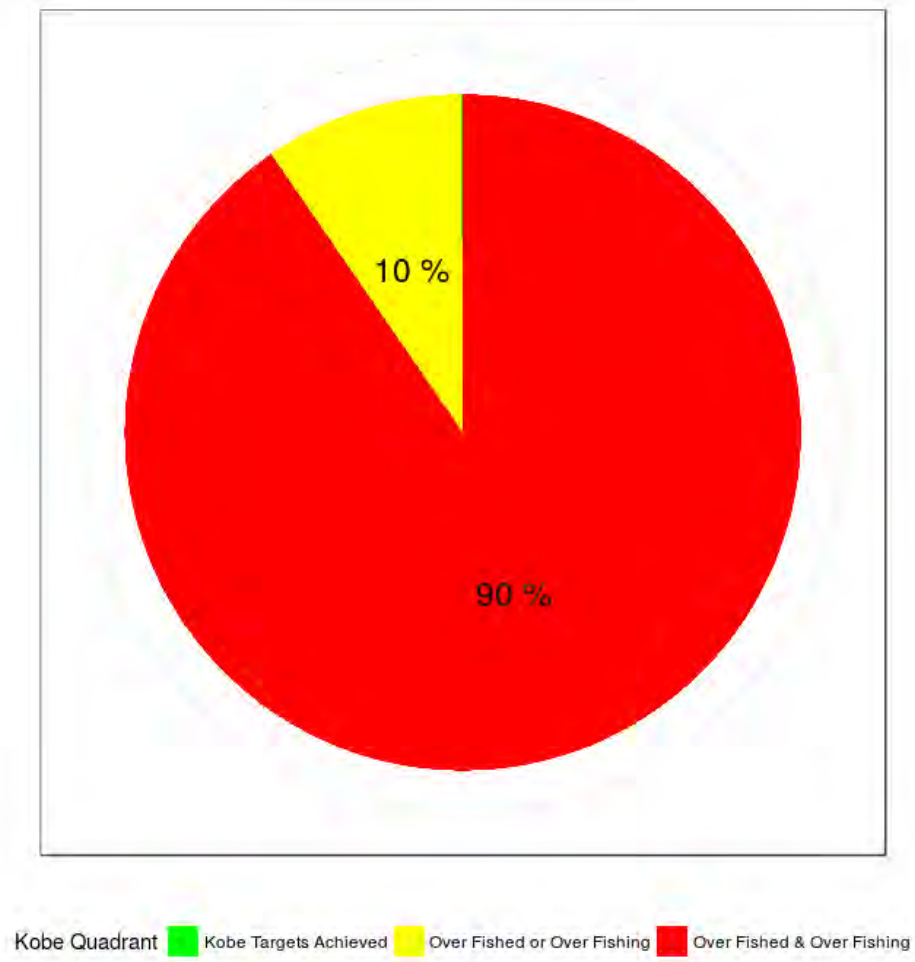
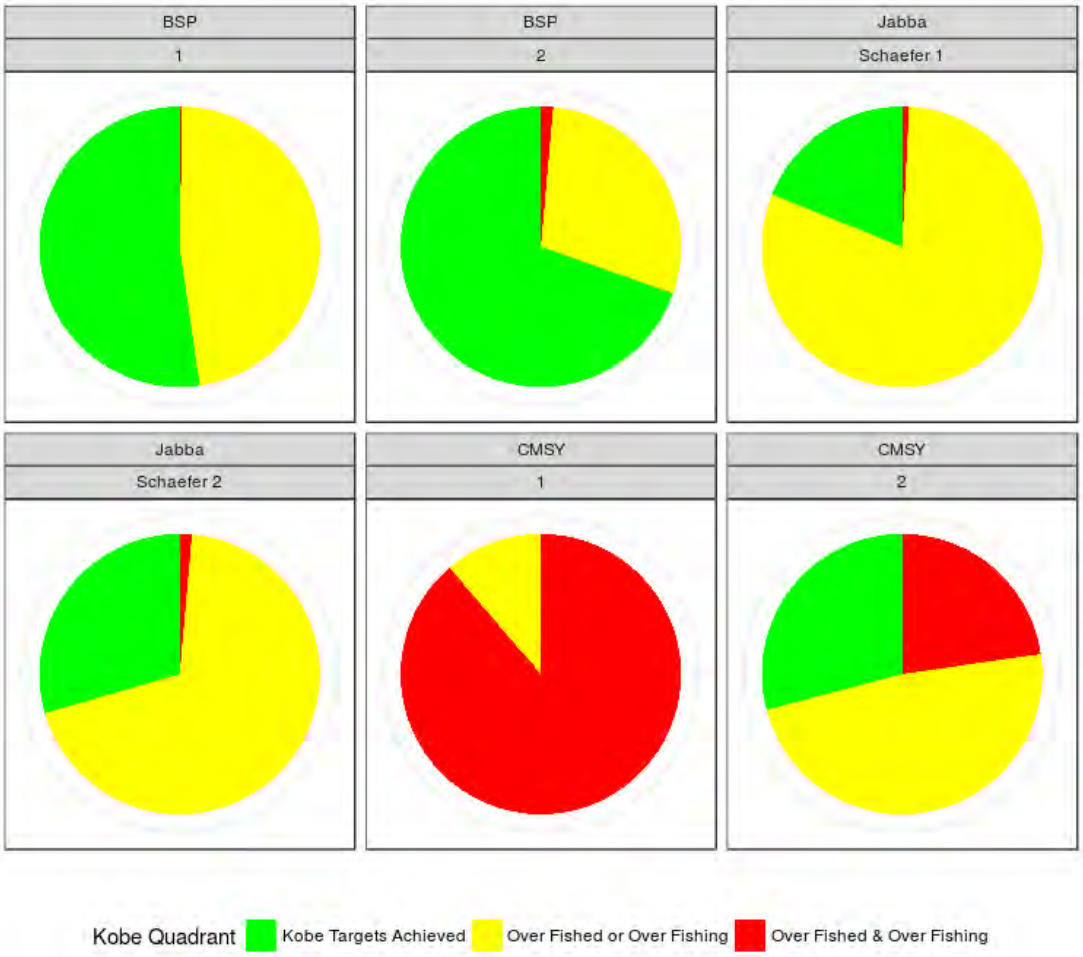


Figure 24. Kobe Pie Chart for the combined runs in the North Atlantic.



	Method	Run	red	yellow	green
1	BSP	1	0.3	47.4	52.3
2	BSP	2	1.4	29.0	69.6
3	Jabba Schaefer	1	0.8	80.3	18.9
4	Jabba Schaefer	2	1.4	69.1	29.5
5	CMSY	1	88.7	11.2	0.1
6	CMSY	2	22.7	48.2	29.1

Figure 25. Kobe Pie Chart for the individual runs in the South Atlantic. From left to right, models are: BSP1=BSP2JAGS, Catch 1, Schaefer; BSP2= BSP2JAGS, Catch 2, Schaefer; JABBA Schaefer with Catch 1; JABBA Schaefer with Catch 2; CMSY with Catch 1; CMSY with Catch 2.

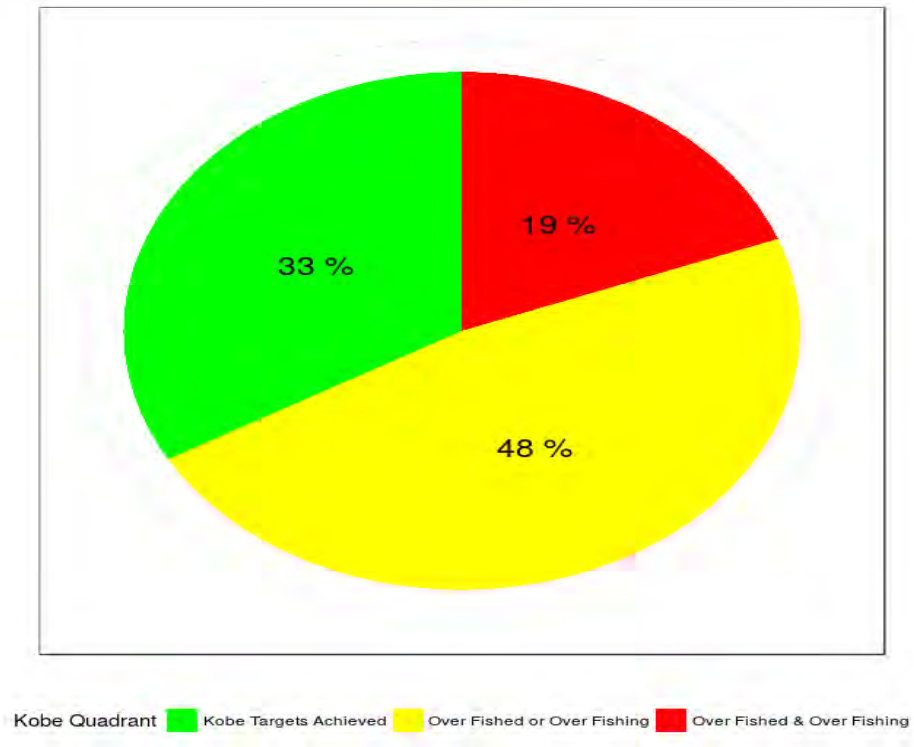


Figure 26. Kobe Pie Chart for the combined runs in the South Atlantic.

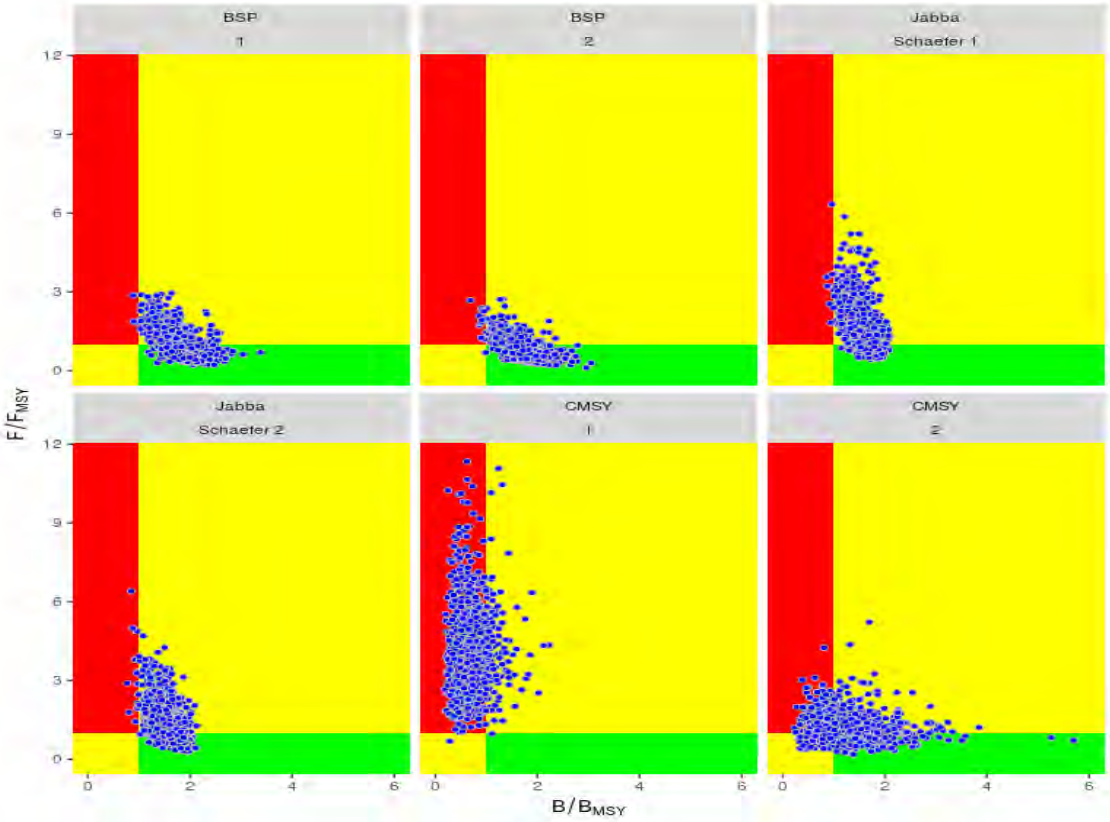


Figure 27. Kobe phase plots for the individual model runs in the South Atlantic. See Figure 25 caption for a description of the models.

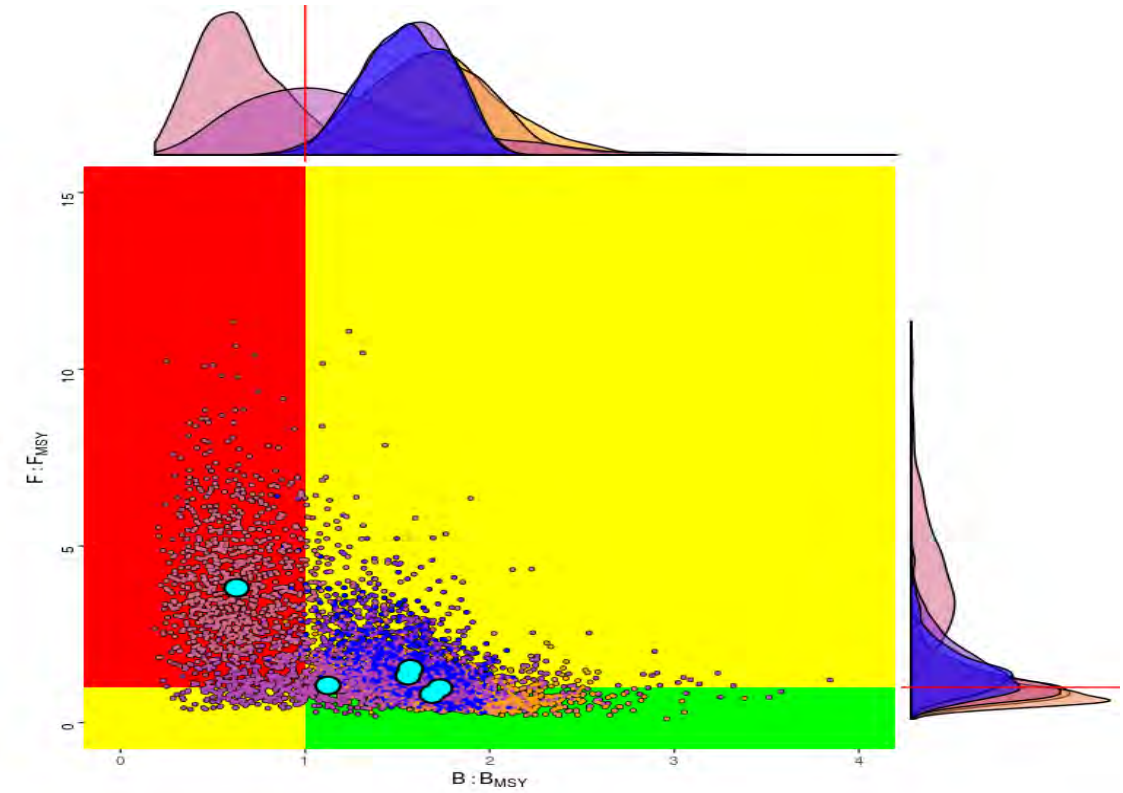


Figure 28. Kobe phase plot for South Atlantic, large points show the medians for each assessment scenario, small points show the individual simulations, marginal distributions are also shown.

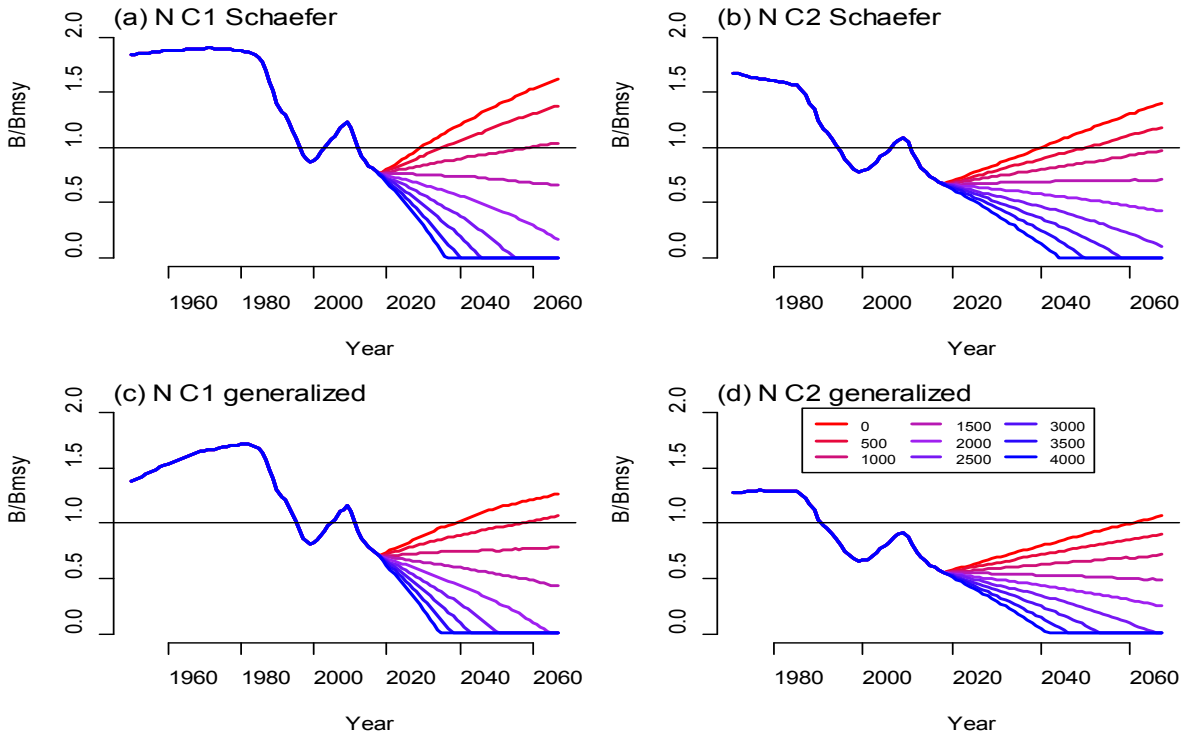


Figure 29. Median TAC projections (0 – 4000 t) from BSP2-JAGS North Atlantic for JAGS fits for (a) C1 Schaefer, (b) C2 Schaefer, (c) C1 generalized production model, and (d) C2 generalized production model.

Appendix 1

Agenda

1. Opening, adoption of Agenda and meeting arrangements
2. Summary of available data submitted by the assessment data deadline (30 April, 2017)
   2.1 Stock identity
   2.2 Catches
   2.3 Indices of abundance
   2.4 Biology
   2.5 Length compositions
   2.6 Other relevant data
3. Methods and other data relevant to the assessment
   3.1 Production models
   3.2 Other methods
   3.3 Length-based age-structured models: Stock Synthesis
4. Stock status results
   4.1 Production models
   4.2 Other methods
   4.3 Stock Synthesis
   4.4 Synthesis of assessment results
5. Projections
6. Recommendations
   6.1 Research and statistics
   6.2 Management
7. Other matters
8. Adoption of the report and closure

Appendix 2

List of Participants

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Appendix 3

List of Papers and Presentations

Reference	Title	Authors
SCRS/2017/108	Updated standardized catch rates of shortfin mako (*Isurus oxyrinchus*) caught by the Spanish surface longline fishery targeting swordfish in the Atlantic ocean during the period 1990-2015	Fernández-Costa J., García-Cortés B., Ramos-Cartelle A. and Mejuto J.
SCRS/2017/110	An alternative hypothesis for the reconstruction of time series of catches for North and South Atlantic stocks of shortfin mako shark	Coelho R. and Rosa D.
SCRS/2017/111	Age and growth of shortfin mako in the North Atlantic, with revised parameters for consideration to use in the stock assessment	Rosa D., Mas F., Mathers A., Natanson L.J., Domingo A., Carlson J. and Coelho R.
SCRS/2017/125	Stock synthesis (SS3) model runs conducted for North Atlantic shortfin mako shark	Courtney D., Cortés E. and Zhang X.
SCRS/2017/126	Estimates of maximum population growth rate and steepness for shortfin makos in the North and South Atlantic Ocean	Cortes E.
SCRS/2017/129	Anomalous ratios of blue and shortfin mako shark landings from individual north-Atlantic longline fishing vessels	Queiroz N., Mucientes G., Sousa L.L., Sims D.W.
SCRS/2017/130	Highly spatially resolved catch records of shortfin mako in the Central North Atlantic	Queiroz N., Mucientes G., Sousa L.L., Sims D.W.
SCRS/2017/132	Proposal of implementation of low-fecundity spawner-recruitment relationship for shortfin mako in the North Atlantic	Kai M. and Carvalho F.
SCRS/2017/135	Initial stock assessment results for the North and South Atlantic shortfin mako (*Isurus oxyrinchus*) using a Bayesian Surplus Production Model and the Catch-Resilience method CMSY	Winker H, Carvalho F., Sharma R., Parker D. and Kerwath S.
SCRS/P/2017/017	Fishing the RFMO boundary: South African shortfin mako data	Winker H., Kerwath S. and Parker D.
SCRS/P/2017/020	Linking age-structured (SS3) and surplus production models	Winker H. and Carvalho F.
SCRS/P/2017/021	CMSY and a fitted SPMs: Lessons learned from Mediterranean albacore with application to South Atlantic shortfin mako	Winker H. and Parker D.
SCRS/P/2017/022	Using Satellite Telemetry to Quantify Fisheries Interaction and Survival of Shortfin Mako Sharks	Byrne M.

Appendix 4

SCRS Document Abstracts

SCRS/2017/108 – Standardized catches per unit of effort (in number and weight) were obtained for the shortfin mako (*Isurus oxyrinchus*) using General Linear Modeling procedures based on trip data from the Spanish surface longline fleet targeting swordfish in the North and South Atlantic Ocean over the period 1990-2015. A base case and two GLM sensitivity analyses were carried out including a MIXED procedure. Area was identified to be the most relevant factor in explaining CPUE variability in all cases. The base case models explained between 40-46% of CPUE variability. The comparison of the standardized CPUEs obtained from the base case and the two sensitivity models show a very similar and stable general trend over time regardless of the model used for the North Atlantic stock. The base case and sensitivity analysis using a mixed model also show very similar trends over time in the case of the South Atlantic stock. All scenarios tested suggest overall stable CPUE trends or a slightly increase trend, in the North and South Atlantic stocks, respectively, during the 26-year period analyzed.

SCRS/2017/110 – The reconstruction of shark catch time series is particularly important for stock assessments, as the nominal catch data on sharks is usually very limited and a major source of uncertainty. This document provides an alternative hypothesis for the reconstruction of shark catches in the Atlantic (ICCAT fisheries) based on a method developed for the EUPOA-Sharks (EU Plan of Action for Sharks). The estimation method is based on ratios of sharks:main species catches, obtained from observer programs, literature revision and/or personnel communications. In this paper we present the average estimations by fleet/métier for the Atlantic (2000-2015) as well as time series for 1971-2015. A specific estimation for shortfin mako by stock is also presented. In this specific case, the main differences in the declared vs. estimated catches are more relevant in the earlier years of the series, which is consistent with more underreporting and lack of species specific information in the earlier years. These time series (North and South stocks) can be considered for use as alternative catch histories in the 2017 ICCAT SMA stock assessment.

SCRS/2017/111 – The shortfin mako, *Isurus oxyrinchus* (Lamnidae), is regularly caught as bycatch in pelagic longline fisheries and is among the most vulnerable sharks to this fishery. The age and growth of *I. oxyrinchus* was studied along a wide North Atlantic region. Data from 375 specimens ranging in size from 57 to 366 cm fork length (FL) for females and 52 to 279 cm FL for males were analysed. Growth models were fitted using the von Bertalanffy growth equation re-parameterised to calculate L0, instead of t0, and a modification of this equation using the known size at birth. Growth models were compared using the Akaike information criterion (AIC) and Bayesian Information Criterion (BIC). The von Bertalanffy growth equation with fixed L0 (size at birth = 63 cm FL) seemed to adequately model growth in this species, with resulting growth parameters of Linf = 241.8 cm FL, k = 0.136 year-1 for males and Linf = 350.3 cm FL, k = 0.064 year-1 for females. This study adds to knowledge of the vital life-history parameters of shortfin mako in the Atlantic Ocean, which can be used in future stock assessments for producing scientific advice to promote the management and conservation of this species.

SCRS/2017/125 – Stock Synthesis model runs were conducted for the North Atlantic shortfin mako shark based on the available catch, CPUE, length composition, and life history data compiled by the Shark Working Group. A sex-specific model was implemented in order to allow for observed differences in growth between sexes. Beverton-Holt stock-recruitment was assumed. The steepness of the stock recruitment relationship and natural mortality at age were fixed at independently estimated values. A two-stage data weighting approach was implemented to iteratively tune (re-weight) variance adjustment factors for fleet-specific relative abundance indices (CPUE) externally to the model (Stage 1) and fleet-specific size data distributions (length composition) within the Stock Synthesis model (Stage 2). Ending year (2015) stock status relative to maximum sustainable yield (MSY) reference points obtained from the final SS3 model run following the two stage data weighting approach indicated that the fishing mortality rate in 2015 was above the fishing mortality rate at maximum sustainable yield (F_2015/F_MSY = 3.7) and that F_2015/F_MSY first exceeded 1.0 in 1985. The final SS3 model run also indicated that spawning stock size in 2015, calculated here as spawning stock fecundity (SSF, 1,000s), was very close to being below the spawning stock size at MSY (SSF_2015/SSF_MSY = 1.005).

SCRS/2017/126 – Maximum population growth rates and steepness values of the Beverton-Holt stock-recruitment relationship were computed for North and South Atlantic stocks of shortfin mako (*Isurus oxyrinchus*) based on the biological information provided at the 2017 Shortfin Mako Data Preparatory meeting and soon thereafter. I used a dual life table/Leslie matrix approach to obtain estimates of productivity (r_{max}), net reproductive rate (R_0), generation time (μ_1), and derived steepness analytically. To encompass a plausible range of biological values, I considered parameters from the von Bertalanffy growth function obtained in a recently

completed study by the Shark Species Group and those from a previous study for the North Atlantic, and from two published studies for the South Atlantic. I also considered a female size vs. litter size relationship or constant fecundity. Finally, natural mortality at age was obtained from the minimum of five estimates obtained through different life history invariant methods to approximate a maximum population growth rate. Estimated productivity ranged from r_{max}=0.031 to 0.060 yr^{-1} for the North Atlantic stock and from r_{max}=0.066 to 0.123 yr^{-1} for the South Atlantic stock. Analytically derived values of steepness corresponding to these productivities ranged from h=0.34 to 0.52 for the North Atlantic stock and h=0.44 to 0.72 for the South Atlantic stock. These estimates can be used to formulate informative priors of r_{max} and h in production and age-structured stock assessment models, respectively.

SCRS/2017/129 – Here we examine the verified landings of shortfin mako and blue sharks made by 21 individual European longline fishing vessels in 2008. Catches of shortfin mako typically comprise 3–13% of blue shark catches in the same longline or gill-net fishery, hence large deviations from this ratio may represent overreporting of mako landings that can affect scientific stock assessments. For the 21 vessels operating in the North Atlantic in 2008 the catches of shortfin mako were between 27.8 and 6481 % of blue shark catches. The average of mako was 725 % (± 1611.2 S.D.) of blue shark catches. Considering only 9 vessels for which the percentage was less than 100, the catches of mako were on average 48.6 % (± 18.9 S.D.) of blue shark catches. Although some discarding of blues may have affected the higher percentage makos observed, it seems likely that the majority of blue shark catches were retained and implies that the excess 'mako' could have been a regulated species such as swordfish. The scale of this problem prior to 2013 may already have affected data used in assessing shortfin mako populations in the Atlantic.

SCRS/2017/130 – Here we examine highly-spatially resolved catch records of individual shortfin mako detailed in personal logbooks from two longline-vessel captains over a 16 year period. Logbooks comprised data recording time, location (latitude/longitude), water temperature, gear type and setting practice (exact hook number, type, depth) and numbers of sharks and total biomass per species captured on each longline set. Results show median fishing trip duration increased from 29 days pre-2005 to 37 post-2005, with fishing areas expanded spatially by as much as 5º further west and between 2o and 20º further south from pre- to post-2005, together with a general shift in density distribution of sets. The expansion overlapped key areas of shark habitat use not previously exploited by those vessels, resulting in CPUE and biomass of shortfin mako being generally higher at the expanding edges of the core fishing areas post-2005. Whether fishing patterns responded to lower biomass of shortfin mako being available within higher use shark habitat remains an open question, but our results argue for detailed spatially-referenced catch data to be analysed in relation to new telemetry of oceanic shark space-use and fishing vessel movements to obtain a greater understanding of how CPUE varies through time.

SCRS/2017/132 – This document paper presents the short review of low-fecundity spawner-recruitment relationship (LFSR) to give a motivation of the implementation of the LFSR in the stock synthesis model. The parameter values of the LFSR are also computed using the preliminary value of the steepness for shortfin mako in the North Atlantic.

SCRS/2017/135 – We present results of two alternative stock assessment modeling frameworks applied to the North Atlantic (NA) and South Atlantic (SA) shortfin mako shark catch and CPUE data series. First we applied a Bayesian State-Space Surplus Production Model (Just Another Bayesian Biomass Assessment: JABBA), which estimates process variance and additional observation variance simultaneously and was fitted to primary catch time series and all provided standardized CPUE time series for the NA and SA. Based on the JABBA base-case fits, the MSY estimate for North Atlantic base-case was 1134.1 metric tons (479.9 – 3324.5 95% C.I.) and at 1130.5 metric tons (325.3 – 2274.1 95% C.I.) for the South Atlantic. Stock status trajectory of over time showed a typical anti-clockwise pattern for the NA shortfin mako shark stock status moving from underexploited through a period of unsustainable fishing, leading to a 99% posterior probability of being over-exploited in 2015. In contrast, the South Atlantic stock reveals a clockwise pattern moving from an underexploited state to a recovery as result of decreasing biomass under sustainable fishing, which is followed by a short period of overfishing. For the SA shortfin mako shark population, the resulting stock status posterior for 2015 therefore appears somewhat implausible and ambiguous. Model diagnostics in for evaluating forecasting, retrospective patterns and sensitivity to dropping on CPUE series at a time (jackknife) indicated overall good performance for the NA stock, but highlighted that stock biomass estimates must be treated with extreme caution. This was further corroborated by the good match between the catch-only method CMSY for NA, but strong discrepancies between CMSY and fitted models for SA. The latter can be attributed to the apparent contradiction between the observation process (i.e. CPUE) and process equation, which is informed by the catch and resilience (r) information.

Appendix 5

Additional results using the Visual BASIC Bayesian Surplus Production Software (BSP1 and BSP2), and the equivalent in JAGS (BSP2-JAGS)

This appendix presents results of the BSP1, BSP2 and BSP2-JAGS runs that were discussed at the assessment meeting, but not included in the main text. This includes the detailed results of BSP1 and BSP2 continuity runs, as well as some sensitivity analyses done with BSP2-JAGS.

The continuity runs using the BSP1 VisualBASIC model were set up using the same catch data and indices as all the other BSP models (Section 3.1). We ran three models for the North Atlantic (**Table Appendix 1a**) and three models for the South Atlantic (**Table Appendix 1b**) using data through 2015. For the North and the South the first run (na1, sa1) was the C1 catch starting in 1950 and 1971 respectively. Both second runs (na2, sa2) used the C2 catch series both starting in 1971. The final run (na3, sa3) applied a generalized production model and the alternative catch series both starting in 1971. Runs na2 and sa1 are continuity runs for comparison to the 2012 assessment methods. All BSP1 models were able to converge adequately, with percent maximum weight less than 0.5% and similar values of the log(weights) and log(likelihood*priors). However, without process error they were not able to fit the zigzag pattern in the CPUE series in the North Atlantic (**Figure Appendix 1**), or the increasing trend in the South Atlantic (**Figure Appendix 2**). All BSP1 results had high K values and were fairly optimistic (**Table Appendix 2, Table Appendix 3, Figure Appendix 3, Figure Appendix 4, Figure Appendix 5**).

Although the BSP2 VisualBASIC model with process error (BSP2) was able to estimate the mode of the posterior distribution, the SIR algorithm did not converge on the posterior distribution. For the North Atlantic, the authors were able to estimate the mode of the posterior distribution, and the fit at the mode (**Figure Appendix 6**) was similar to the fits from the BSP2-JAGS models with the same data (**Figure Appendix 7**).

Additional sensitivity analyses of the BSP1, BSP2 and BSP2-JAGS models were presented using slightly different priors and weighting methods, with the same catch and CPUE data through 2015. These models were presented at the beginning of the meeting, and they have different priors than the runs used for the assessment. The models were used in part to explore the differences between BSP VisualBASIC and BSP2-JAGS implementations (Babcock and Cortés (in press)). They were based on the runs conducted during the 2012, except where noted (**Table Appendix 4**). While the starting year was 1971 for the North Atlantic in the 2012 assessment, these runs used the first year of the catch series, which was 1950. The indices used in the north Atlantic were US-Log, JPLL-N, POR-LL-N, ESP-LL-N, and CH-TA-LLN. In a sensitivity run, the US-Obs series was also included. Catches were either the catches from the data preparatory meeting (C1), or the alternative catch scenario based on ratios (C2). In the north, the C1 catches were used for 1950 to 1970 in the C1 catch scenario. In one run, catches from 1950 to 1996 were predicted from effort using an estimated constant of proportionality. For the south Atlantic, the indices were UR-LL-Log, JPLL-S, BR-L, UR-LL-Obs, ESP-LL-S, and CH-TA-LLS.

For both the North and the South, a lognormal informative prior was used for r, in which the mean of r was set to the mean of the newly calculated values of r from several different methods life history methods. The log-standard deviation of r was the same as the 2012 assessment (log-sd=0.12). The means were 0.046 for the north and 0.073 for the south (corresponding to log-means of -3.09 in the north and -2.62 in the south). In one sensitivity analysis the log-sd of r was doubled. The other priors were the same as in 2012. The starting biomass relative to K was lognormal with a mean of one and log-standard deviation of 0.2, bounded between 0.2 and 1.1. K was uniform on log-K, bounded between 0.01 and 5,000,000. In the BSP1 and BSP2 runs, q was estimated using the MLE shortcut. For the BSP2-JAGS runs, for each series was estimated with a uniform prior between 1.0E-10 and 10. In most model runs, the error standard deviation was assumed to be the same for all points and was estimated with a uniform prior between 0.01 and 10. In the "catch weighting" runs, the error standard deviation in each data point was estimated from the proportion of catch in each year in each series. In the BSP2 runs, it is not possible to estimate the error standard deviation, so error standard deviation was set equal to a value slightly larger than the mean MLE sigma (0.4 in the north, and 0.45 in the south). Process error was zero in all the BSP1 runs, and fixed at either log-sd=0.05 or log-sd=0.005 in BSP2 and BSP2-JAGS. We also conducted post-model pre-data runs to evaluate the impact of the priors on the posterior distribution. These runs included only a single CPUE data point so that the results are driven entirely by the priors and the catch time series.

In the north Atlantic, the BSP1 alternative models were all able to converge adequately, with percent maximum weight less than 0.5% and similar values of the log(weights) and log(likelihood*priors). For the BSP2 runs, none of the importance functions produced good convergence; the final percent maximum weight was 1.97% for run n5, above the target of 0.5%. The BSP1 and BSP2 models generally produced fits that were quite optimistic, with biomass above B_{MSY} and F below F_{MSY} (**Table Appendix 5**, **Figure Appendix 5, Figure Appendix 8, Figure Appendix 9**). The BS2-JAGS alternative models for the north Atlantic also suffered from convergence problems, but generally had Gelman Rubin diagnostics less than 1.05 (**Table Appendix 6**). Like the BSP runs, the BSP2-JAGS runs returned values of r that were very similar to the priors. However, the BSP2-JAGS runs produced lower estimate of K, and were generally more pessimistic (**Table Appendix 6, Figure Appendix 10, Figure Appendix 11**). Process error improved the model fits.

For the south Atlantic, the BSP1 alternative models converged adequately, but the BSP2 model did not. The percent maximum weight was13.5% for run s2, above the target of 0.5%. The BSP2-JAGS runs all converged adequately. All models produced posterior distributions that were similar to the priors for r. However, the BSP2-JAGS models estimated higher values of K, so that they were more optimistic than the BSP2-JAGS models (**Table Appendix 7, Table Appendix 8, Figure Appendix 12, Figure Appendix 13**). The BSP2-JAGS runs estimated an increasing trend during the years with CPUE data (**Figure Appendix 14**).

Finally, **Figure Appendix 15** shows the Kobe plot for the main assessment model results described in section 3.1 for the South Atlantic.

Table Appendix 1. Inputs for the BSP1 and BSP2 continuity runs.

(a) North BSP1

Run	*Weighting*	*Catch*	*Catch start date*	*B0/K prior*	*r prior*	*Name*	*Shape*
na1	equal	C1	1950	lnorm(1)	lnorm(log(0.0254), 0.434)	N 1950	n=2
na2	equal	alt	1971	lnorm (.85)	lnorm(log(0.0254), 0.434)	N continuity	n=2
na3	equal	alt	1971	lnorm(.85)	lnorm(log(0.0254), 0.434)	N 1971 gen	n=5

b) South BSP1

Run	*Weighting*	*Catch*	*Catch start date*	*B0/K prior*	*r prior*	*Name*	*Shape*
sa1	equal	C1	1971	lnorm	lnorm(log(0.052), 0.275)	S continuity	n=2
sa2	equal	alt	1971	lnorm	lnorm(log(0.052), 0.275)	S alt cat	n=2
sa3	equal	alt	1971	lnorm	lnorm(log(0.052), 0.275)	S alt cat gen	n=5

(c) North BSP2

Run	*Area*	*Weighting*	*Catch*	*Process error*	*Catch start date*	*B0/K prior*	*r prior*	*Name*	*Shape*
na4	North	input CV	C1	0.05	1950	lnorm(1)	lnorm(log(0.0254), 0.434)	N 1950	n=2
na5	North	input CV	alt	0.05	1971	lnorm (.85)	lnorm(log(0.0254), 0.434)	N continuity	n=2
na6	North	input CV	alt	0.05	1950	lnorm(.85)	lnorm(log(0.0254), 0.434)	N 1971 gen	n=5

(d) South BSP2

Run	*Area*	*Weighting*	*Catch*	*Process error*	*Catch start date*	*B0/K prior*	*r prior*	*Name*	*Shape*
sa4	South	input CV	C1	0.05	1971	lnorm	lnorm(log(0.052), 0.275)	S continuity	n=2
sa5	South	input CV	alt	0.05	1971	lnorm	lnorm(log(0.052), 0.275)	S alt cat	n=2
sa6	South	input CV	alt	0.05	1971	lnorm	lnorm(log(0.052), 0.275)	S alt cat gen	n=5

Table Appendix 2. Expected values (CVs) of estimated parameters for the BSP1 continuity model runs for North Atlantic mako sharks.

Variable	*mako17Na1*	*mako17Na2*	*mako17Na3*
K (1000)	1755.63(0.70)	1967.08(0.6)	1670.76(0.76)
r	0.03(0.46)	0.03(0.5)	0.03(0.48)
MSY (1000)	10.98(0.88)	11.93(0.8)	22.95(0.97)
Bcur (1000)	1620.98(0.74)	1713.97(0.7)	1595.70(0.79)
Binit (1000)	1603.58(0.71)	1663.14(0.7)	1451.19(0.78)
Bcur/Binit	0.99(0.12)	1.01(0.1)	1.09(0.14)
Ccur/MSY	0.55(0.83)	0.61(0.8)	0.39(0.85)
Bcur/Bmsy	1.77(0.09)	1.67(0.1)	1.38(0.09)
Fcur/Fmsy	0.34(0.99)	0.40(0.9)	0.31(1.03)

Table Appendix 3. Expected values (CVs) of estimated parameters for the BSP1 model continuity runs for South Atlantic mako sharks.

Variable	*mako17Sa1*	*mako17Sa2*	*mako17Sa3*
K (1000)	2547.55(0.50)	2473.56(0.52)	1842.71(0.72)
r	0.06(0.21)	0.06(0.21)	0.04(0.18)
MSY (1000)	35.02(0.54)	34.24(0.56)	37.99(0.72)
Bcur (1000)	2317.55(0.51)	2243.62(0.53)	1792.91(0.73)
Binit (1000)	1360.17(0.55)	1318.90(0.57)	711.75(0.77)
Bcur/Binit	1.75(0.19)	1.75(0.19)	2.60(0.19)
Ccur/MSY	0.11(0.79)	0.11(0.78)	0.13(0.91)
Bcur/Bmsy	1.81(0.05)	1.80(0.05)	1.44(0.03)
Fcur/Fmsy	0.06(0.85)	0.06(0.86)	0.09(0.97)

Table Appendix 4. Inputs for the BSP and BSP2-JAGS sensitivity runs using alternative priors.

(a) North Atlantic

Run	*Weighting*	*Catch*	*Indices*	*Est Cat*	*Proc. error*	*Software*	*Cat start date*	*B0/K prior*	*r prior*	*Name*
n1	equal, estimated	C1	base	no	0	BSP	1950	lnorm (mean 1, CV 0.2)	lnorm, mean 0.046	N equal wt
n2	equal, estimated	C1	base	effort	0	BSP	1997	uniform (0.2, 1.1)	lnorm,mean 0.046	N effort fit
n3	catch wt	C1	base	no	0	BSP	1950	lnorm	lnorm,mean 0.046	N catch wt
n4	equal, estimated	C1	base	no	0	BSP	1950	lnorm	lnorm,mean 0.046, double sd	N double r sd
n1pmpd	NA	C1	NA	no	0	BSP	1950	lnorm	lnorm,mean 0.046	N pmpd
n5	equal, estimated	C1	base	no	0.05	BSP2	1950	lnorm	lnorm,mean 0.046	N process error
n6	by series	C1	base	no	0	BSP	1950	lnorm	lnorm,mean 0.046	N series wt
n7	equal, estimated	C2	base	no	0	BSP	1950	lnorm	lnorm,mean 0.046	N alt catch
n8	equal, estimated	C1	base+US obs	no	0	BSP	1950	lnorm	lnorm,mean 0.046	N alt index
jn1	equal, estimated	C1	base	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N equal wt
jn2	equal, estimated	C1	base	effort	0.005	JAGS	1997	uniform	lnorm,mean 0.046	N effort fit
jn3	catch wt	C1	base	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N catch wt
jn4	equal, estimated	C1	base	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046, double sd	N double r sd
n1pmpd	NA	C1	NA	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N pmpd
jn5	equal, estimated	C1	base	no	0.05	JAGS	1950	lnorm	lnorm,mean 0.046	N process error
jn6	by series	C1	base	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N series wt
jn7	equal, estimated	C2	base	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N alt catch
jn8	equal, estimated	C1	base+US obs	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N alt index
jn1s1	estimated	C1	1	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N index 1
jn1s2	estimated	C1	2	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N index 2
jn1s3	estimated	C1	3	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N index 3
jn1s4	estimated	C1	4	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N index 4
jn1s5	estimated	C1	5	no	0.005	JAGS	1950	lnorm	lnorm,mean 0.046	N index 5

(b) South Atlantic

Run	*Weighting*	*Catch*	*Indices*	*Est cat*	*Proc. error*	*Software*	*Catch start date*	*B0/K prior*	*r prior*	*Name*
s1	equal, estimated	C1	base	no	0	BSP	1971	lnorm	lnorm, mean 0.073	S equal wt
s2	equal, fixed	C1	base	no	0.05	BSP2	1971	lnorm	lnorm, mean 0.073	S process error
s1pmpd	NA	C1	NA	no	0	BSP	1971	lnorm	lnorm, mean 0.073	S pmpd
js1	equal, estimated	C1	base	no	0.005	JAGS	1971	lnorm	lnorm, mean 0.073	S equal wt
js2	equal, estimated	C1	base	no	0.05	JAGS	1971	lnorm	lnorm, mean 0.073	S process error
js1pmpd	NA	C1	NA	no	0.005	JAGS	1971	lnorm	lnorm, mean 0.073	S pmpd

Table Appendix 5. Expected values (CVs) of estimate parameters for the BSP1 and BSP2 model alternative runs for North Atlantic mako sharks.

Variable	*mako17N1*	*mako17N2*	*mako17N3*	*mako17N4*	*mako17N5*	*mako17N6*	*mako17N7*	*mako17N8*	*mako17N1PMPD*
	equal wt	*effort fit*	*catch wt*	*double r sd*	*process error*	*series wt*	*C2 catch*	*alt index*	
K (1000)	1592.96 (0.78)	446.71(1.0)	1395.38(0.9)	1594.17(0.78)	1160.38(0.8)	1088.96(1.0)	1810.40(0.70)	1756.96(0.70)	1245.22(1.0)
r	0.05(0.12)	0.05(0.1)	0.05(0.1)	0.05(0.24)	0.05(0.1)	0.05(0.1)	0.05(0.12)	0.05(0.12)	0.05(0.1)
MSY (1000)	18.20(0.80)	5.20(1.0)	16.04(0.9)	18.16(0.84)	13.54(0.8)	12.54 (1.0)	20.68 (0.71)	20.11(0.71)	14.32(1.0)
Bcur (1000)	1515.92 (0.82)	302.00(1.6)	1316.91(1.0)	1514.94(0.82)	1020.82(0.8)	1013.84(1.1)	1715.90(0.73)	1678.88(0.73)	1165.04(1.1)
Binit (1000)	1455.62 (0.80)	294.65(1.5)	1260.14(0.9)	1456.44(0.80)	1058.20(0.8)	1004.30(1.0)	1655.66(0.71)	1596.00(0.71)	1122.33(1.0)
Bcur/Binit	1.02(0.14)	1.04(0.4)	0.97(0.2)	1.02(0.14)	0.91(0.2)	0.95(0.2)	1.02(0.14)	1.04(0.14)	0.90(0.3)
Ccur/MSY	0.34(0.82)	0.78(0.3)	0.50(0.9)	0.35(0.82)	0.53(0.7)	0.53(0.7)	0.36(0.78)	0.28(0.78)	0.70(1.0)
Bcur/Bmsy	1.82(0.08)	1.17(0.3)	1.73(0.2)	1.82(0.08)	1.64(0.2)	1.72(0.1)	1.82(0.08)	1.85(0.06)	1.59(0.3)
Fcur/Fmsy	0.20(0.96)	0.79(0.5)	0.37(1.4)	0.21(0.97)	0.37(0.8)	0.34(0.8)	0.21(0.94)	0.16(0.90)	1.27(4.3)

Table Appendix 6. BSP2-JAGS alternative model expected values and CVs for north Atlantic mako sharks.

Parameter	*1N equal wt*	*2N effort fit*	*3N catch wt*	*4N double r sd*	*5N pmpd*	*6N process error*	*7N series wt*	*8N C2 catch*	*9N alt index*
Rhat	1.01	1.17	1.02	1.04	1.15	1	1.01	1.02	1.02
n.eff	280	15	87	110	24	2100	180	520	110
K(1000)	251.57(0.29)	256.72(0.17)	342.33(0.08)	252.16(0.29)	493.29(1.87)	159.99(0.26)	227.14(0.24)	304.17(0.3)	265.69(0.27)
r	0.05(0.12)	0.05(0.13)	0.05(0.06)	0.05(0.12)	0.05(0.12)	0.05(0.12)	0.05(0.12)	0.05(0.12)	0.05(0.12)
B0/Bmsy	1.75(0.16)	1.82(0.13)	0.41(0.03)	1.79(0.14)	1.82(0.13)	1.81(0.13)	1.81(0.13)	1.77(0.14)	1.77(0.14)
Bcur.Bmsy	1.36(0.12)	0.88(0.24)	1.3(0.04)	1.37(0.12)	0.73(1.12)	1.09(0.21)	1.32(0.11)	1.35(0.13)	1.42(0.1)
HRcur.HRmsy	0.88(0.34)	1.22(0.25)	0.57(0.08)	0.88(0.34)	2441.6(1.23)	1.75(0.32)	0.97(0.29)	0.99(0.37)	0.78(0.32)

Table Appendix 7. Expected values (CVs) of model outputs from BSP1 and BSP2 alternative model runs for the South Atlantic.

Variable	*mako17S1*	*mako17s2*	*mako17S1PMPD*
	equal wt	*process error*	*pmpd*
K (1000)	2416.85(0.53)	1489.99(0.51)	1079.86(1.1)
r	0.07(0.11)	0.07(0.09)	0.07(0.1)
MSY (1000)	42.86(0.54)	26.21(0.47)	19.70(1.2)
Bcur (1000)	2288.62(0.54)	1594.18(0.52)	1039.75(1.2)
Binit (1000)	1238.15(0.58)	922.35(0.60)	976.59(1.2)
Bcur/Binit	1.90(0.20)	1.82(0.13)	0.93(0.3)
Ccur/MSY	0.09(0.82)	0.13(0.47)	0.60(1.2)
Bcur/Bmsy	1.88(0.03)	2.13(0.08)	1.66(0.3)
Fcur/Fmsy	0.05(0.88)	0.06(0.47)	1.05(4.6)

Table Appendix 8. Expected values (CVs) or model outputs from BSP2-JAGS alternative model runs for the South Atlantic.

Parameter	*10S equal wt*	*11S process error*	*12S pmpd*
Rhat	1	1	1.21
n.eff	1400	3600	13
K(1000)	236.69(0.44)	161.93(0.43)	352.39(2.28)
r	0.07(0.11)	0.07(0.11)	0.07(0.12)
B1.K	1.07(0.22)	1.1(0.2)	1.83(0.12)
Bcur.Bmsy	1.58(0.09)	2.04(0.15)	0.7(1.2)
HRcur.HRmsy	0.47(0.47)	0.55(0.43)	4363.62(1.19)

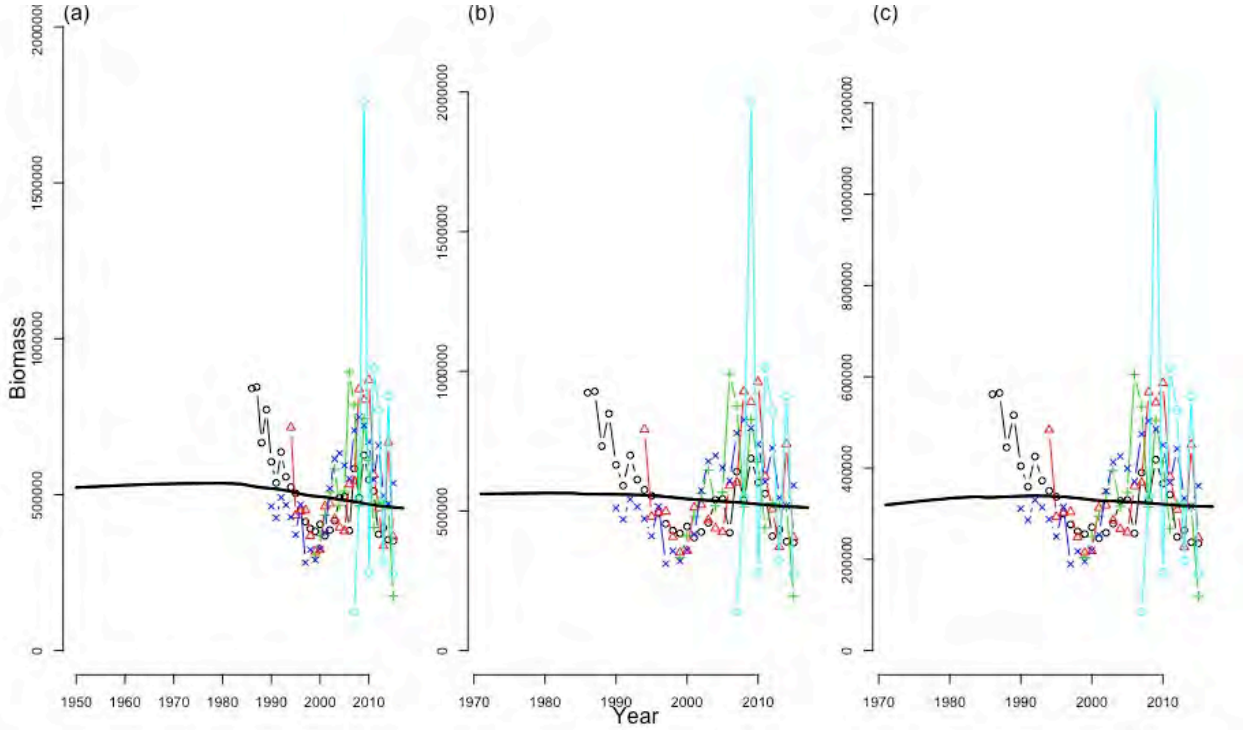

Figure Appendix 1. BSP1 model fits for the North Atlantic, for the runs described in **Table Appendix 1a**.

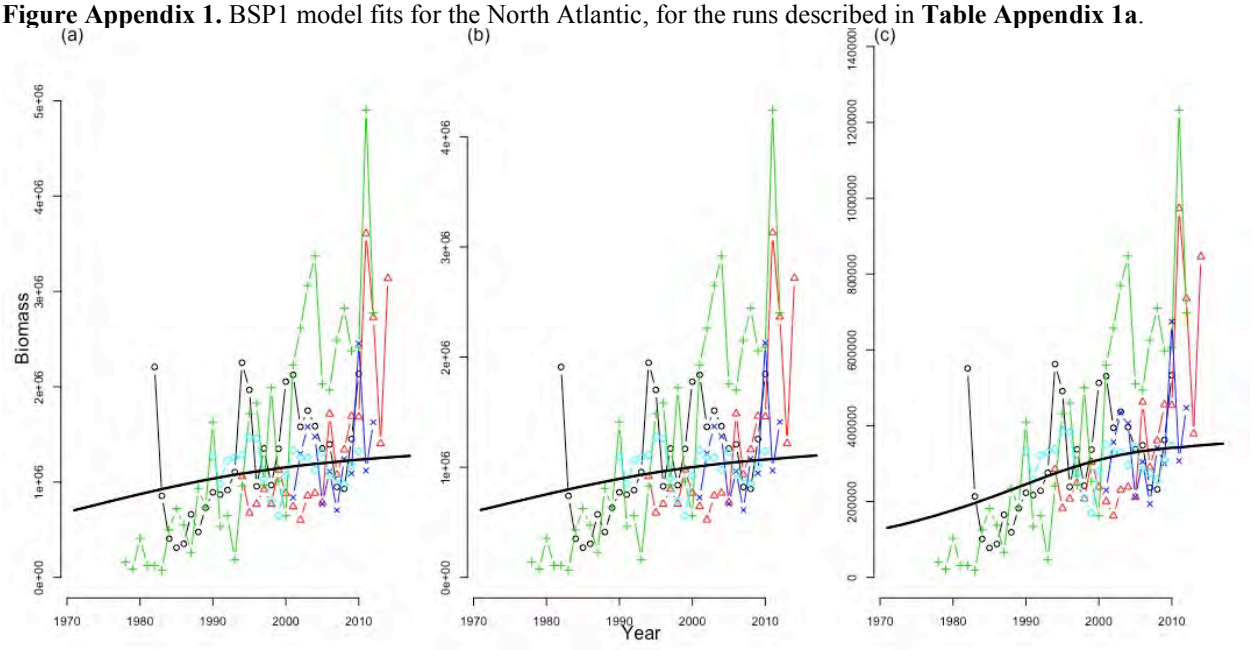

Figure Appendix 2. BSP1 continuity model fits for the South Atlantic for the runs described in **Table Appendix 1b**.

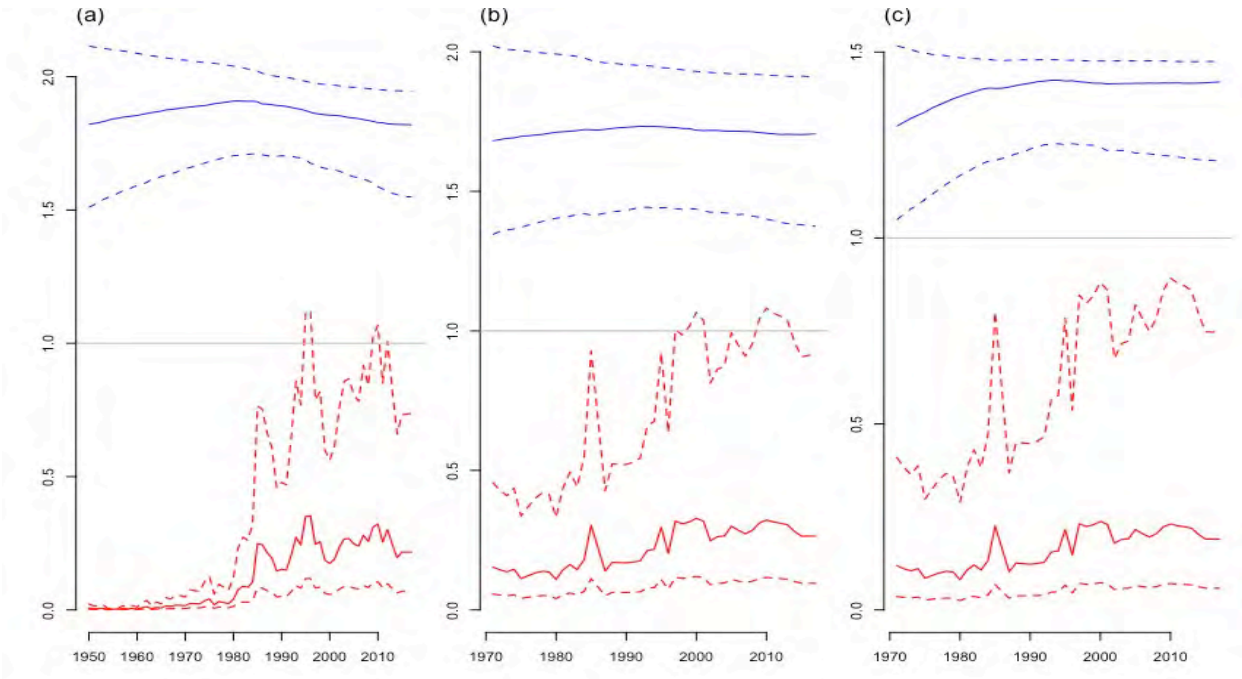

Figure Appendix 3. B/B_{MSY} (blue) and H/H_{MSY} (red) with 80% credible intervals for north Atlantic mako BSP1 continuity runs (a) C1 catch, (b) C2 catch, and (c) generalized model with C1 catch.

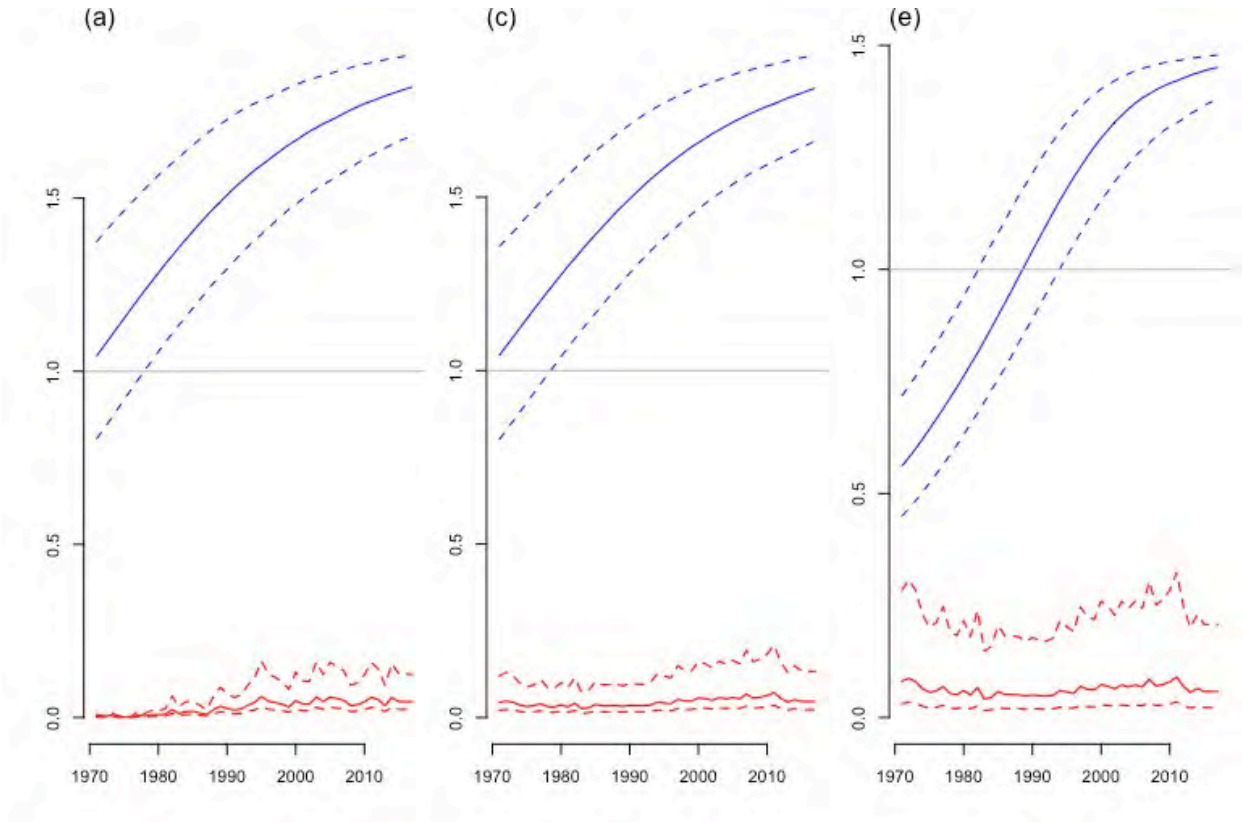

Figure Appendix 4. B/B_{MSY} (blue) and F/F_{MSY} (red) with 80% credible intervals for south Atlantic mako BSP1 continuity runs (a) C1 catch , (b) C2 catch, and (c) generalized model with C1 catch.

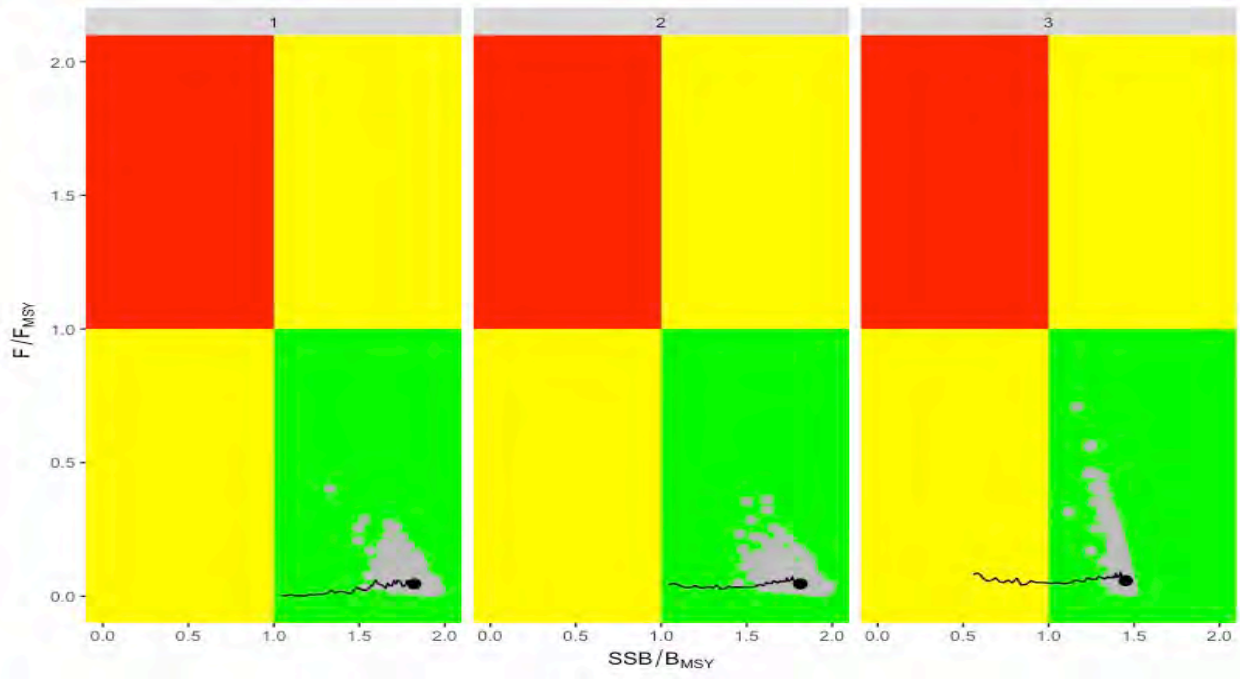

Figure Appendix 5. Kobe plots for south Atlantic mako BSP1 runs (a) C1 catch, (b) C2 catch, (c) generalized model.

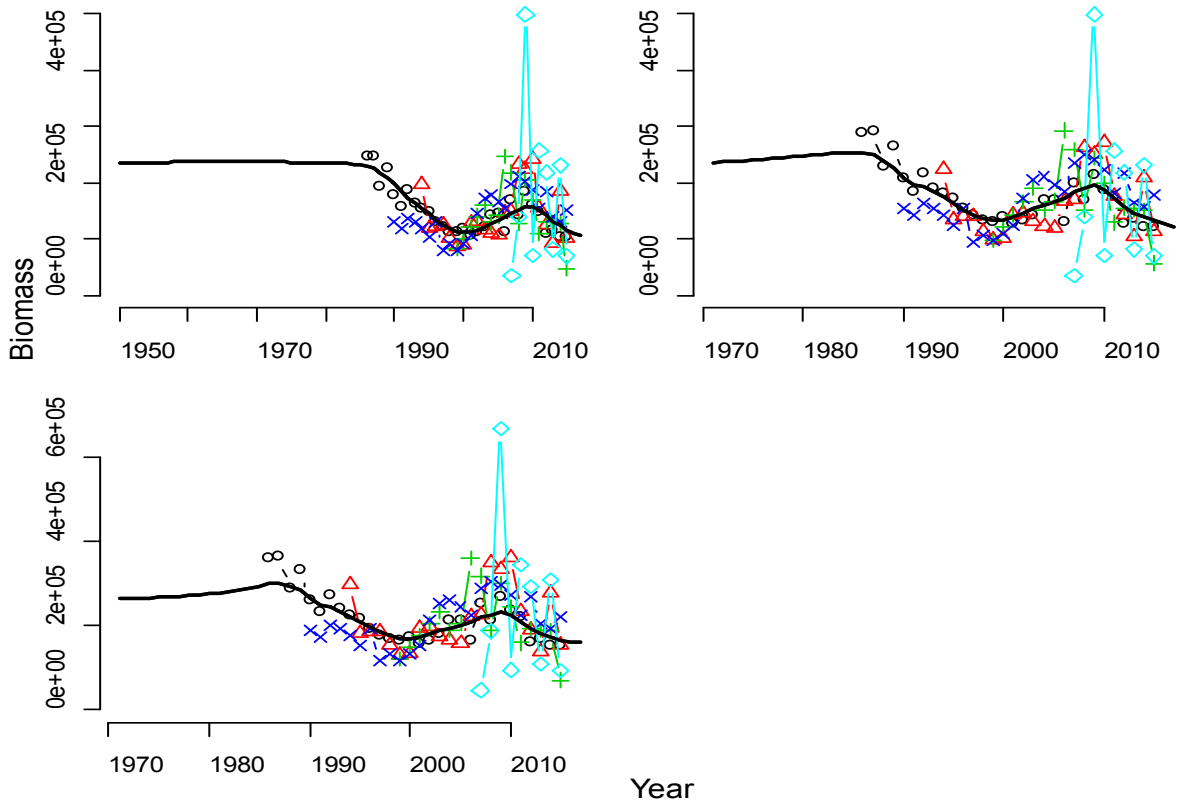

Figure Appendix 6. Mode of the posterior biomass trend for the BSP2 runs in the North Atlantic, with CPUE fits, for (a) C1 catch Schaefer, (b) C2 catch Schaefer, (c) C2 catch generalized production model.

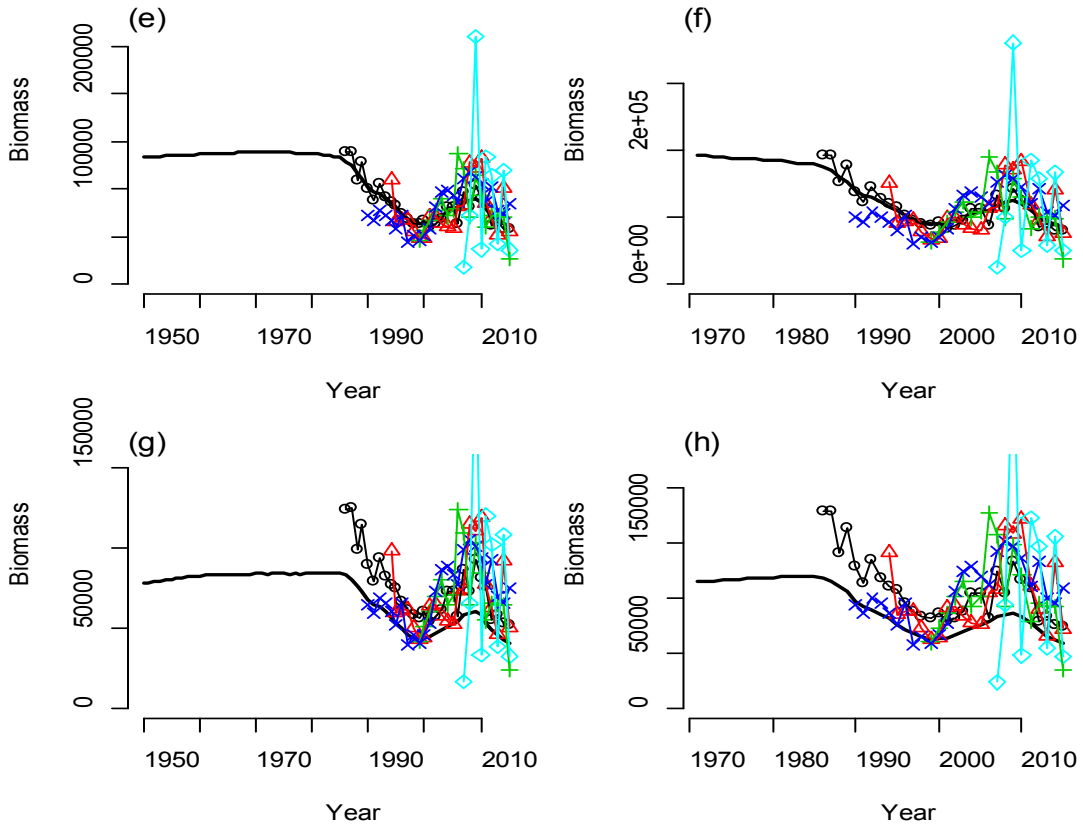

Figure Appendix 7. Median biomass trajectory from the BSP2-JAGS runs described in section 3.1 for the North Atlantic, for (a) the C1 catch Schaefer model, (b) C2 catch Schaefer model, (c) C1 catch generalized production model, and (d) C2 catch generalized production model.

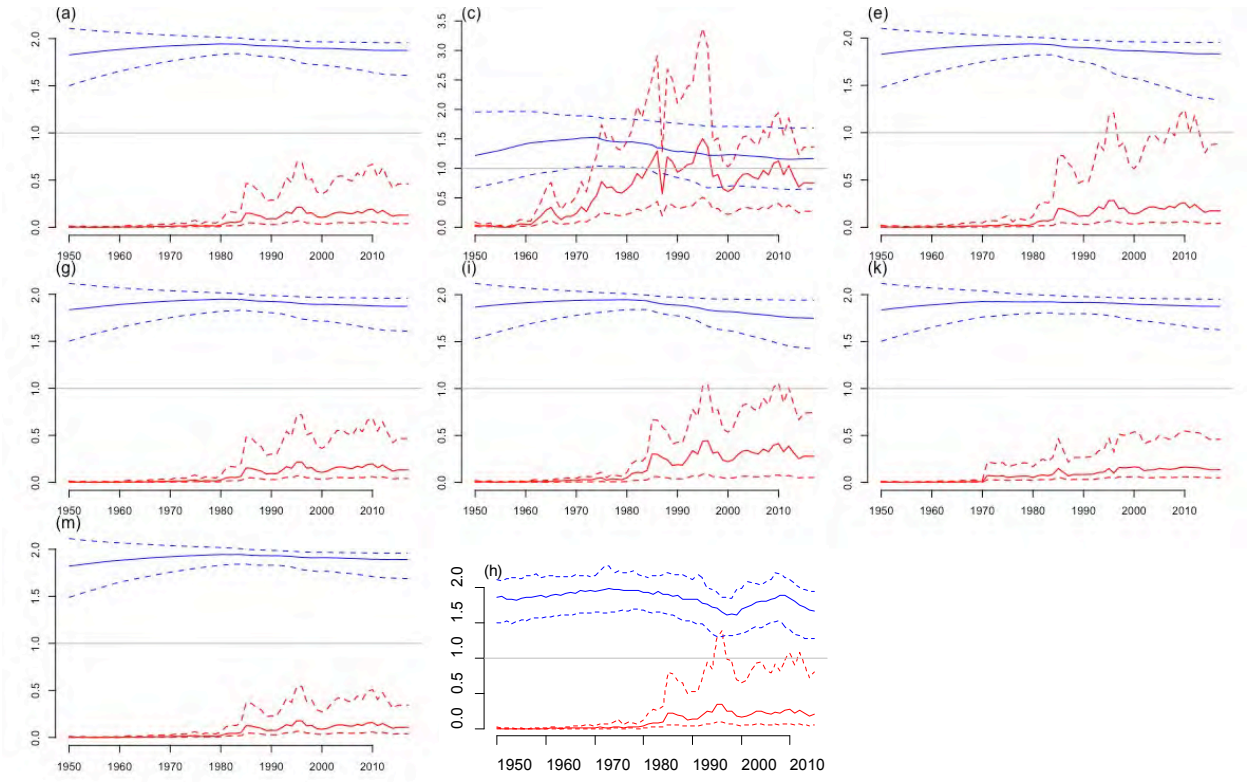

Figure Appendix 8. History of B/B_{MSY} (blue) and H/H_{MSY} (red) with 80% credible intervals for north Atlantic mako BSP1 and BSP2 alternative runs (a) equal weighting, (b) fitted to effort, (c) catch weighting, (d) double r standard deviation, (e) series weighting, (f) catch C2, (g) alternative index, and (h) BSP2 with process error.

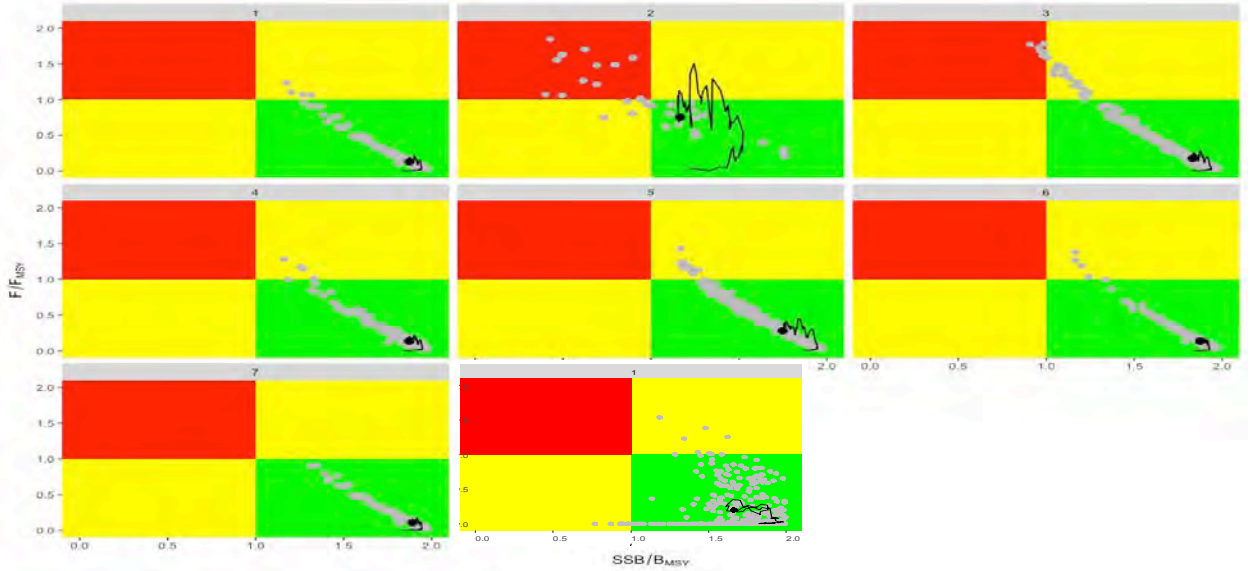

Figure Appendix 9. Kobe plots for north Atlantic mako BSP1 and BSP2 alternative runs (1) equal weighting, (2) fitted to effort, (3) catch weighting, (4) double r standard deviation, (5) series weighting, (6) C2 catch, (7) alternative index, and BSP 2. Current year is 2015.

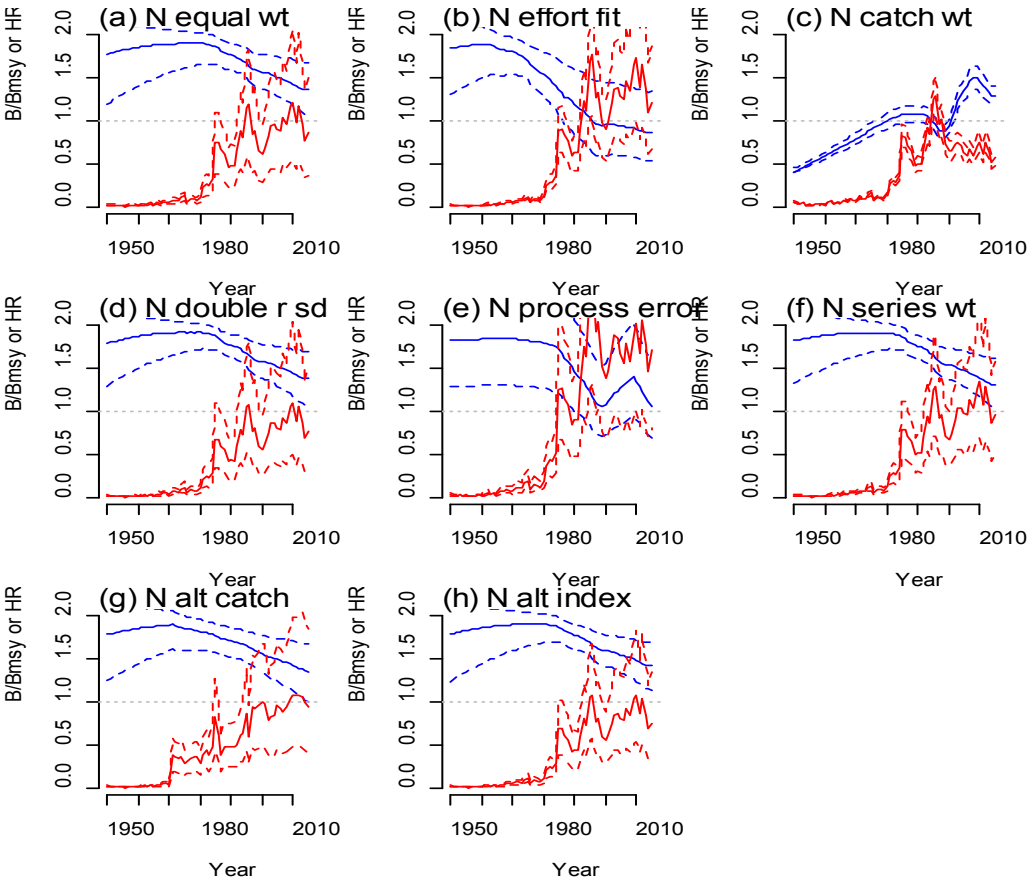

Figure Appendix 10. Biomass and harvest rate trends from BSP2-JAGS alternative models for North Atlantic mako sharks.

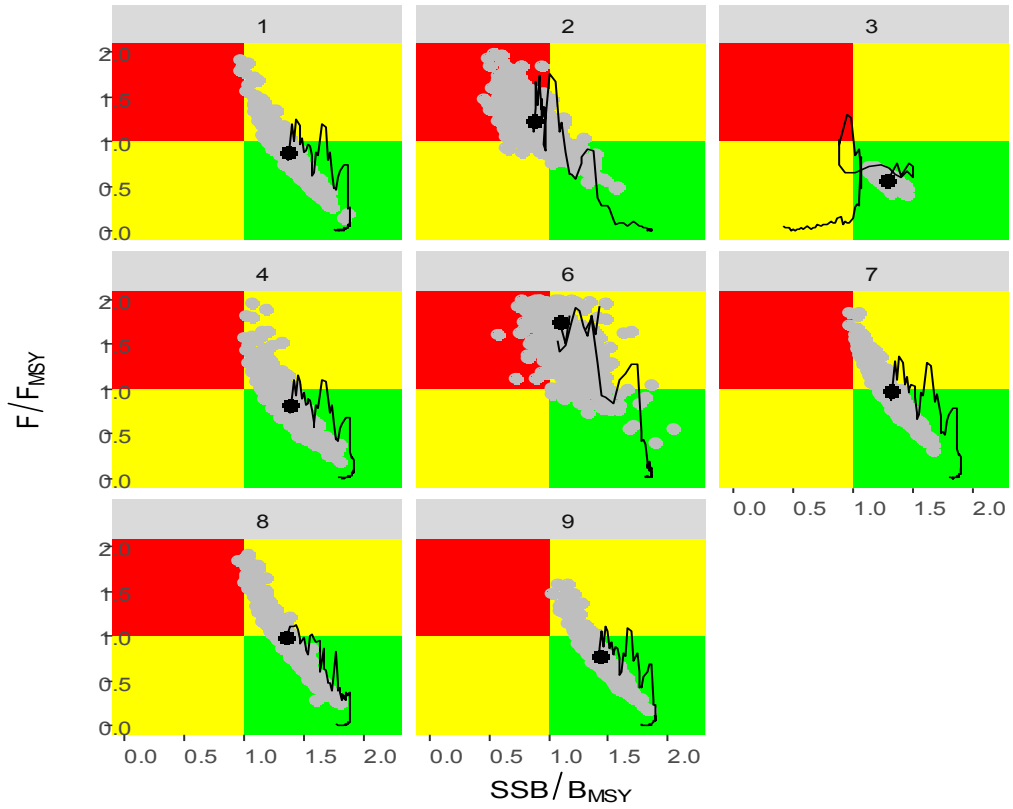

Figure Appendix 11. Kobe plots from BSP2-JAGS alternative models for North Atlantic mako sharks. Current year is 2015 (solid black dot).

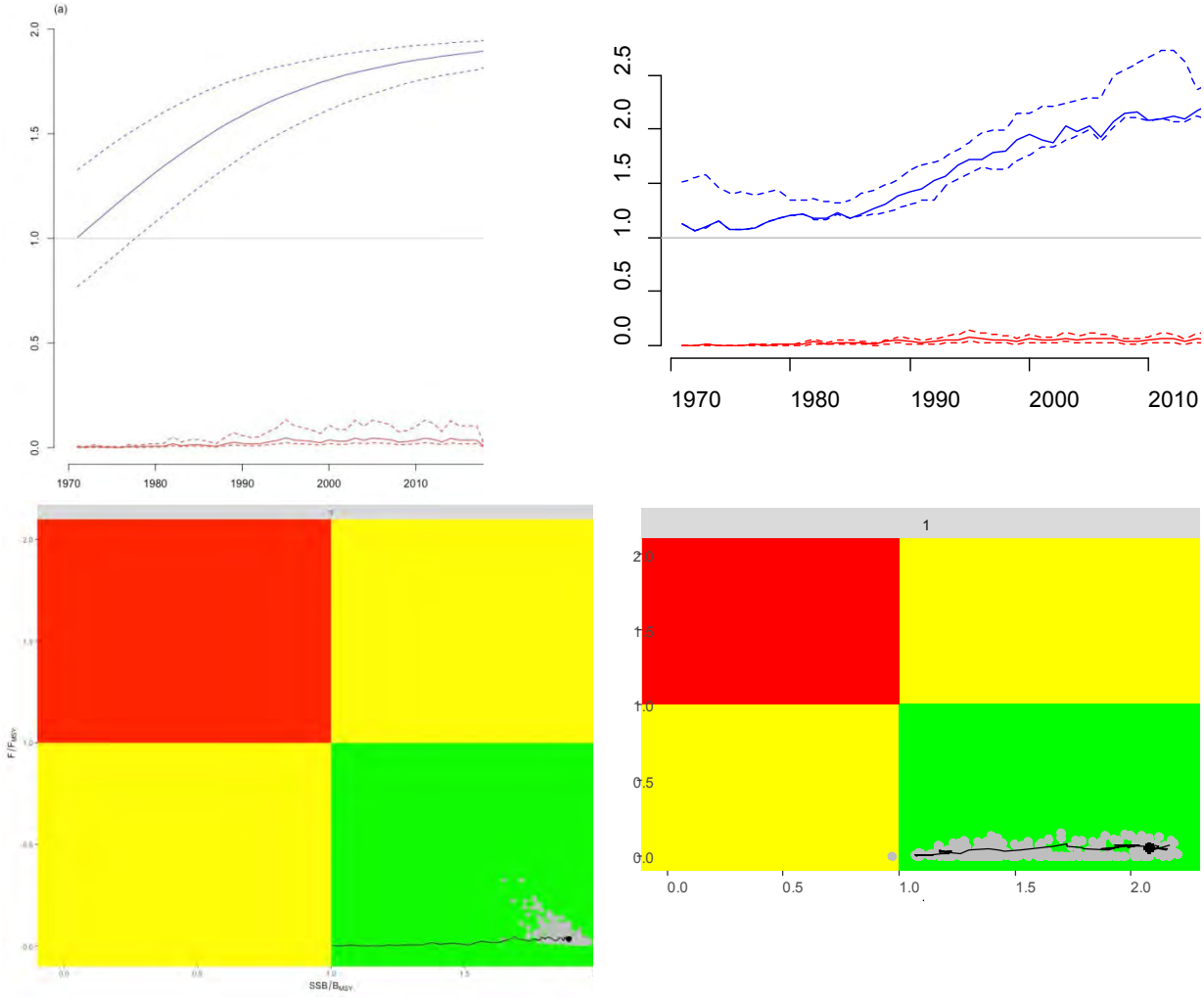

Figure Appendix 12. Biomass and harvest rate trends (top) and Kobe plots (bottom) for South Atlantic mako sharks obtained with the BSP1 (left) and BSP2 (right) results.

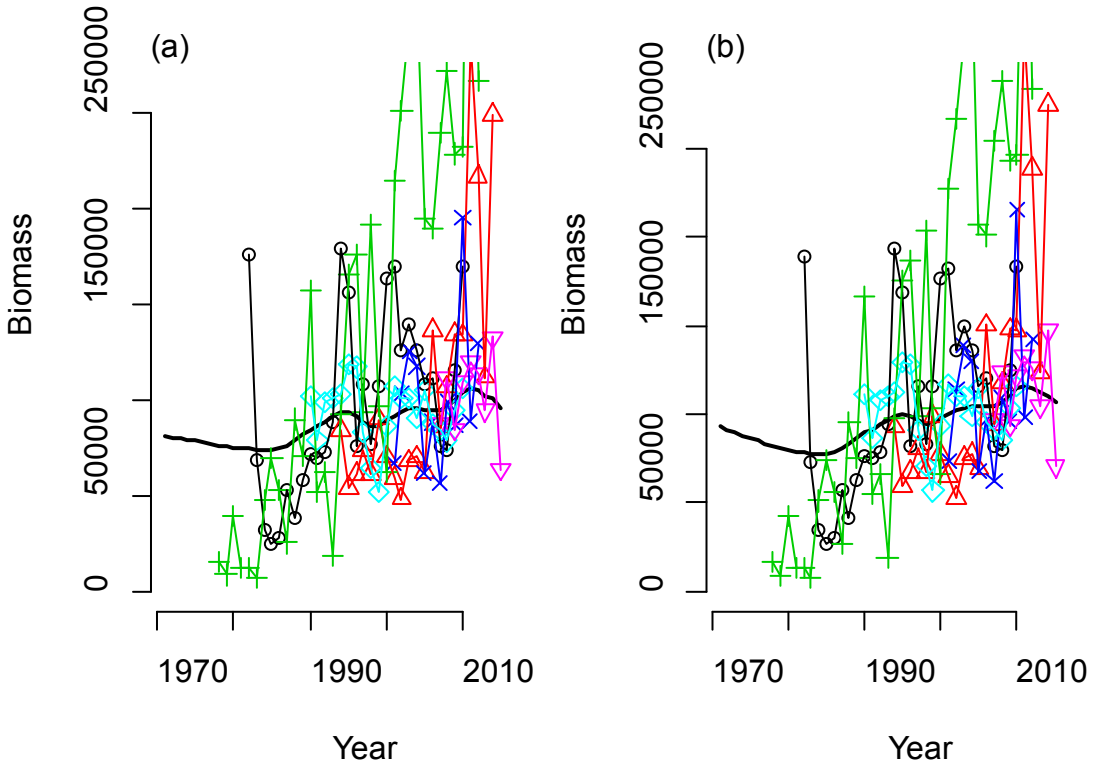

Figure Appendix 13. Median biomass trajectory from the BSP2-JAGS runs for the South Atlantic.

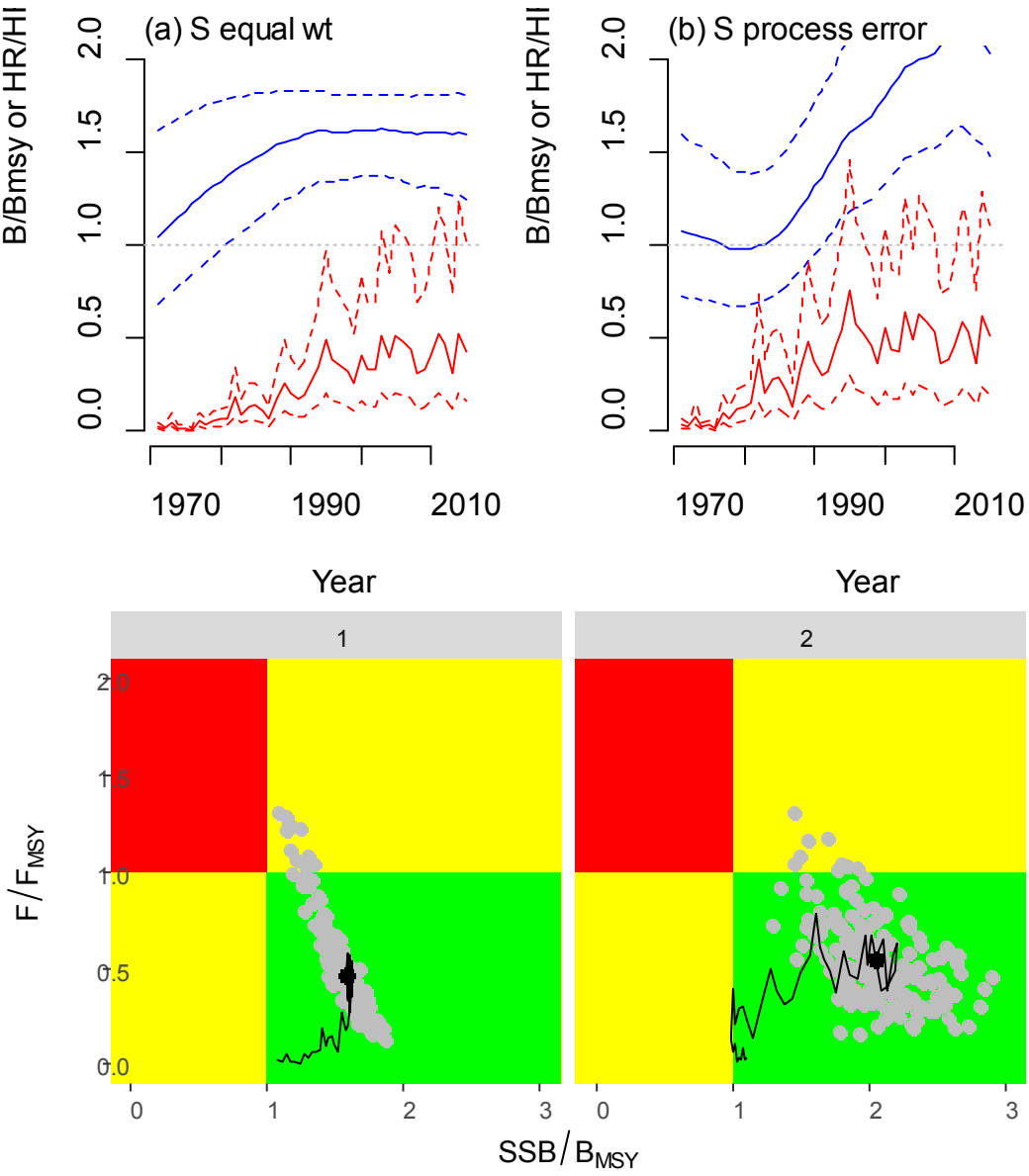

Figure Appendix 14. South Atlantic BSP2-JAGS results without process error (left) and with process error (right), using the priors described in **Table Appendix 1**.

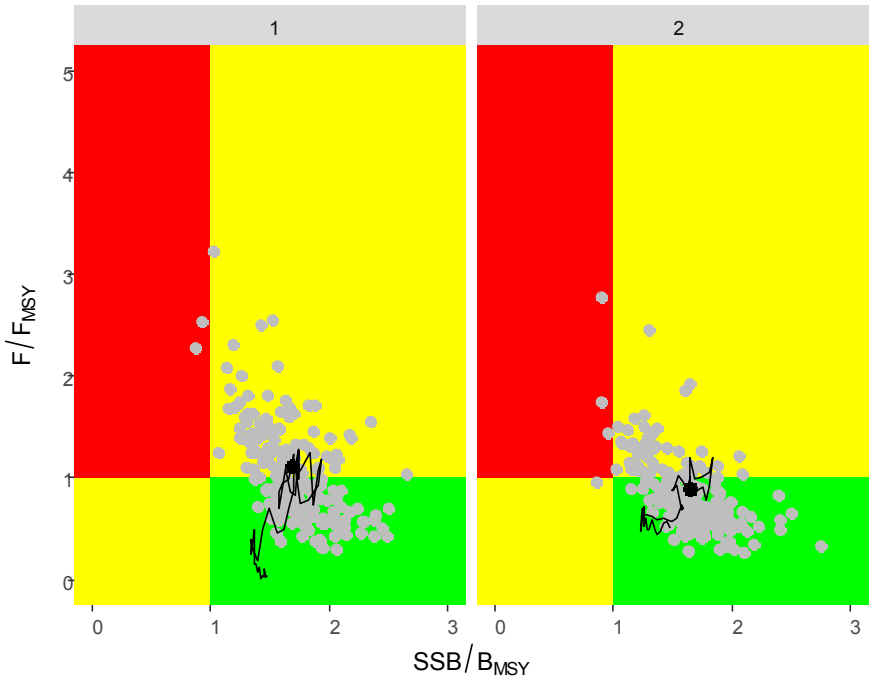

Figure Appendix 15. South Atlantic BSP2-JAGS results from the process error Schaefer models described in section 3.1, using catch C1 (left) or catch C2 (right).

alternatives and, when regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, and other advantages; distributive impacts; and equity). Executive Order 13563 (Improving Regulation and Regulatory Review) emphasizes the importance of quantifying both costs and benefits, reducing costs, harmonizing rules, and promoting flexibility. Executive Order 12866 (Regulatory Planning and Review) defines a ''significant regulatory action'' requiring review by OMB, unless OMB waives such review, as ''any regulatory action that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.''

The economic, interagency, budgetary, legal, and policy implications of this regulatory action have been examined, and it has been determined not to be a significant regulatory action under Executive Order 12866. VA's impact analysis can be found as a supporting document at *http://www.regulations.gov,* usually within 48 hours after the rulemaking document is published. Additionally, a copy of the rulemaking and its impact analysis are available on VA's website at *http://www.va.gov/orpm/,* by following the link for ''VA Regulations Published From FY 2004 Through Fiscal Year to Date.'' This rule is not an Executive Order 13771 regulatory action because this rule is not significant under Executive Order 12866.

Unfunded Mandates

The Unfunded Mandates Reform Act of 1995 requires, at 2 U.S.C. 1532, that agencies prepare an assessment of anticipated costs and benefits before issuing any rule that may result in the expenditure by state, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. This final rule will have no such effect on state, local, and tribal governments, or on the private sector.

Paperwork Reduction Act

This final rule contains no provisions constituting a collection of information under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3521).

Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.* (RFA), imposes certain requirements on Federal agency rules that are subject to the notice and comment requirements of the Administrative Procedure Act (APA), 5 U.S.C. 553(b). This final rule is exempt from the notice and comment requirements of the APA because the 2015 Act directed the Department to issue the annual adjustments without regard to section 553 of the APA. Therefore, the requirements of the RFA applicable to notice and comment rulemaking do not apply to this rule. Accordingly, the Department is not required either to certify that the final rule would not have a significant economic impact on a substantial number of small entities or to conduct a regulatory flexibility analysis.

Catalog of Federal Domestic Assistance

The Catalog of Federal Domestic Assistance number and title for the program affected by this document is 64.114, Veterans Housing Guaranteed and Insured Loans.

List of Subjects

38 CFR Part 36

Condominiums, Housing, Individuals with disabilities, Loan programs—housing and community development, Loan programs—Veterans, Manufactured homes, Mortgage insurance, Reporting and recordkeeping requirements, Veterans.

38 CFR Part 42

Administrative practice and procedure, Claims, Fraud, Penalties.

Signing Authority

The Secretary of Veterans Affairs, or designee, approved this document and authorized the undersigned to sign and submit the document to the Office of the Federal Register for publication electronically as an official document of the Department of Veterans Affairs. Gina S. Farrisee, Deputy Chief of Staff, Department of Veterans Affairs, approved this document on February 23, 2018, for publication.

Dated: February 23, 2018.

Jeffrey Martin,

Impact Analyst, Office of Regulation Policy & Management, Office of the Secretary, Department of Veterans Affairs.

For the reasons stated in the preamble, the Department of Veterans Affairs amends 38 CFR parts 36 and 42 as set forth below:

PART 36—LOAN GUARANTY

■ 1. The authority citation for part 36 continues to read as follows:

Authority: 38 U.S.C. 501 and 3720.

§ 36.4340 [Amended]

■ 2. In § 36.4340, amend paragraphs (k)(1)(i) introductory text and (k)(3) by removing ''$21,563'' and adding, in its place, ''$22,363.''

PART 42—STANDARDS IMPLEMENTING THE PROGRAM FRAUD CIVIL REMEDIES ACT

■ 3. The authority citation for part 42 continues to read as follows:

Authority: Pub. L. 99–509, secs. 6101–6104, 100 Stat. 1874, codified at 31 U.S.C. 3801–3812.

§ 42.3 [Amended]

■ 4. In § 42.3, amend paragraphs (a)(1)(iv) and (b)(1)(ii) by removing ''$10,781'' and adding, in its place, ''$11,181.''

[FR Doc. 2018–04241 Filed 3–1–18; 8:45 am]

BILLING CODE 8320–01–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 635

[Docket No. 180104009–8201–01]

RIN 0648–BH49

Emergency Measures To Address Overfishing of Atlantic Shortfin Mako Shark

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Interim final rule, emergency action; request for comments.

SUMMARY: NMFS is taking emergency action through this interim final rule, in response to a new stock assessment for North Atlantic shortfin mako sharks to implement measures required by International Commission for the Conservation of Atlantic Tunas (ICCAT)

Recommendation 17–08. Based on the results of the stock assessment, on December 13, 2017, NMFS determined the North Atlantic shortfin mako shark stock to be overfished, with overfishing occurring. The emergency management measures will reduce shortfin mako shark landings in commercial and recreational shark fisheries, with retention allowed only in certain limited circumstances. The emergency management measures are expected to meet the United States' obligations in relation to ending overfishing, but are not expected to result in significant economic impacts.

DATES: Effective March 2, 2018 through August 29, 2018. Comments must be received on May 7, 2018. A public hearing will be held at the Highly Migratory Species (HMS) Advisory Panel meeting on March 7, 2018, from 11 a.m.–12:15 p.m., EST. For specific location and webinar information, please see the **SUPPLEMENTARY INFORMATION** section of this document and the HMS AP meeting website at: *https://www.fisheries.noaa.gov/event/march-2018-hms-advisory-panel-meeting.*

ADDRESSES: Copies of the Environmental Assessment and other supporting documents for this emergency action are available from the HMS Management Division website at *https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species.*

Written comments, identified by NOAA–NMFS–2018–0010, may be submitted to the HMS Management Division by either of the following methods:

- *Electronic Submissions:* Submit all electronic public comments via the Federal e-Rulemaking portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2018-0010,* click the ''Comment Now!'' icon, complete the required fields, and enter or attach your comments.
- *Mail:* Submit written comments to NMFS, Highly Migratory Species Management Division, 1315 East-West Highway, Silver Spring, MD 20910. Mark the outside of the envelope ''Comments on Atlantic Shortfin Mako Emergency Rule.''

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and generally will be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address, etc.), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous).

FOR FURTHER INFORMATION CONTACT: Tobey Curtis at 978–281–9273 or Guy DuBeck or Lauren Latchford at 301–427–8503.

SUPPLEMENTARY INFORMATION:

Background

The North Atlantic shortfin mako shark (*Isurus oxyrinchus*) is a highly migratory species that ranges across the entire North Atlantic Ocean and is caught by fishermen from numerous countries. These sharks are a small but valued component of U.S. recreational and commercial shark fisheries, which are managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan and its amendments. In recent years, U.S. catch represents only approximately 11 percent of the species' total catch in the North Atlantic by all reporting countries. International measures are, therefore, critical to the species' effective conservation and management.

In August 2017, ICCAT's Standing Committee on Research and Statistics (SCRS) conducted a new benchmark stock assessment on the North Atlantic shortfin mako stock. At its November 2017 annual meeting, ICCAT accepted this stock assessment and determined the stock to be overfished, with overfishing occurring. On December 13, 2017, based on this assessment, NMFS issued a status determination finding the stock to be overfished and experiencing overfishing using domestic criteria. The assessment specifically indicated that biomass (B_{2015}) is substantially less than the biomass at maximum sustainable yield (B_{MSY}) for eight of the nine models used for the assessment (B_{2015}/B_{MSY} = 0.57–0.85). In the ninth model, spawning stock fecundity (SSF) was less than SSF_{MSY} (SSF_{2015}/SSF_{MSY} = 0.95). Additionally, the assessment indicated that fishing mortality (F_{2015}) was greater than F_{MSY} (1.93–4.38), with a combined 90-percent probability from all models that the population is overfished, with overfishing occurring.

The 2017 assessment estimated that total North Atlantic shortfin mako catches across all ICCAT parties are currently between 3,600 and 4,750 mt per year, and that total catches would have to be at 1,000 mt or below (72–79 percent reductions) to prevent further population declines and that catches of 500 t or less currently are expected to stop overfishing and begin to rebuild the stock. The projections indicate that a total allowable catch of 0 mt would produce a greater than 50 percent probability of rebuilding the stock by the year 2040, which is approximately equal to one mean generation time. Research indicates that post-release survival rates of Atlantic shortfin mako sharks are high (70 percent); however, the assessment could not determine if requiring live releases alone would reduce landings sufficiently to end overfishing and rebuild the stock.

Based on this information, ICCAT adopted new management measures for Atlantic shortfin mako (Recommendation 17–08), which the United States must implement as necessary and appropriate under the Atlantic Tunas Convention Act. These measures largely focus on maximizing live releases of Atlantic shortfin mako sharks, allowing retention only in certain limited circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries. In November 2018, ICCAT will review the catches from the first six months of 2018 and decide whether these measures should be modified. In 2019, the SCRS will evaluate the effectiveness of these measures in ending overfishing and beginning to rebuild the stock. SCRS will also provide rebuilding information that reflects rebuilding timeframes of at least two mean generation times. Also in 2019, ICCAT will establish a rebuilding plan that will have a high probability of avoiding overfishing and rebuilding the stock to B_{MSY} within a timeframe that takes into account the biology of the stock.

Emergency Management Measures

NMFS is implementing emergency measures in HMS recreational and commercial fisheries consistent with Recommendation 17–08 to address overfishing and to provide meaningful information reflective of the new measures for the six-month reporting requirement in the Recommendation. Management measures in the emergency rule are as follows:

- Commercial fishermen on vessels deploying pelagic longline gear, which are required to have a functional electronic monitoring system on board under current regulations, must release all live shortfin mako sharks with a minimum of harm, while giving due consideration to the safety of crew members. Commercial fishermen using pelagic longline gear can only retain a shortfin mako shark if it is dead at haulback.

• Commercial fishermen using gear other than pelagic longline commercial gear (*e.g.,* bottom longline, gillnet, handgear, etc.) must release all shortfin mako sharks, whether they are dead or alive.

• Recreational fishermen (fishermen with HMS Angling or Charter/Headboat permits, and fishermen with Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) must release any shortfin mako sharks smaller than the minimum size of 83 inches (210 cm) fork length (FL). This minimum size is an increase from the current minimum size of 54 inches FL. This measure is more conservative than what was specifically recommended in Recommendation 17–08, which suggested separate minimum size limits for males (180 cm FL) and females (210 cm FL). NMFS is implementing a single minimum size limit of 83 inches (210 cm) FL due to recent analyses conducted by NMFS (but were not available during the ICCAT meeting) that indicate the lower minimum size limit for males would not sufficiently reduce total shortfin mako shark landings to levels that the stock assessment estimates are required to end overfishing (refer to the EA; see **ADDRESSES**). Furthermore, confirming the sex of a large and potentially active shortfin mako shark prior to its landing can be challenging for fishermen and may have safety implications. Therefore, a single minimum size limit for the species is simpler to implement and enforce, and is more consistent with the objectives of this action.

NMFS is soliciting public comment on this interim final rule and will take into consideration any comments received and any testimony at the public hearing, as it evaluates whether any modifications to the emergency measures are needed. These emergency measures will be effective until August 29, 2018, with a possible extension of up to an additional 186 days. These measures will be replaced by long-term measures, which will be considered through notice and comment rulemaking for an upcoming fishery management plan amendment, accompanied by an Environmental Impact Statement (EIS). The Notice of Intent to Prepare an Environmental Impact Statement for that fishery management plan amendment will publish in the same issue of the **Federal Register** as this interim final rule.

These emergency measures are expected to reduce shortfin mako landings in the HMS commercial fisheries and the ex-vessel revenues from those landings by approximately 75 percent. Thus, the commercial fisheries could cumulatively experience revenue losses of approximately $281,000 per year, 97 percent of which would be lost by the pelagic longline fishery. Lost revenues would have greater social and economic impacts on fishing communities with higher shortfin mako shark landings, including Wanchese, NC, Fairhaven/New Bedford, MA, and Barnegat Light, NJ. Shortfin mako sharks are a minor source of economic revenue to the overall HMS commercial fishery, but may be an important source of seasonal revenue to some individual fishermen. The socioeconomic impacts associated with these reductions in revenue are not expected be significant overall, however, as shortfin mako sharks comprise less than 1 percent of total ex-vessel revenues in the pelagic longline fishery on average, and an even smaller fraction of total fisheries revenues in the potentially-affected fishing communities. Therefore, socioeconomic impacts on the commercial fishery are expected to be slightly negative.

These emergency measures would also reduce recreational landings of shortfin mako sharks by approximately 83 percent. However, as catch-and-release practices would still be permitted, a significant reduction in recreational fishing or charter/headboat activity is not expected. However, the reduced opportunities to catch and land a shortfin mako shark of legal size may slightly reduce demand and revenues for charters and tournaments that target this species. Approximately five percent of charter vessels and seven percent of headboat vessels in the U.S. Atlantic target pelagic sharks, including shortfin mako, with the majority of these businesses located off the northeast United States. According to NMFS Northeast Fisheries Science Center tournament data, the larger minimum size limit may not significantly limit the ability of tournaments to land shortfin mako sharks, because most of the largest shortfin mako sharks landed at tournaments in recent years have been above the 83 inches FL minimum size limit. However, it is likely that fewer vessels will be able to catch a shortfin mako shark of legal size, within or outside of tournaments. Therefore, the socioeconomic impacts associated with recreational shark fishing effort (fuel, bait, fishing supply expenditures, tournament participation, etc.) are expected to be slightly negative.

Public Hearing

Comments on this interim final rule may be submitted via *http://www.regulations.gov* or mail, and comments may also be submitted at the public hearing. NMFS solicits comments on this interim final rule by May 7, 2018. During the comment period, NMFS will hold one public hearing for this interim final rule.

TABLE 1—DATE, TIME, AND LOCATION OF THE UPCOMING PUBLIC HEARING

Venue	Date/time	Meeting locations	Location contact information
Public Hearing	March 7, 2018, 11 a.m.–12:15 p.m.	Silver Spring, MD	HMS AP Meeting, Sheraton Silver Spring, 8777 Georgia Avenue, Silver Spring, MD 20910.

Classification

This emergency interim final rule is promulgated pursuant to section 305(c) of the Magnuson-Stevens Act, and NMFS has determined that it is consistent with that Act and other applicable laws. NMFS policy guidelines for the use of emergency rules (August 21, 1997; 62 FR 44421) specify the following three criteria that define what an emergency situation is: (1) The emergency results from recent, unforeseen events or recently discovered circumstances; (2) the emergency presents serious conservation or management problems in the fishery; and (3) if the emergency action is being implemented without prior public comment, the emergency can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts on participants to the same extent as would be expected under the normal rulemaking process.

This action meets the NMFS guidelines and criteria for emergency

rulemaking. The action is needed to address recently discovered circumstances including the 2017 ICCAT stock assessment and Recommendation 17–08 for North Atlantic shortfin mako shark in November and NMFS's determination that the stock is overfished and overfishing is occurring in December (Criteria 1). The stock assessment conclusions differ significantly and unexpectedly from the most recent previous assessments, which had indicated that the stock was not overfished or experiencing overfishing. The new assessment indicates that dramatic immediate reductions in fishing mortality are needed to end overfishing of this stock, and this action is needed to address this serious conservation problem (Criteria 2). Finally, the immediate benefits to the shortfin mako shark resource and our need to meet obligations under the Magnuson-Stevens Act and Atlantic Tunas Convention Act outweigh the value of the advance notice and public comments provided under the normal rulemaking process (Criteria 3). Without an emergency rule to implement these measures, the reported U.S. catches at the end of the ICCAT six-month reporting period (ending at the end of June 2018) would reflect catches under the existing management practices and thus not reflect whether the new measures were effective to address overfishing. Any resulting action based on such information could disadvantage U.S. fishermen in the long-term.

Pursuant to 5 U.S.C. 553(b)(B) and 5 U.S.C. 553(d)(3), the Assistant Administrator for Fisheries finds good cause to waive the otherwise applicable requirements for both notice-and-comment rulemaking and a 30-day delay in effectiveness for this interim final, emergency rule implementing North Atlantic shortfin mako shark management measures. The recent unforeseen circumstances described above, and need for expedient action, make it impracticable to provide prior notice-and-comment opportunity and a 30-day delay. The new stock assessment for Atlantic shortfin mako sharks was completed in August 2017 and accepted in November by ICCAT and December 2017 by NMFS, revealing that the North Atlantic shortfin mako shark stock is overfished, with overfishing occurring. ICCAT developed Recommendation 17–08 at its annual meeting in November 2017, which the United States must implement as necessary and appropriate under the Atlantic Tunas Convention Act. It would be potentially harmful to the long-term sustainability of the resource to implement these measures through notice-and-comment rulemaking because immediate reductions in fishing mortality are needed to address overfishing and begin to rebuild the stock and data will be re-evaluated as soon as November 2018 to determine whether additional measures are needed. Unless the new measures are in place, they cannot be properly evaluated for effectiveness in the fall and ICCAT will not be able to determine whether additional measures are immediately needed. Additionally, affected fishing vessel owners should not require time to adjust to these regulations, as the regulations do not constitute substantive operational changes, such as changes to equipment that might require time for purchasing and installation, or changes to practices that might require special training. Here, the rule only affects the landing of a particular species, and thus vessel owners should be able to understand and implement the changes immediately. Furthermore, the agency requested voluntary implementation of these measures earlier this year, so fishermen have already been notified of these management changes.

For the reasons outlined, NMFS finds it impracticable and contrary to the public interest to provide prior opportunity to comment on the Atlantic shortfin mako shark emergency measures. As noted above, NMFS is soliciting public comment on this interim final rule and will take into consideration any comments received and any testimony at the public hearing, as it evaluates whether any modifications to the emergency measures are needed. In addition, there will be multiple opportunities for public participation and notice-and-comment rulemaking as NMFS develops a long-term fishery management amendment to rebuild North Atlantic shortfin mako sharks.

This action is being taken pursuant to the emergency provision of the Magnuson-Stevens Act and is exempt from OMB review.

This rule is exempt from the otherwise applicable requirement of the Regulatory Flexibility Act to prepare a regulatory flexibility analysis because the rule is issued without opportunity for prior public comment.

List of Subjects in 50 CFR Part 635

Fisheries, Fishing, Fishing vessels, Foreign relations, Imports, Penalties, Reporting and recordkeeping requirements, Treaties.

Dated: February 27, 2018.

Samuel D. Rauch, III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR part 635 is amended as follows:

PART 635—ATLANTIC HIGHLY MIGRATORY SPECIES

■ 1. The authority citation for part 635 continues to read as follows:

Authority: 16 U.S.C. 971 *et seq.;* 16 U.S.C. 1801 *et seq.*

* * * * *

■ 2. In § 635.20 suspend paragraph (e)(2) and add paragraphs (e)(6) and (7) to read as follows:

§ 635.20 Size limits.

* * * * *

(e) * * *

(6) All sharks, except as otherwise specified in this subsection below, landed under the recreational retention limits specified at § 635.22(c)(2) must be at least 54 inches (137 cm) FL.

(7) All North Atlantic shortfin mako sharks landed under the recreational retention limits specified at § 635.22(c)(2) must be at least 83 inches (210 cm) fork length.

* * * * *

■ 3. In § 635.21, add paragraphs (a)(4) and (c)(1)(iv) to read as follows:

§ 635.21 Gear operation and deployment restrictions.

(a) * * *

(4) Any person issued a commercial shark permit must release all shortfin mako sharks, alive or dead, caught on any gear other than pelagic longline gear.

* * * * *

(c) * * *

(1) * * *

(iv) Has pelagic longline gear on board, persons aboard that vessel are required to release unharmed, to the extent practicable, any shortfin mako shark that is alive at the time of haulback. Any shortfin mako shark that is dead at the time of haulback may be retained provided the electronic monitoring system is installed and functioning in accordance with § 635.9.

* * * * *

■ 4. In § 635.24, suspend paragraphs (a)(4)(i) and (iii), and add paragraphs (a)(4)(v) and (vi) to read as follows:

§ 635.24 Commercial retention limits for sharks, swordfish, and BAYS tunas.

* * * * *

(a) * * *

(4) * * *

(v) A person who owns or operates a vessel that has been issued a directed shark LAP may retain, possess, or land pelagic sharks if the pelagic shark fishery is open per §§ 635.27 and 635.28. Shortfin mako sharks may only be retained by persons using pelagic longline gear, and only if each shark is dead at the time of haulback per § 635.21(c)(1).

(vi) Consistent with paragraph (a)(4)(ii) of this section, a person who owns or operates a vessel that has been issued an incidental shark LAP may retain, possess, land, or sell no more than 16 SCS and pelagic sharks, combined, per vessel per trip, if the respective fishery is open per §§ 635.27 and 635.28. Of those 16 SCS and pelagic sharks per vessel per trip, no more than 8 shall be blacknose sharks. Shortfin mako sharks may only be retained by persons using pelagic longline gear, and only if each shark is dead at the time of haulback per § 635.21(c)(1).

* * * * *

■ 5. In § 635.71, add paragraphs (d)(27) through (29) to read as follows:

§ 635.71 Prohibitions.

* * * * *

(d) * * *

(27) Land a shortfin mako shark that was caught with gear other than pelagic longline as specified at § 635.21(a).

(28) Retain, land, or possess a shortfin mako shark that was caught with pelagic longline gear and was alive at haulback as specified at § 635.21(c)(1).

(29) As specified at § 635.21(c)(1), retain, land, or possess a shortfin mako shark that was caught with pelagic longline gear when the electronic monitoring system was not installed and functioning in accordance with the requirements at § 635.9.

* * * * *

[FR Doc. 2018–04262 Filed 3–1–18; 8:45 am]

BILLING CODE 3510–22–P

Issues and Options for

Amendment 11 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan

March 2018

Highly Migratory Species Management Division
Office of Sustainable Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910

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1 Introduction

The National Marine Fisheries Service (NMFS) intends to amend the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) (Consolidated HMS FMP) to address overfishing of the North Atlantic shortfin mako shark. This document examines potential management options to address overfishing of and begin rebuilding the North Atlantic shortfin mako stock and also requests additional information and input from consulting parties and the public prior to development of a formal Draft Environmental Impact Statement (DEIS) and proposed rule. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires NMFS to "consult with and consider the comments and views of affected Councils, commissions and advisory groups appointed under Acts implementing relevant international fishery agreements pertaining to highly migratory species, and the [HMS] advisory panel in preparing and implementing any fishery management plan or amendment." Therefore, we are starting our scoping stage and requesting comments and views on this Issues and Options document for Amendment 11 to the 2006 Consolidated Atlantic HMS FMP by May 7, 2018. An electronic version of this document is available on the HMS Management Division website at: https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species.

In August 2017, the International Commission for the Conservation of Atlantic Tunas (ICCAT) Standing Committee on Research and Statistics (SCRS) conducted a new benchmark stock assessment on the North Atlantic shortfin mako shark stock. In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results, which indicated that the stock was overfished with overfishing occurring. On December 13, 2017, based on the results of this assessment, NMFS also determined the stock to be overfished with overfishing occurring. Based on the stock assessment, ICCAT adopted new management measures for shortfin mako (Recommendation 17-08), which the United States must implement as necessary and appropriate under the Atlantic Tunas Convention Act (ATCA). NMFS initially implemented these measures through an interim final rule using emergency Magnuson-Stevens Act authority to temporarily and immediately implement commercial and recreational measures. In 2018, ICCAT will review the catches from the first six months of 2018 and decide whether the measures contained in Recommendation 17-08 should be modified. Without implementing the interim final rule, the reported U.S. catch data for the first half of 2018 would reflect catches under the existing management practices, and thus not reflect the true potential of the new measures at addressing overfishing. Any resulting action by ICCAT based on such incomplete information could disadvantage U.S. fishermen. For more details on the stock assessment and recommendation, please refer to the ICCAT website at http://www.iccat.int/.

NMFS is developing Amendment 11 to the 2006 Consolidated Atlantic HMS FMP (Amendment 11) in response to the ICCAT Recommendation and the stock status determination. NMFS anticipates that the proposed rule and DEIS will be available in mid-2018 and the Final Amendment 11 and its related documents will be available in Spring 2019. NMFS requests receipt of any comments on this scoping document by May 7, 2018.

Any written comments on this document should be submitted to Guý DuBeck, HMS Management Division, F/SF1, Office of Sustainable Fisheries, 1315 East West Highway, Silver Spring, MD 20910 or via the Federal e-Rulemaking Portal

(*www.regulations.gov/#!docketDetail;D=NOAA-NMFS*-2018-0011) by May 7, 2018. For further information, contact Guý DuBeck or Karyl Brewster-Geisz at (301) 427-8503.

This document includes a summary of the anticipated purpose and need (Chapter 1) of the FMP amendment and tables summarizing the potential environmental, social, and economic impacts of conservation and management options that NMFS is considering at this time (Chapter 2). The options outlined in Chapter 2 may be modified, removed, or supplemented based on any comments received, additional analyses, and other factors, as appropriate.

NMFS specifically solicits opinions and advice on the potential range of options and whether there are additional options that should be addressed and considered in the rulemaking process. Additionally, NMFS solicits opinions and advice on the impacts described for each option.

1.1 Management History

Atlantic HMS fisheries are managed under the dual authority of the Magnuson-Stevens Act and ATCA. HMS fisheries require management at the international, national, and state levels because of the highly migratory nature of the species. NMFS manages HMS fisheries in federal waters (domestic) and the high seas (international), while individual states establish regulations for some HMS in their own waters. However, there are exceptions to this generalization. For example, as a condition of their permit, federally-permitted HMS fishermen are required to follow federal regulations in all waters, including state waters, unless the state has more restrictive regulations, in which case the state laws prevail. Additionally, in 2005, the Atlantic States Marine Fisheries Commission (ASMFC) agreed to develop an interstate coastal shark FMP. This interstate FMP coordinates management measures among all states along the Atlantic coast (Florida to Maine). NMFS participated in the development of this interstate shark FMP, which went into effect in 2010.

On the international level, NMFS participates in the stock assessments conducted by the SCRS and in the annual ICCAT meetings. NMFS implements conservation and management measures adopted through ICCAT and through other relevant international agreements, consistent with specific domestic implementing legislation. ICCAT has assessed the Atlantic blue and the shortfin mako shark stocks, participated with the International Council for the Exploration of the Sea (ICES) on a joint porbeagle assessment, and has conducted several ecosystem risk assessments for various shark species, among other things. Stock assessments and management recommendations or resolutions are listed on ICCAT's website at http://www.iccat.int. As described below, in recent years ICCAT has adopted several shark-specific recommendations, to address sharks caught in association with ICCAT fisheries.

NMFS manages sharks domestically through the 2006 Consolidated HMS FMP and its amendments, along with other Atlantic HMS. For more information on the complete HMS management history as it relates to sharks, please refer to the 2006 Consolidated HMS FMP and Amendments 2, 3, 5a, 5b, 6, 9, and 10, which address shark conservation and management. Relevant proposed rules, final rules, and other official notices, along with supporting documents

including the original FMPs, can be found on the HMS Management Division's webpage at https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species. Documents can also be requested by calling the HMS Management Division at (301) 427-8503.

1.2 Shortfin Mako Shark Stock Assessment

ICCAT's SCRS has assessed blue, shortfin mako, and porbeagle sharks. All SCRS final stock assessment reports can be found at www.iccat.int/en/assess.htm. The shortfin mako ICCAT SCRS report from 2017 can be found at http://iccat.int/Documents/Meetings/Docs/2017_SCRS_REP_ENG.pdf

The 2017 stock assessment included significant updates to inputs and model structures compared to the 2012 shortfin mako shark assessment. In addition to including a new model structure, the new assessment also used improved and longer catch time series (1950-2015), sex-specific biological parameters, updated length composition data, and new tagging data. One of the primary changes in data for the new stock assessment was a new estimate of the fishing mortality rate largely derived from satellite tagging research (Byrne et al. 2017). For this research, 40 shortfin mako sharks were tagged and then tracked in the North Atlantic between 2013 and 2016 for periods of 81-754 days. Of these tagged sharks, 12 (30 percent) were captured by fishing vessels (Figure 1). These direct observations of mortality resulted in fishing mortality rate estimates of 0.19-0.53, which are significantly higher than the estimates of 0.015-0.024 used in previous assessments (SCRS 2012).

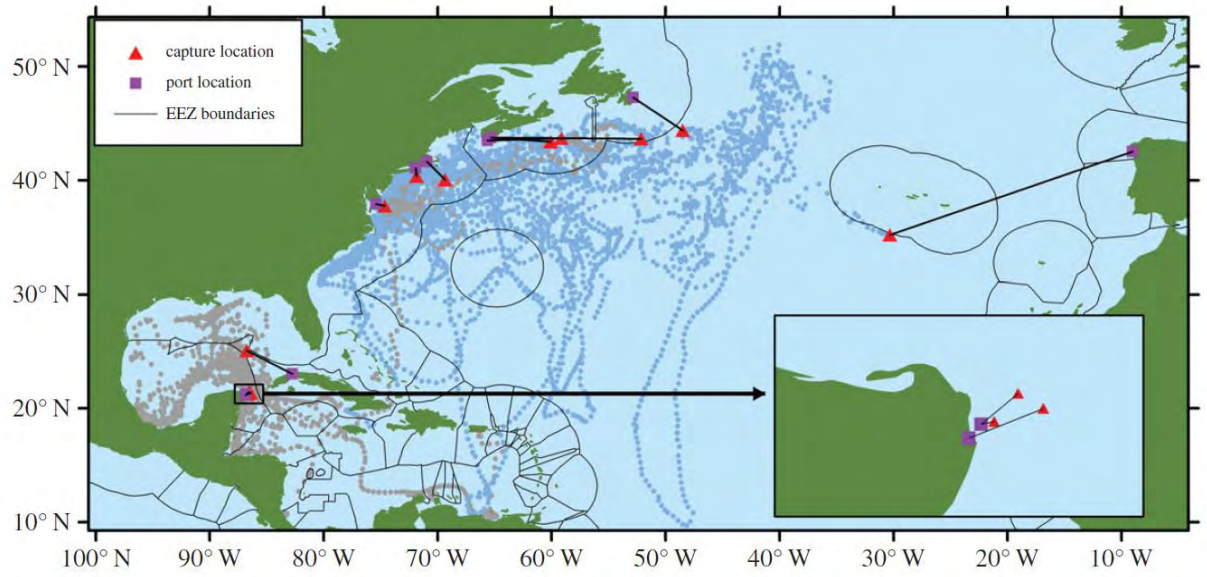

Figure 1. Tracks (dots) and capture locations (triangles) of 40 satellite tagged shortfin mako sharks from Byrne et al. (2017).

In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results, which determined that the stock was overfished with overfishing occurring applying

ICCAT criteria. On December 13, 2017, based on the results of this assessment, NMFS determined the stock to be overfished with overfishing occurring. The assessment specifically indicated that B_{2015} is substantially less than B_{MSY} for eight of the nine models (B_{2015}/B_{MSY} = 0.57-0.85). In the ninth model, spawning stock fecundity (SSF) was less than SSF_{MSY} (SSF_{2015}/SSF_{MSY} = 0.95). Additionally, the assessment indicated that F_{2015} was greater than F_{MSY} (1.93-4.38), with a combined 90-percent probability from all models that the population is overfished with overfishing occurring (Figure 2).

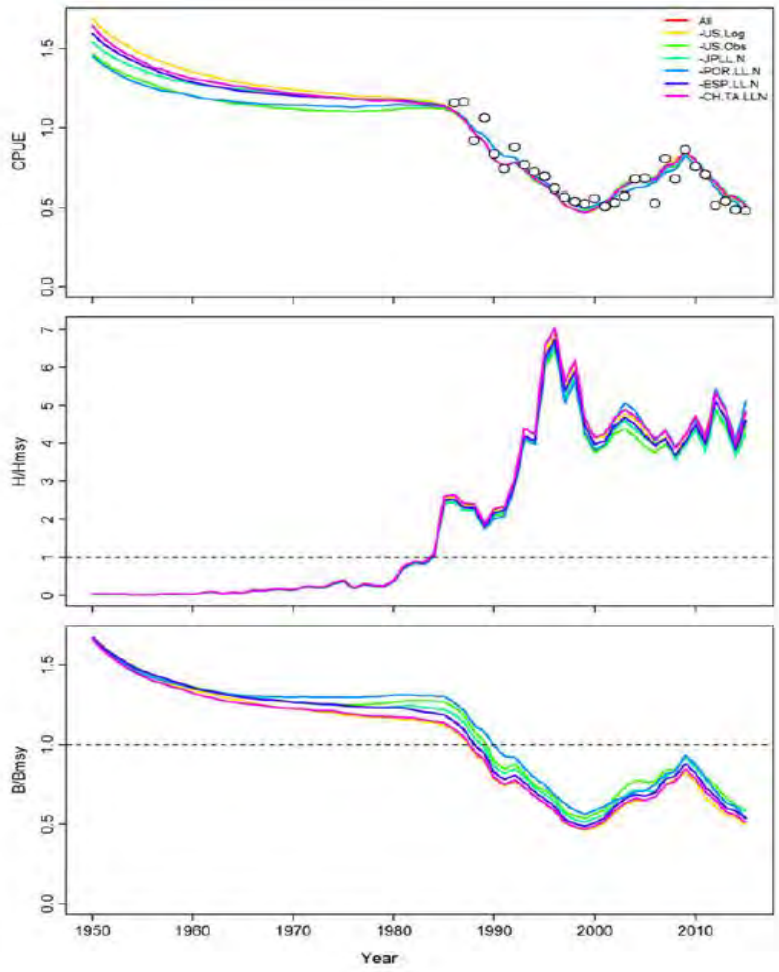

Figure 2. Trends in North Atlantic shortfin mako shark CPUE, F/F_{MSY}, and B/B_{MSY} using the C1 catch scenario used in the 2017 stock assessment. Circles denote US pelagic longline CPUE.

The 2017 assessment estimated that total North Atlantic shortfin mako shark catches across all nations are currently between 3,600 and 4,750 mt per year and that total catches would have to be reduced below 1,000 mt (72-79 percent reductions) to prevent further population declines. The projections indicate that a total allowable catch of 0 mt would produce a greater than 50-percent probability of rebuilding the stock by the year 2040, which is approximately equal to one mean generation time. Research indicates that post-release survival rates of shortfin

mako sharks are high (70 percent); however, the assessment could not determine if requiring live releases alone would reduce landings sufficiently to end overfishing and rebuild the stock.

1.3 Biological Information

The shortfin mako shark is an oceanic species found in warm to warm-temperate waters throughout all oceans. Mark-recapture information from the NMFS Apex Predator Program is shown in Figure 3. Northwest Atlantic tagging data for immature sharks presented at the 2017 ICCAT shortfin mako stock assessment meeting indicated distinct core use areas in the Mid-Atlantic Bight and off the western edge of the Yucatan Channel (Mexico). Vaudo et al. (2017) also noted spatial segregation between 12 sharks tagged in the Gulf of Mexico/Caribbean and 14 sharks tagged in the northwest Atlantic. Sharks tagged off the Yucatan Peninsula traveled considerably less distance by several orders of magnitude, than sharks tagged in the Mid-Atlantic Bight. Seasonal distribution was observed in the latter, with several individuals observed making round-trips between the Sargasso Sea and northern habitats between the Mid-Atlantic Bight and the Grand Banks. Many of the sharks tagged off Mexico remained along the eastern edge of Campeche Bank, Mexico for several consecutive months (i.e., no seasonal patterns were observed in the data). Similar results are presented in Byrne et al. (2017), which analyzed data collected on 46 sharks over a three-year time span to evaluate fishery interactions and mortality. Vaudo et al. (2017) hypothesized that behavioral differences were linked to resource utilization; the unique oceanography off the Yucatan Peninsula may have created an environment that concentrated prey resources, whereas in the northwest Atlantic shortfin mako sharks may have moved in response to large-scale climactic and oceanographic forces that affected prey distribution. Shortfin mako sharks feed on fast-moving fishes such as swordfish, tuna, and other sharks (Castro 1983) as well as clupeids, needlefishes, crustaceans, and cephalopods (Maia et al. 2007a). MacNeil et al. (2005) found evidence of a diet switch from cephalopod to bluefish in the spring.

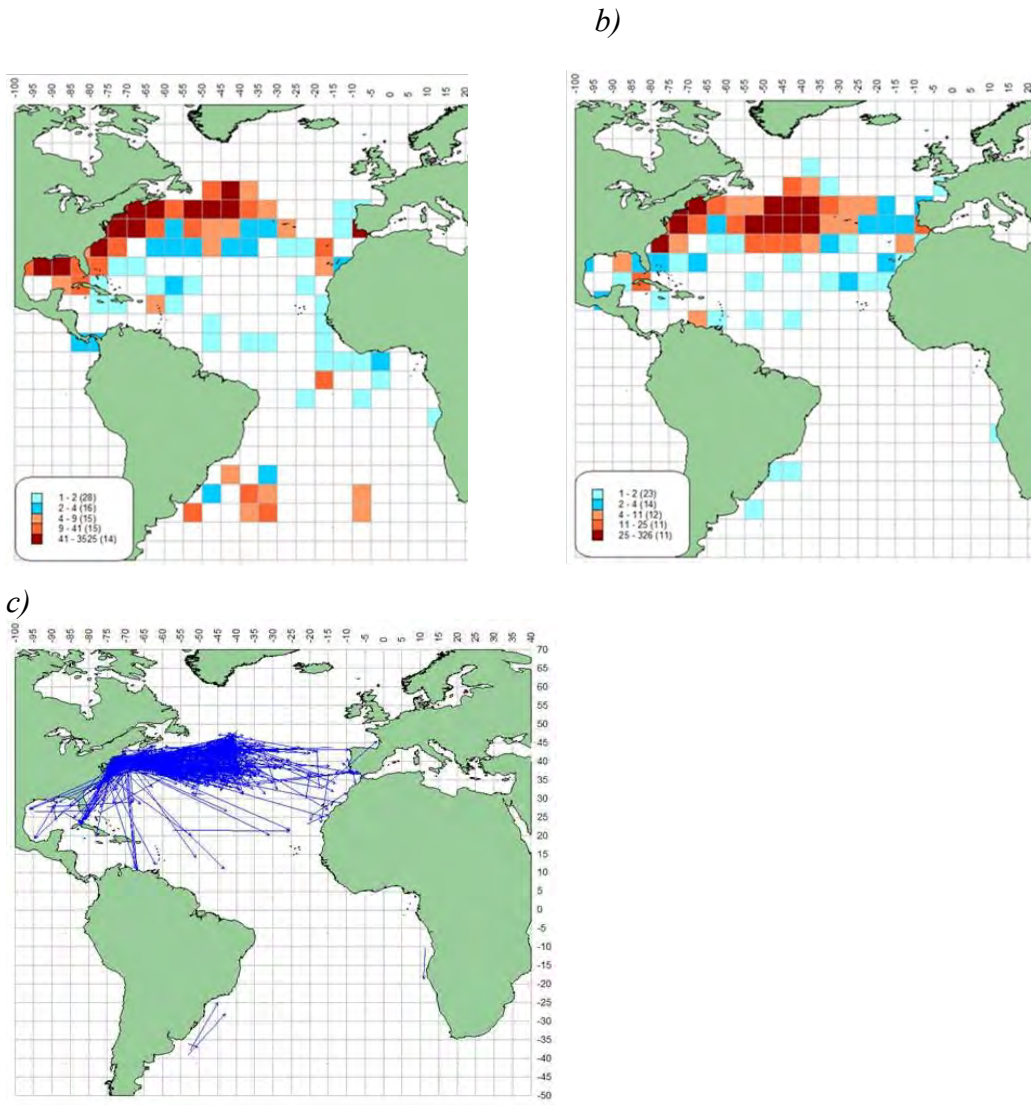

Figure 3. NMFS Apex Predator Program tag and release distributions for shortfin mako in the Atlantic Ocean (a = Density of releases, b = Density of recoveries, c = Straight displacement between release and recovery locations). Source: SCRS 2012.

Considerable variation exists in the descriptions of reproductive life history for shortfin mako sharks. For example, reported age and length at maturity varies by region (ICCAT 2006-2016), and it has been noted that males have double the growth rate of females in the North Atlantic. Cailliet and Mollet (1997) estimated that a female mako shark matures at four to six years, has a two-year reproductive cycle, and a gestation period of approximately 12 months. According to Pratt and Casey (1983), females mature at about 7 years of age; however, Campana et al. (2002) used radiocarbon assays and found that the estimate may have been incorrect. Bishop et al. (2006) considered Campana et al. (2002) when estimating median age at maturity in New Zealand waters to be 19 to 21 years for females and 7 to 9 years for males. In Maia et al.

(2007b), length at maturity for males was estimated at 180 cm FL, which is similar to the size of Natanson et al. (2006); size at female maturity was not estimated because female sharks from 210-290 cm FL were not sampled, although this appears to be the interval where maturation occurs. Cailliet et al. (1983) estimated the von Bertalanffy parameters (n = 44) for the shortfin mako shark as: L = 3210 mm, K = .072, and t_0 = -3.75.

Litter size ranges from 4 to 25, and size at birth is approximately 70 cm TL (Mollet et al. 2000). Gestation period was estimated at 15-18 months and the reproductive cycle at 3 years. Semba et al. (2011) estimated gestation period being between 9 and 13 months, with fecundity increasing as the female grows. North Atlantic shortfin mako shark populations have higher productivity than South Atlantic shortfin mako shark populations (SCRS 2017).

Based on cohort analysis of shortfin mako sharks in the eastern North Atlantic, average growth was determined as 61.1 cm/year for the first year and 40.6 cm/year for the second year (Maia et al., 2007b). There was a marked seasonality in growth, with average monthly rates of 5.0 cm/month in summer and 2.1 cm/month in winter. Lack of sex differences in cohort analysis for the first years of life was in accordance with previous studies that reported male and female mako sharks grew at the same rate until they reached about 200 cm FL (Casey and Kohler, 1992; Campana et al. 2005). Bishop et al. (2006) described rapid initial growth rates to approx. 39 cm fork length in the first year. Thereafter, males and females grew at similar, but slower rates until about age 7 years, after which the relative growth of males declined. Life span estimates are varied; published maximum ages for females are 11.5 years (Pratt and Casey 1983), 25 years (Cailiet and Mollet 1997), and 29 years (Bishop et al. 2006), and 28 years for males (Bishop et al. 2006).

Heist et al. (1996) found considerable intraspecific genetic variation and significant partitioning of haplotypes between the North Atlantic and other regions; however, there was no evidence of multiple subspecies, nor of any past genetic isolation among shortfin mako shark populations. Very weak evidence of population structure throughout the Atlantic and Pacific Oceans was found in microsatellite analysis by Schrey and Hiest (2003). The authors indicated that integrating the results from microsatellite- and mitochondrial-based studies may provide evidence for gender-biased dispersal for the shortfin mako. The significant genetic structure detected in mtDNA data indicated that female shortfin mako sharks may exhibit philopatry for parturition sites, and thus reproductive stocks of mako sharks may exist in the presence of considerable male-mediated gene flow. Pregnant shortfin mako sharks have only been captured between 20° and 30° N or S lat. (Gilmore 1993); however, there is no information about the area where mating occurs.

1.3.1 Shortfin Mako Essential Fish Habitat

Section 303(a)(7) of the Magnuson-Stevens Act requires FMPs to describe and identify essential fish habitat (EFH), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. § 1802 (10)).

Implementing regulations for EFH provisions are at 50 C.F.R. 600, Subpart J. Shortfin mako EFH was identified following the methods described in Amendment 10 to the 2006 Consolidated HMS FMP (NMFS 2017). Size breaks used to distinguish different life stages of pelagic sharks, including shortfin mako, are shown in Table 1.

Table 1. Size class information for Atlantic HMS pelagic sharks used in EFH analyses. Source: NMFS 2017.

Pelagic Sharks	**Young-of-the-year FL (cm) ≤**	**Juveniles FL (cm) =**	**Adults** F 50% mat or max range at 1st maturty **FL (cm) ≥**	Young-of-the- year size range **FL (cm) =**	Embryo size range or maximum embryo size in term females **FL (cm) =**	Length at 1st maturity or range at 50% maturity **FL (cm) =**	**References**
Bigeye Thresher *Alopias superciliosus*			216			209-216	Stillwell & Casey (1976), Moreno & Moron (1992)
Blue *Prionace glauca*	76	77-184	185	30-76	46.61	185	Stevens (1975), Silva (1996), Skomal & Natanson (2003), Pratt (1979)
Common Thresher *Alopias vulpinus*	111	112-212	213		94	213	Moreno *et al.* (1989), Gervelis (2005)
Longfin Mako *Isurus paucus*			225			225	Guitart-Manday (1966)
Oceanic Whitetip *Carcharhinus longimanus*	68	69-179	180	42-68	55	180	Leesa *et al.* (1999), Seki *et al.* (1998), ICCAT (2014)^
Porbeagle *Lamna nasus*	105	106-196	197	57-105	66	197	Jensen *et al.* (2002), Natanson *et al.* (2002)
Shortfin Mako *Isurus oxyrinchus*	128	129-274	275	64-128	70	275	Duffy & Francis (2001), Natanson et al. (2006), ICCAT (2014)^

^ICCAT manual, with notations on life history parameters.
https://www.iccat.int/Documents/SCRS/Manual/Appendices/Appendix%204%20III_SHK.pdf

A map depicting the boundaries of shortfin mako shark EFH is shown in Figure 4. At this time, available information is insufficient for the identification of EFH by life stage, therefore all life stages are combined in the EFH designation. EFH in the Atlantic Ocean includes pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary and Georges Bank (off Massachusetts) to Cape Cod (seaward of the 200 m bathymetric line); coastal and offshore habitats between Cape Cod and Cape Lookout, North Carolina; and localized habitats off South Carolina and Georgia. EFH in the Gulf of Mexico is seaward of the 200 m isobaths in the Gulf of Mexico, although in some areas (e.g., northern Gulf of Mexico by the Mississippi delta) EFH extends closer to shore. EFH in the Gulf of Mexico is located along the edge of the continental shelf off Fort Meyers to Key West (southern West Florida Shelf), and also extends from the northern central Gulf of Mexico around Desoto Canyon and the Mississippi Delta to pelagic habitats of the western Gulf of Mexico that are roughly in line with the Texas/Louisiana border. For more information, please refer to Final Amendment 10 at http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am10/index.html.

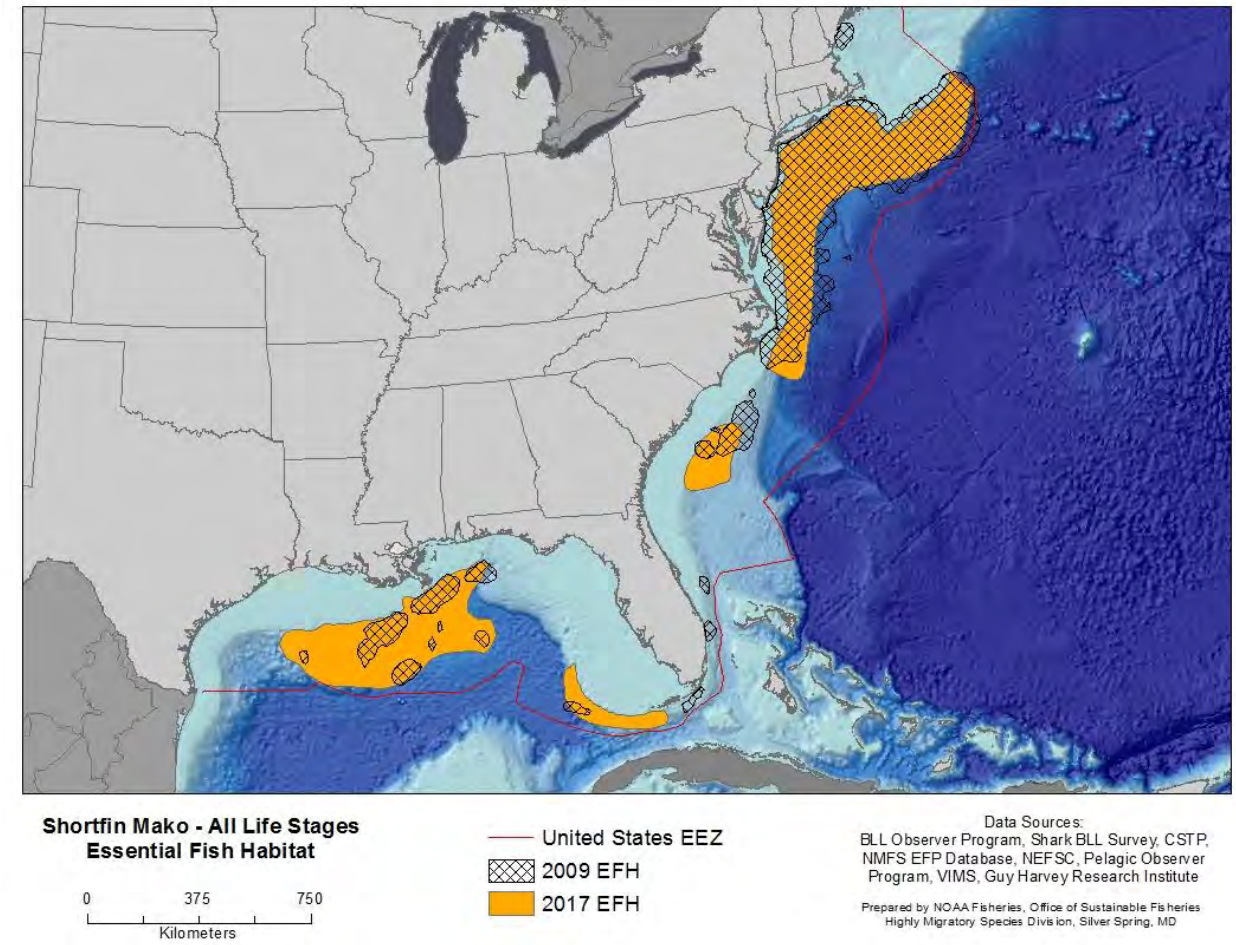

Figure 4. EFH of shortfin mako sharks (all life stages combined). Note: Neonate/YOY (≤ 128 cm FL), Juvenile (129 to 274 cm FL), and Adult (≥ 275 cm FL)

1.4 ICCAT Recommendation 17-08

In November 2017, as a result of the most recent stock assessment, ICCAT adopted Recommendation 17-08 requiring new commercial and recreational management measures for shortfin mako sharks, which the United States must implement under the Atlantic Tunas Convention Act. The recommendation requires the release of all shortfin mako sharks in a manner that causes the least harm, while giving due consideration to the safety of crew members. Under the commercial measures, fishermen using pelagic longline gear must release all live shortfin mako sharks and can retain a shortfin mako shark only if it is dead at haulback and either an observer or functioning electronic monitoring system are on board. Under the recreational measures, fishermen that hold an HMS Angling or HMS Charter/Headboat permit, and fishermen that hold Atlantic Tunas General category and/or Swordfish General Commercial permits when participating in a registered HMS tournament, and who choose to land a shortfin mako shark can only land – at a minimum – males at least 71 inches (180 cm) FL and females at least 83 inches (210 cm) FL. For more details on the recommendation, please refer to the ICCAT website at http://www.iccat.int/.

1.5 Purpose, Need, and Objectives

The purpose of Amendment 11 is to develop and implement management measures that would address overfishing and will take steps towards rebuilding the North Atlantic shortfin mako shark stock. This action is consistent with ICCAT Recommendation 17-08, and U.S. responsibilities under ATCA and the Magnuson-Stevens Act.

The need of Amendment 11 is to implement management measures consistent with the requirements of ATCA, the Magnuson-Stevens Act, and other statutes. On December 13, 2017, NMFS determined that North Atlantic shortfin mako sharks are overfished with overfishing occurring. NMFS, as required by Magnuson-Stevens Act on behalf of the Secretary, must take action to end overfishing immediately and to implement conservation and management measures to rebuild overfished stocks within two years of making this determination. To address overfishing and to ensure that timely data is provided to ICCAT under a provision in Recommendation 17-08, an interim final rule was published to implement management measures for North Atlantic shortfin mako sharks based on the measures in the ICCAT Recommendation, and using NMFS' authority to issue emergency regulations under the Magnuson-Stevens Act. Under this authority, temporary regulations may remain in effect for no more than 180 days, but may be extended for an additional 186 days as described in section 305(c) of the Magnuson-Stevens Act. Since the emergency rule may only be effective for up to 366 days, NMFS is developing an amendment to the 2006 Consolidated Atlantic HMS Fishery Management Plan that will consider and evaluate the measures in ICCAT Recommendation 17-08 and additional management options to address overfishing and to establish a foundation for rebuilding the North Atlantic shortfin mako shark stock. This amendment is expected to be implemented prior to the expiration of the emergency rule. This Issues and Options paper is part of the scoping process for that FMP amendment and associated rulemaking.

The goal of this issues and options document is to examine potential management options to address overfishing of and take steps toward rebuilding the Atlantic shortfin mako stock, and to request additional information and input from consulting parties and the public, prior to development of a DEIS and proposed rule.

Objectives: To achieve the purpose and address the need for acting, NMFS would implement management measures to address overfishing and take steps toward rebuilding the stock. More specifically, NMFS has identified the following objectives with regard to this proposed action:

- Address overfishing of shortfin mako sharks;
- Develop and implement management measures consistent with the ICCAT Recommendation 17-08; and
- Take steps towards rebuilding the shortfin mako shark stock.

2 Range of Potential Options

In this chapter, NMFS examines an initial range of options to meet the objectives of the rule and NEPA requirements and invites comment these options and on whether additional options should be examined. This chapter is organized by the following sections: commercial, recreational, recreational monitoring, and rebuilding program.

2.1 Commercial Options

NMFS is considering a variety of commercial options, some of which are from ICCAT Recommendation 17-08 and the interim final rule, and some that end overfishing and/or rebuilding, but are not specifically included in the ICCAT Recommendation. These options include no action, requiring live release, creating new shark management quotas, allowing additional shortfin mako shark landings by non-pelagic longline gear, and prohibiting commercial retention of shortfin mako sharks.

Option 1 – No Action. Keep current regulations for shortfin mako sharks.

Under Option 1, NMFS would not implement any new management measures in commercial HMS fisheries. Directed and Incidental shark limited access permit (LAP) holders would continue to be allowed to land and sell shortfin mako sharks to an authorized dealer, subject to current limits, including the pelagic shark commercial quota. In recent years, about 180,000 lb dw of shortfin mako sharks have been landed and the commercial revenues from shortfin mako sharks have averaged approximately $375,000 per year, which equates to approximately 1 percent of overall HMS ex-vessel revenues (Table 2).

Table 2. Average shortfin mako shark ex-vessel prices, and overall percentage of total shark ex-vessel revenue, 2013-2016. Sources: HMS eDealer database, 2017 SAFE Report.

Year	Shortfin Mako	Annual landings (lb dw)	AVG Ex-Vessel Price	Ex-Vessel Annual Revenue	Percentage of Overall Shark Ex-Vessel Revenue	Percentage of Overall HMS Ex-Vessel Revenue
2013	Meat	199,177	$1.92	$382,420	20.3%	1.0%
	Fins	6,573	$6.05	$39,766		
	Total			$422,186		
2014	Meat	218,295	$1.97	$430,041	19.4%	1.0%
	Fins	5,894	$2.34	$13,792		
	Total			$443,833		
2015	Meat	141,720	$1.92	$272,102	9.4%	0.8%
	Fins	4,393	$2.93	$12,872		
	Total			$284,975		
2016	Meat	160,829	$2.07	$332,916	13.8%	0.9%
	Fins	4,342	$3.58	$15,546		
	Total			$348,462		

Pros

- Would have no negative economic impacts in the short-term on U.S. commercial fishermen since no fishing restrictions would be implemented.
- HMS commercial fishermen would continue to be able to harvest shortfin mako sharks under the current regulations.

Cons

- Overfishing of shortfin mako sharks would continue and further reduce the stock size, complicating rebuilding efforts. If stock health continues to decline, future stock assessments may advise no fishing mortality immediately, which could result in reduced access to the resource for U.S. fishermen and restrictions in fisheries that interact with the species.
- This option would not implement ICCAT Recommendation 17-08, which requires contracting parties to reduce mortality of shortfin mako sharks and includes several measures that largely focus on maximizing live releases of shortfin mako sharks. Failing to implement ICCAT Recommendation 17-08 and address overfishing of shortfin mako sharks would be inconsistent with ATCA and may result in ICCAT penalties or restrictions specific to the United States.
- Would be inconsistent with the Magnuson-Stevens Act requirement to end overfishing and to implement a rebuilding plan within two years of determining a species is overfished and experiencing overfishing.

Option 2 – Require live release of shortfin mako sharks in the commercial pelagic longline fishery

Under Option 2, fishermen using pelagic longline gear would be required to release all live shortfin mako sharks with a minimum of harm, while giving due consideration to the safety of crew members. This option would be consistent with ICCAT Recommendation 17-08. This option would reduce the number of landings by pelagic longline vessels on average by 74 percent based on observer data from 2013-2016 (Table 3). However, this option would not reduce the number of shortfin mako shark interactions by commercial pelagic longline gear. On average, pelagic longline vessels interact annually with 2,902 shortfin mako sharks (Table 4). This option would require those fishermen to release all shortfin mako sharks that are brought to the vessel alive. There could be greater socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings, including Wanchese, NC; Fairhaven/New Bedford, MA; and Barnegat Light, NJ (Table 5). However, shortfin mako sharks are a minor source of economic revenue to the overall HMS commercial fisheries, but may be a significant source of seasonal revenue to individual fishermen. Shortfin mako shark ex-vessel revenue accounts for over 15 percent of the total shark ex-vessel revenue, but only 1 percent of overall HMS ex-vessel revenue (Table 2).

Table 3. Disposition of shortfin mako shark interactions with pelagic longline gear, 2013-2016. Source: Atlantic Pelagic Observer Program

Year	Number of Shortfin Mako Discarded Alive	Number of Shortfin Mako Discarded Dead	Number of Shortfin Mako Kept (Alive at Vessel)	Number of Shortfin Mako Kept (Dead at Vessel)	Total	Percent of Shortfin Mako Alive at Vessel	Percent of Shortfin Mako Discarded Alive
2013	204	52	132	81	469	71.6%	60.7%
2014	105	31	137	31	344	70.3%	43.4%
2015	128	27	212	59	444	76.6%	37.6%
2016	87	30	480	211	808	70.2%	15.3%
AVG	131	35	240	96	502	74.0%	35.3%

Table 4. Shortfin mako shark interactions in the pelagic longline fishery, 2012-2016. Source: Fisheries Logbook System (pelagic longline)

Year	Total Number of Vessels	Total Number of Trips	Number of Vessels Reporting Shortfin Mako Sharks	Number of Trips with Shortfin Mako Shark Interactions	Number of Shortfin Mako Sharks Kept	Number of Shortfin Mako Sharks Discarded Dead	Number of Shortfin Mako Sharks Discarded Live	Total Shortfin Mako Shark Interactions
2012	112	1,592	108	659	2,226	58	367	2,651
2013	115	1,558	103	663	2,941	24	407	3,372
2014	110	1,422	90	508	3,117	17	388	3,522
2015	104	1,185	81	434	2,007	16	483	2,506
2016	85	1,025	70	402	2,062	49	347	2,458
AVG	107	1,356	90	533	2,471	33	398	2,902

Table 5. Top 10 ports reporting shortfin mako shark landings, 2013-2017. Note: All commercial landings are in lb dw. Source: HMS eDealer database

Port	State	Total Commercial Landings of Shortfin Mako Shark	Percentage of Total Shortfin Mako Shark Landings
Wanchese	NC	336,793	37.2%
Fairhaven	MA	98,843	10.9%
Barnegat Light	NJ	56,992	6.3%
Ocean City Harbor	MD	41,407	4.6%
New Bedford	MA	34,282	3.8%
Fort Pierce	FL	34,260	3.8%
Newfoundland and Labrador	CN	33,762	3.7%
Beaufort	NC	32,468	3.6%
Islip	NY	27,090	3.0%
Wadmalaw Isalnd	SC	20,979	2.3%

Pros

- Would have ecological benefits since it is expected to result in live release and reducing shortfin mako shark fishing mortality.
- Would assist with the rebuilding of the stock since the U.S. would be implementing part of the ICCAT Recommendation under this option.
- Would be consistent with the Magnuson-Stevens Act requirement to end overfishing and to implement a rebuilding plan within two years of determining a species is overfished and experiencing overfishing.

Cons

- Would have some negative socioeconomic impacts on fishermen since they would have to release all live shortfin mako sharks, reducing efficiency, landings, and potential economic benefits, although shortfin mako sharks are not significant source of revenue.

Option 3 – Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback, caught incidentally with pelagic longline gear during fishing for other species, and there is a functional electronic monitoring system on board the vessel

Option 3 would allow retention of a shortfin mako shark only if it is dead at haulback by a vessel with a Directed or Incidental shark LAP, if it is caught incidentally during fishing for other species using pelagic longline gear, and a functional electronic monitoring system onboard the vessel. In the commercial fishery, the vast majority of shortfin mako sharks are rarely targeted. Rather, these sharks are caught incidentally on pelagic longline sets that are targeting tunas and swordfish. Under the current HMS regulations, all HMS permitted pelagic longline vessels are already required to have an electronic monitoring system on board the vessel (79 FR 71510; December 2, 2014) and either a Directed or Incidental shark LAP. Commercial vessels

with other gear types, such as bottom longline or gillnet vessels, could not land dead shortfin mako sharks under this option.

Based on HMS logbook data, 85 percent of shortfin mako sharks caught are kept and landed by fishermen across all gear types, while 14 percent are discarded alive and 1 percent are discarded dead (Table 4). Based on Pelagic Observer Program data, over 70 percent of the shortfin mako sharks are alive upon capture on pelagic longline vessels (Table 6). Therefore, this option would require those individuals to release the majority of the shortfin mako sharks caught and only a small portion of shortfin mako sharks would be retained (those that are dead at haulback and of legal size). Survival rates are expected to be high for released sharks.

Table 6. Summary of all available observed shortfin mako shark interactions by data source, 2012-2016.

Year	Data Source	Number of Vessels Observed with Shortfin Mako	Number of Shortfin Mako Kept	Number of Shortfin Mako Discarded Dead	Number of Shortfin Mako Discarded Alive	Total
2012	NEFSC Northeast Fisheries Observer Program	3	0	3	0	3
	Atlantic Pelagic Observer Program (PLL)	66	167	56	153	376
	SEFSC Bottom Longline Observer Program Targeting Sharks	1	0	0	1	1
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2013	NEFSC Northeast Fisheries Observer Program	2	0	2	0	2
	Atlantic Pelagic Observer Program (PLL)	75	213	52	204	469
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2014	NEFSC Northeast Fisheries Observer Program	9	9	4	1	14
	Atlantic Pelagic Observer Program (PLL)	56	206	31	105	342
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2015	NEFSC Northeast Fisheries Observer Program	8	3	5	0	8
	Atlantic Pelagic Observer Program (PLL)	54	271	26	131	428
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2016	NEFSC Northeast Fisheries Observer Program	4	5	0	1	6
	Atlantic Pelagic Observer Program (PLL)	50	691	27	143	861
	SEFSC Bottom Longline Observer Program Targeting Sharks	2	2	1	0	3
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0

Currently, commercial pelagic longline vessels are required to report shortfin mako shark catches in logbooks. Landings information is reported by an authorized HMS dealer while observers record information on catches. Since an operating electronic monitoring system is already required on board the vessel, the footage would assist with improving monitoring of shortfin mako sharks.

Pros

- Improved health of the stock as there would be an increase on live releases of shortfin mako sharks that would otherwise have been retained and landed.
- No increases in fishing effort in the commercial pelagic longline fishery expected.
- Provides another potential check of data between all other sources: observers, logbooks, or dealers.
- Does not create additional reporting or permit requirements for pelagic longline vessels.
- Contribute to ending overfishing and rebuilding consistent with MSA requirements and contribute to ICCAT recommendation requirements consistent with ICCAT obligations and ATCA.

Cons

- Reduced opportunities to land shortfin mako sharks for vessels who do not meet the criteria and may want to retain shortfin mako (e.g., bottom longline, gillnet, handgear, etc.).
- Reduced opportunities and revenue losses by the pelagic longline fishery as a result of the landing reduction for the commercial fishery. Even though shortfin mako sharks are a minor source of economic revenue to the overall HMS commercial fisheries, this species could be a significant source of seasonal revenue to individual fishermen.
- Could have negative socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings.

Option 4 – Prohibit the landing of all shortfin sharks caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.)

Under Option 4, NMFS would prohibit the landing of all shortfin mako sharks caught by commercial fishermen using non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.). Commercial fishermen using non-pelagic longline gear would be required to release all shortfin mako sharks with a minimum of harm, while giving due consideration to the safety of crew members. Based on HMS logbook data, an annual average of ten commercial vessels that used non-pelagic longline gear interacted with shortfin mako sharks (Table 7). Those vessels only interacted with, on average, 18 shortfin mako sharks per year of these 14 shortfin mako sharks were kept. This represents less than 1 percent of the total shortfin mako shark interactions in the HMS logbook data.

Table 7. Shortfin mako shark interactions in non-pelagic longline fisheries, 2012-2016. Source: Fisheries Logbook System.

Year	Total Number of Vessels	Total Number of Trips	Number of Vessels Reporting Shortfin Mako Sharks	Number of Trips with Shortfin Mako Shark Interactions	Number of Shortfin Mako Sharks Kept	Number of Shortfin Mako Sharks Discarded Dead	Number of Shortfin Mako Sharks Discarded Live	Total Shortfin Mako Shark Interactions
2012	123	1,136	14	23	17	0	6	23
2013	92	844	8	19	15	0	6	21
2014	88	751	12	19	13	0	8	21
2015	89	640	7	8	7	0	7	8
2016	87	538	10	15	18	0	1	19
AVG	96	782	10	17	14	0	6	18

Pros

- Improved health of the stock as there would be an increase on live releases of shortfin mako sharks that would otherwise have been retained and landed.
- No increase in protected resources interactions or fishing effort in the commercial pelagic longline fishery expected.
- Would only affect a small number of fishermen since pelagic longline gear is the primary commercial gear used to land pelagic shark species, including shortfin mako sharks.
- Would have few socioeconomic impacts for individual fishermen, given so few shortfin mako sharks are caught on non-pelagic longline gears.

Cons

- Would cause fishermen who interact with shortfin mako sharks with non-pelagic longline gear to release the sharks regardless on their status (live or dead).
- Reduced opportunities and revenue losses by the pelagic longline fishery as a result of the landings reduction for the commercial fishery.
- Would have negative socioeconomic impacts on individual fishermen with higher reliance on shortfin mako shark landings.

Option 5 – Remove shortfin mako sharks from pelagic shark quota; use recent landings to both establish a shortfin mako shark quota and adjust the pelagic shark quota

Under Option 5, NMFS would remove shortfin mako sharks from the pelagic shark quota and would establish a species-specific quota for shortfin mako sharks and a new pelagic shark species quota for common thresher and oceanic whitetip sharks based on recent landings. The quotas for blue and porbeagle sharks would not change under this option and would be 273 mt dw and 1.7 mt dw, respectively. Regulations regarding overharvest and underharvest of pelagic shark quota, and retention limits for pelagic sharks would remain the same.

Shortfin mako sharks are caught as bycatch in the pelagic longline fishery, and there is no directed fishery in the United States for this species. Removing shortfin mako sharks from the quota group of pelagic sharks, which includes common thresher, oceanic whitetip, and shortfin mako sharks, would allow them to be managed separately and would give NMFS the ability to track this separate quota more efficiently. To be consistent with the current ICCAT Recommendation, NMFS would need to require live release of shortfin mako sharks in the pelagic longline fishery, so only shortfin mako sharks that are dead at haulback could be retained (as described in Commercial Options 2 and 3 above) and counted towards a shortfin mako shark quota. Currently, the annual quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. On average, only 24 percent (116.3 mt dw) of the pelagic shark quota is filled every year of which approximately 71 percent (82.1 mt dw) is comprised of shortfin mako sharks (Table 8). While establishing a quota could allow NMFS to track shortfin mako and pelagic shark landings more efficiently, establishing a shortfin mako shark quota goes beyond the current ICCAT Recommendation. Additionally, if a large number of dead shortfin mako sharks are caught and appropriately landed under the ICCAT Recommendation, any quota established could be exceeded which would cause the fishery to close and require fishermen to release dead shortfin mako sharks, contributing to regulatory discards and waste, which would not be consistent with the recommendation.

Table 8. Commercial Landings of Shortfin Mako, Oceanic Whitetip, and Thresher Sharks, 2013-2017. Source: 2013-2016 data from 2017 HMS SAFE Report; 2017 data from HMS eDealer database (preliminary).

Year	Shortfin Mako Shark (lb dw)	Shortfin Mako shark (mt dw)	Oceanic Whitetip Shark (lb dw)	Oceanic Whitetip Shark (mt dw)	Thresher Shark (lb dw)	Thresher shark (mt dw)
2013	199,177	90.3	62	< 0.1	48,768	22.1
2014	218,295	99.0	22	< 0.1	116,012	52.6
2015	141,720	64.2	0	0	72,463	32.9
2016	160,829	73.0	0	0	78,219	35.5
2017	185,403	84.1	0	0	61,284	27.8
Average	181,085	82.1	17	< 0.1	75,349	34.2

Pros

- Establishing a separate shortfin mako shark quota could allow fishermen to track monthly updates of how many shortfin mako sharks have been caught, via the shark landings updates released on the HMS Management Division listserv and website.
- Establishing a quota would cap commercial landings of shortfin mako sharks in the U.S. which would assist with a potential rebuilding plan in the future.

Cons

- A species-specific landings quota would require authorized fishermen to discard all shortfin mako sharks once the quota is reached, potentially leading to an increase in regulatory discards, which would not contribute to the health of the stock.
- A reduced pelagic shark species quota may also lead to increased regulatory discards of common thresher and oceanic whitetip sharks if the quota is reached.
- Given there are no current stock assessments for oceanic whitetip or common thresher sharks, it would be difficult to determine the ecological impacts of setting a reduced quota for these two species when you remove shortfin mako sharks from the pelagic shark species management group.
- ICCAT has not established country-specific TACs for shortfin mako sharks. Because the United States does not have a TAC for shortfin mako sharks, it is difficult to determine at what level to set a species-specific quota to best benefit the stock, while also accounting for high catches from other countries.
- The data are not yet available from the ICCAT SCRS on areas of high shortfin mako shark interactions, there is no information fishermen can use to avoid interacting with shortfin mako sharks once the quota is met.
- A reduced pelagic shark species quota and species-specific shortfin mako shark quota could potentially result in revenue losses to fishermen and businesses that rely on this resource if the quotas are met before the season ends.
- A shortfin mako shark quota and a reduced pelagic shark species quota could disadvantage vessels that primarily fish later in the year, depending on when in the year the quotas are met.

Option 6 – Allow retention of shortfin mako sharks greater than 83 inches FL by persons with a Directed or Incidental shark LAP caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.)

Option 6 would establish a commercial minimum size of 83 inches FL (210 cm FL) for non-pelagic longline gears to retain a shortfin mako shark. The majority of commercial shortfin mako shark interactions occur in the pelagic longline fishery (> 97 percent of catch), but observer reports from the NEFSC Northeast Fisheries Observer Program and SEFSC Bottom Longline Observer Program Targeting Sharks have observed small numbers of shortfin mako shark interactions (Table 6). Currently, there are no commercial minimum size restrictions for sharks because any such restriction would require the head remain attached for the size to be valid. Because sharks need to be dressed quickly to preserve the quality of the meat, fishermen are allowed to dress the shark by removing the head and the viscera as long as the fins remain naturally attached to the carcass. Under this option, fishermen would be required to leave the head of the shortfin mako shark attached to the carcass unless an appropriate alternative minimum size specific to shortfin mako sharks can be determined.

Pros

- Could have beneficial socioeconomic impact on non-pelagic longline gears since fishermen with this gear would have to discard all shortfin mako sharks under other options (i.e., Commercial Option 4 and 5).
- Could have beneficial ecological impacts to the stock since non-pelagic longline gear fishermen would only be able to retain shortfin mako sharks greater than 83 inches FL (210 cm FL).
- Would be consistent with ICCAT Recommendation 17-08.

Cons

- Vessels with non-pelagic longline gear on board are not required to have electronic monitoring or have a low to no observer coverage rate.
- Would allow additional landings of shortfin mako sharks (dead or alive), which could have ecological impacts to the stock.
- Would require the head remain attached to the shark carcass, which could reduce the quality of the meat and reduce the ex-vessel price. Additionally, keeping the head on a large shark could also complicate the packing/storage process and reduce efficiencies on the vessel.

Option 7 – Allow landing of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.) only if an observer is on board

Option 7 would allow fishermen to retain shortfin mako sharks caught on gears other than pelagic longline (e.g., bottom longline, gillnet, handgear, etc.), provided that an observer is on board that can verify that the shark was dead at haulback. This option is similar to Commercial Option 3 except that the observer would be acting in a capacity similar to the electronic monitoring system and confirming whether the shark was dead before it was brought onboard the vessel. On average, only about one percent of the total shortfin mako shark landings occurred on non-pelagic longline gear (Table 9). Currently, observer coverage on bottom longline shark research fishery is 100 percent and bottom longline observer overage outside the shark research fishery is 5 – 10 percent. Observer coverage in the shark gillnet fishery is 4 – 11 percent.

Table 9. Shortfin mako shark commercial landings by gear type, 2013-2016. Source: HMS eDealer database, which includes some uncertainty in gear type reporting.

Gear Type	Total Landed Weight (lb dw)	Percent of Total
Longline (Pelagic and Bottom)	700,263	97.26%
Gillnets	7,914	1.10%
Hook and Line	7,180	1.00%
Hand Line	2,758	0.38%
Other/Unknown	1,906	0.26%

Pros

- Would allow other gears types to catch and land a small amount (less than one percent of total landings) of shortfin mako sharks when compared to pelagic longline.
- Could provide beneficial socioeconomic per-trip revenue for some fishermen.
- Would be consistent with ICCAT Recommendation 17-08.

Cons

- Would not lead to a large amount of landings due to the low landings reported and observations on non-pelagic longline gear. Imposing additional regulations may not justify the minimal impact.
- Observers would be required to determine the disposition of the shark and whether the fishermen can retain it. This could hinder normal observer data collection activities and exacerbate tensions on the vessel.
- Shortfin mako sharks that are caught when no observer is onboard the vessel, which is likely given the rarity of catching a shortfin mako shark on these gears and the current percent of observer coverage for these gear types, would still need to be discarded, live or dead.

Option 8 – Prohibit the commercial landing of all shortfin mako sharks, live or dead

Option 8 would place shortfin mako sharks on the prohibited species list to prohibit any catch or retention of shortfin mako sharks in commercial HMS fisheries, although some small level of bycatch would be expected to occur. HMS permit holders would be prohibited from landing shortfin mako sharks commercially. On average, 181,085 lb dw of shortfin mako sharks are landed annually, which accounts for on average 71 percent of the total pelagic shark landings (Table 10).

Table 10. Commercial Landings of Shortfin Mako Sharks and Percentage of the Pelagic Shark Landings, 2013-2017. Source: HMS eDealer database.

Year	Commercial Landings (lb dw)	Percentage of Pelagic Shark Landings
2013	199,177	77%
2014	218,295	61%
2015	141,720	66%
2016	160,829	67%
2017	185,403	75%
Average	181,085	71%

Pros

- Could result ecological benefits and assist with the potential rebuilding of the stock since the total landings of shortfin mako sharks would be reduced from their current levels to zero.
- Interactions with shortfin mako sharks would still occur in commercial fisheries, but all individuals would be release or discarded. The only remaining sources of mortality would be from post-release mortality and those individuals that are dead at haulback.
- Would result a large numbers of live releases of shortfin mako sharks would be released that would otherwise have been retained and landed.
- Would comply with the obligations under MSA since we would prohibit landings and assist with ending overfishing of the stock.

Cons

- Would eliminate all commercial ex-vessel revenues derived from shortfin mako sharks (approximately $375,000 per year).
- Lost revenues would have greater socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings, including Wanchese, NC, Fairhaven/New Bedford, MA, and Barnegat Light, NJ.

2.2 Recreational Options

NMFS is also considering a variety of recreational options, some of which are from ICCAT Recommendation 17-08 and interim final rule, and some that otherwise promote ending overfishing and/or rebuilding, but are not specifically included in the ICCAT Recommendation. These range from no action, creating a catch and release fishery for shortfin mako sharks, increasing the minimum size to 83 inches FL or greater, restricting landings to tournaments or tagging program, revising the circle hook requirement, and establishing a variable inseason minimum size restriction.

Option 1 – No Action. Keep current regulations for shortfin mako sharks

Under Option 1, NMFS would maintain the current recreational regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP and amendments. Recreational fishermen would continue to be limited to one authorized shark species, which includes shortfin mako sharks, greater than 54 inches FL per vessel per trip along with one Atlantic sharpnose and bonnethead shark per person and an unlimited number of smoothhound sharks per trip. In addition, keeping the current regulations the same would allow overfishing of shortfin mako sharks to continue and further reduce the stock size.

Pros

- HMS recreational fishermen would continue to be able to harvest shortfin mako sharks under the current recreational vessel and size limit.
- No short-term negative economic effects on the fishery.

Cons

- Overfishing of shortfin mako sharks would continue and further reduce the stock size, complicating rebuilding efforts. If stock health continues to decline, future stock assessments may advise no fishing mortality immediately, which could result in reduced access to the resource for U.S. fishermen and restrictions in fisheries that interact with the species.
- This option would not implement ICCAT Recommendation 17-08, which requires contracting parties to reduce mortality of shortfin mako sharks and includes several measures that largely focus on maximizing live releases of shortfin mako sharks. Failing to implement ICCAT Recommendation 17-08 and address overfishing of shortfin mako sharks would be inconsistent with ATCA and may result in ICCAT penalties or restrictions specific to the United States.
- Would be inconsistent with the Magnuson-Stevens Act requirement to end overfishing and to implement a rebuilding plan within two years of determining a species is overfished and experiencing overfishing.

Option 2 – Prohibit landing of shortfin mako sharks in in the HMS recreational fishery (catch and release only)

Under Option 2, recreational HMS anglers (fishermen who hold HMS Angling or Charter/Headboat permits, or Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) would only be authorized to catch and release shortfin mako sharks. This is similar to recreational measures for the catch and release of white sharks.

Pros

- Could reduce mortalities of shortfin mako sharks in the recreational fishery.
- Could help to rebuild the overfished stock.
- Would not prevent U.S. fishermen from recreational fishing for shortfin mako sharks.

Cons

- May have some negative socioeconomic impacts to HMS tournaments that have traditionally landed sharks, due to the decreased opportunity to land shortfin mako sharks. However, HMS tournaments could still target shortfin mako sharks under this option.
- Could have some negative socioeconomic impacts on charter/headboat operators whose passengers want to land shortfin mako sharks.

Option 3 – Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL (180 cm FL) for male and 83 inches FL (210 cm FL) for female shortfin mako sharks

Option 3 would implement management measures for the HMS recreational fishery consistent with ICCAT Recommendation 17-08. Recreational HMS permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 83 inches FL (210 cm FL), reducing the amount of recreational landings. According to length composition information from the Large Pelagics Survey (LPS), this option would reduce the recreational landings of male shortfin mako sharks by up to 44 percent and female shortfin mako sharks by up to 78 percent assuming 100 percent retention of legal-sized sharks (Table 11). Shortfin mako sharks below those minimum sizes would likely still be caught and released by recreational fishermen, but only 56 percent of males and 22 percent of females that are caught are expected to be large enough to retain under this option.

Table 11. Size composition of sampled male and female mako sharks in the recreational fishery, 2010-2016 (N=581). Source: Large Pelagics Survey.

Fork Length Category	Percent of Total Males	Percent of Total Females
<54 in (137 cm)	0	1
54-71 in (137-180 cm)	44	38
71-83 in (180-210 cm)	45	39
>83 in (210 cm)	11	22

Pros

- Could result in beneficial ecological impacts since a large numbers of live releases of shortfin mako sharks would occur in the U.S. that would otherwise have been retained and landed.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to decreased opportunity to land shortfin mako sharks.
- Confirming the sex of a large and potentially active shortfin mako shark prior to its landing can be challenging for fishermen and may have safety implications.

Option 4 – Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches (210 cm) FL

Under Option 4, recreational fishermen (those who hold HMS Angling or Charter/Headboat permits, and Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) could only land shortfin mako sharks, male or female, that are at least 83 inches FL (210 cm FL). According to length composition information from the Large Pelagics Survey, this recreational minimum size limit could reduce landings by approximately 83 percent in the HMS recreational fishery (Table 12).

Table 12. Proportions and cumulative weights of shortfin mako sharks in various length categories in the recreational fishery, 2012-2016. Source: Large Pelagics Survey.

Fork Length Category	Count	Percent of Total (Count)	Weight in Category (kg)	Percent of Total (Weight)
<54 inches FL (137 cm FL)	89	1%	1,691	0%
54-71 inches FL (137-180 cm FL)	5,490	45%	256,655	29%
71-83 inches FL (180-210 cm FL)	4,676	38%	361,937	41%
>83 inches FL (210 cm FL)	1,911	16%	265,497	30%
Total	12,166		885,779	

Pros

- Could result in beneficial ecological impacts to the stock since a large numbers of live releases of shortfin mako sharks would occur in the U.S. that would otherwise have been retained and landed.
- Would comply with obligations under MSA and ACTA to implement ICCAT recommendations.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to the decreased opportunity to land shortfin mako sharks.

Option 5 – Increase the minimum size of all shortfin mako sharks to 83 inches FL and allow retention in registered HMS tournaments only

Under Option 5, shortfin mako sharks could not be retained outside of registered HMS tournaments. Within registered HMS tournaments, the minimum size for shortfin mako sharks would be increased to 83 inches FL (201 cm FL). HMS tournaments are an important aspect of the HMS recreational fishery. On average, there are 250 HMS tournaments each year with 73 tournaments indicating pelagic sharks as a prize category, which would include shortfin mako sharks (Table 13). Overall, tournaments indicating pelagic sharks as a prize category were the highest in 2014 and 2015 with 84 tournaments in both years. However, 2016 showed a decrease in the number of these tournaments. Based on LPS data, tournaments account for approximately half of the shortfin mako interactions over the last five years; 63 percent of the sharks caught were retained (Table 14). Non-tournament shark interactions result in 53.6 percent being kept. This measure would require the release of all shortfin mako sharks outside tournaments, which could reduce shortfin mako shark mortality over 44 percent. Prohibiting the retention of shortfin mako sharks outside of tournaments and an increase in the minimum size would reduce recreational shortfin mako shark landings in the United States.

Table 13. HMS tournaments targeting shortfin mako and pelagic shark species, 2012-2016.

Year	Total Number of HMS Tournaments	Number of HMS Tournaments with Shortfin Mako Shark in the title or otherwise mentioned by name	Number of HMS Tournaments that Indicated Pelagic Sharks as Target Species (Sharks in General)	HMS Tournaments with Pelagic Sharks as Category by Area	
				Area	Number of Tournaments
2012	218	11	53 (71)	Gulf of Mexico (Caribbean)	25 (2)
				South Atlantic (Keys to SC)	9
				Mid-Atlantic (NC to NY)	16
				North Atlantic (CT to ME)	3
2013	212	13	74 (80)	Gulf of Mexico (Caribbean)	34 (1)
				South Atlantic (Keys to SC)	8
				Mid-Atlantic (NC to NY)	27
				North Atlantic (CT to ME)	5
2014	274	8	84 (85)	Gulf of Mexico	24
				South Atlantic (Keys to SC)	7
				Mid-Atlantic (NC to NY)	39
				North Atlantic (CT to ME)	14
2015	279	8	84 (92)	Gulf of Mexico	27
				South Atlantic (Keys to SC)	12
				Mid-Atlantic (NC to NY)	33
				North Atlantic (CT to ME)	12
2016	267	10	72 (77)	Gulf of Mexico	20
				South Atlantic (Keys to SC)	3
				Mid-Atlantic (NC to NY)	41
				North Atlantic (CT to ME)	8
Average	250	10	73 (81)		

Table 14. Shortfin mako shark observations (numbers and percent) in the Large Pelagic Survey by Tournament and Non-Tournament trips, and their disposition for each trip type, 2010-2015.

Year	Trip Type	Number of Shortfin Mako Interactions (Percentage of Overall)	Number of Shortfin Mako Kept (Percentage of Overall)	Number of Shortfin Mako Released (Percentage of Overall)
2010	Tournament	123 (45.4%)	80 (65.0%)	43 (35.0%)
	Non-Tournament	146 (53.6%)	72 (49.7%)	73 (50.3%)
2011	Tournament	130 (48.7%)	90 (69.2%)	40 (30.8%)
	Non-Tournament	136 (50.9%)	79 (58.1%)	56 (41.2%)
2012	Tournament	149 (56.2%)	100 (67.1%)	49 (32.9%)
	Non-Tournament	116 (43.8%)	51 (44.0%)	65 (56.0%)
2013	Tournament	151 (54.3%)	103 (68.2%)	48 (31.8%)
	Non-Tournament	127 (45.7%)	75 (59.8%)	51 (40.2%)
2014	Tournament	134 (47.4%)	86 (64.2%)	48 (35.8%)
	Non-Tournament	149 (52.6%)	89 (59.7%)	60 (40.3%)
2015	Tournament	161 (53.1%)	78 (48.5%)	83 (51.5%)
	Non-Tournament	142 (46.9%)	74 (50.7%)	70 (49.3%)
Total	Tournament	848 (50.9%)	537 (63.3%)	311 (36.7%)
	Non-Tournament	817 (49.1%)	438 (53.6%)	375 (46.4%)

Pros

- Would have positive ecological impact to the stock since it would limit shortfin mako shark harvest to mature individuals and in tournaments only.
- Could have positive impact on HMS tournament participation since shortfin mako sharks can only be retained in tournaments.
- Would comply with obligations under MSA and ACTA to implement ICCAT recommendations.

Cons

- Negative economic impacts on charter/headboat operators whose passengers have been landing shortfin mako sharks outside of tournaments.
- Negative socioeconomic impacts on non-tournament HMS recreational fishermen since shortfin mako shark retention would be prohibited.

Option 6 – Establish a tagging or lottery program to land shortfin mako sharks greater than 83 inches FL recreationally

Under Option 6, NMFS would establish a tagging or lottery program to allow for the recreational landing of shortfin mako sharks. For this option, registered HMS tournaments would be excluded from this tagging or lottery program and participants would still be allowed to retain shortfin mako sharks greater than 83 inches FL. A possible way to implement this program would be to distribute non-transferable tags to interested HMS recreational permit holders based on a random lottery. HMS recreational permit holders would indicate that they wanted to be included in the lottery when applying for their HMS permit. NMFS would hold random lottery drawings throughout the year, where permit numbers of interested constituents would be selected. This would allow NMFS to potentially set a target catch limit for shortfin mako sharks with the number of tags offered. After tags were distributed, HMS recreational permit holders who received a tag would be able to land a shortfin mako shark greater than 83 inches FL (210 cm FL). Tags would be valid for one year from the date of issuance, with a current HMS permit. NMFS could implement a limit for the number of tags each HMS recreational permit holders would receive a fishing year. The tag would be required to be affixed to the shark at time of landing, and would be required to be reported online within 48 hours of landing. Unused tags, after the date of expiration, would need to be mailed back to NMFS. Failure to comply could jeopardize the ability for constituents to participate in the future.

Pros

- Could result in minor ecological benefits since the number of shortfin mako sharks landed would be limited to the selected recreational HMS permit holders.
- Could result in equal geographic distribution to all recreational participants to the extent that permits are equally distributed.
- Positive socioeconomic benefits if registered HMS tournaments are excluded from this potential tagging or lottery program and participants are still allowed to retain shortfin mako sharks at the new size limit.

- Increase in data availability and confidence in shortfin mako sharks landing estimates.

Cons

- Could cause negative socioeconomic impacts for HMS recreational or charter/headboat permit holders who were not selected to receive a tag in a given fishing year.
- More registered HMS tournaments might occur to get around this program and there is no current reporting requirements for tournaments.
- Administrative burden on HMS recreational permit holders and to the agency to procure and distribute tags, track landings, and ensure tag returns.

Option 7 – Require use of circle hooks for recreational shark fishing in all areas (remove the current management line established for dusky sharks near Chatham, MA)

Option 7 would expand the requirement to use non-offset, non-stainless steel circle hook by all HMS permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, to all waters managed within HMS management division. As of January 1, 2018, this regulation has been in place for all federally managed waters south of 41° 43' N latitude (near Chatham, Massachusetts), but this option would remove the boundary line, requiring fishermen in all areas to use circle hooks. The use of circle hooks may improve the survival rate of sharks that are released by decreasing deep hooking and attendant mortality associated with J-hooks.

Pros

- Would have ecological benefits to the stocks for all sharks including shortfin mako sharks since circle hooks would allow sharks to be more easily released in better condition, reducing dead discards and post-release mortality.
- Would simplify recreational management measures across entire region.

Cons

- Could cause some confusion with constituents since this would change the regulation just implemented at the start of 2018.
- Would cause minor socioeconomic impacts on recreational shark fishermen above the current Chatham, MA line since they would need to buy circle hooks.

Option 8 – Establish a minimum size limit for the retention of shortfin mako sharks that is greater than 83 inches FL

Raising the recreational minimum size for shortfin mako sharks from 54 to 83 inches FL (210 cm FL) would result in significant reductions in recreational landings, but there is some disagreement in the scientific literature about the median size at maturity for female shortfin mako sharks. ICCAT adopted 83 inches FL (210 cm FL) as the minimum size for female

shortfin mako sharks based on the results of Maia et al. (2007b) which estimated length at maturity for females to be between 83 to 114 inches FL (210 to 290 cm FL). Other papers have identified the median size at maturity for female mako sharks to be in the upper reaches of this range with Stevens (1983) and Kohler et al. (2002) estimating it to be as high at 102 or 108 inches FL. Thus, Option 8 considers establishing a minimum size limit that is greater than the ICCAT Recommendation of 83 inches FL (**Table 15**).

Table 15. Estimated number of shortfin mako sharks harvested from 2012-2016 under the existing 54 inches FL minimum size limit compared to the number that would have been harvested under four options of minimum length limits. Source: Large Pelagic Survey.

Minimum Size	2012	2013	2014	2015	2016	Average	Average (mt ww)
54 inches FL	2,735	2,762	2,650	2,126	1,893	2,433	177.2
83 inches FL	408	542	309	325	327	382	53.1
90 inches FL	46	181	172	103	235	147	25.1
102 inches FL	0	0	0	0	117	23	5.4
108 inches FL	0	0	0	0	30	6	1.7

Increasing the minimum size limit for mako sharks from 54 to 83 inches FL would reduce recreational harvest by 84 percent, or 124 mt whole weight (ww), based on average landings from 2012 to 2016 (Table 16). Raising the minimum size to 90 inches FL would reduce the average annual landings by 94 percent and a further 25 mt ww, while further raising the minimum size limit to 102 inches FL would reduce average landings by 99 percent. Any minimum size greater than 102 inches FL would result in estimates of zero harvest of shortfin mako sharks in most years. A breakdown of observed shortfin mako shark landings in the LPS by sex also shows that the sex to size ratio of shortfin mako shark landings below 83 inches FL is approximately 45 percent male and 55 percent female. Above 83 inches FL this ratio shifts to 26 percent male and 74 percent female with 100 percent of observed harvest being female at 102 inches FL or greater.

Table 16. Observed sex to size ratio of shortfin mako sharks harvested from 2012-2016 by size range. Source: Large Pelagic Survey.

Size Range	Percent of Male Shortfin Mako Sharks	Percent of Female Shortfin Mako Sharks
54 to 83 inches FL	45.4%	54.6%
83 to 90 inches FL	26.4%	73.6%
Greater than 102 inches FL	0.0%	100.0%

Increasing the minimum size beyond 83 inches FL may also have a slight negative socioeconomic effect on HMS tournaments. According to NMFS Northeast Fisheries Science Center tournament data, the 83 inches FL (210 cm FL) minimum size implemented by the emergency rule may not greatly impact tournament landings of shortfin mako sharks, where most of the largest sharks landed were above the 83 inches FL (210 cm FL) minimum size (Table 17). However, the larger minimum size limits being considered (102 inches and 108 inches FL) would exceed the sizes of many tournament winning sharks since 2012.

Table 17. Mean weights and lengths of the five largest shortfin mako sharks landed at Northeast shark tournaments, 2012-2016. Source: NEFSC Apex Predator Program

Year	Mean weight of 5 largest sharks (lb ww)	Fork Length (inches)	Fork Length (cm)	Largest male (lb ww)	Fork Length (inches)	Fork Length (cm)
2012	349	95	241.3	368	96	243.8
2013	329.2	93	236.2	311	91	231.1
2014	319.1	92	233.7	294.4	90	228.6
2015	415.8	100	254	349	95	241.3
2016	443.8	102	259.1	507	107	271.8

Pros

- Could result in beneficial ecological impacts.
- Increasing the minimum size limit beyond the ICCAT Recommendation could further reduce recreational harvest and could allow for some minor increased benefit in beginning to rebuild the North Atlantic shortfin mako shark stock.
- Could result in the release of more immature female sharks, which could increase the available breeding stock.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to the decreased opportunity to land shortfin mako sharks.
- Would largely turn the shortfin mako shark recreational fishery into a catch-and-release fishery since majority of the sharks (94-99 percent) would be below the considered minimum size limits.

Option 9 – Establish a variable inseason minimum size limit for shortfin mako sharks

Option 9 would establish criteria for making adjustments to the recreational minimum size limit for shortfin mako sharks on an inseason basis in response to landings estimates from LPS. Under this option, the minimum size for shortfin mako sharks would initially be set at 83 inches FL (210 cm FL). NMFS would monitor monthly landings estimates generated by LPS which covers Maine to Virginia from June through October each year. If shortfin mako shark landings estimates for the year exceed a set threshold, based on a rebuilding program, action could be taken to increase the minimum size within a fishing season. This would reduce landings while still allowing for harvest by HMS tournaments and recreational anglers. The minimum size limits under consideration would be within the range analyzed in Recreational option 8, and the size limit selected would be determined based on how much landings exceeded the rebuilding program. Option 9 is similar to current regulations at 50 CFR 635.20 (d)(5) where

minimum size limits for blue marlin, white marlin, and roundscale spearfish may be increased within a fishing season as total landings approach the 250 marlin annual landings limit. The purpose of this measure for shortfin mako sharks would give recreational fishermen extra incentive to practice catch-and-release of shortfin mako sharks, and ensure rebuilding targets are not exceeded.

However, without mandatory reporting of shortfin mako landings, such an action would likely not be taken any earlier than August as the first LPS harvest estimates are not available until late July. Analysis of shortfin mako shark catch in the LPS from 2012 to 2016 show that on average the majority (54 percent) of harvest occurs in the month of June with 23 percent of harvest occurring in July, and the remaining 23 percent being spread out from August to October (Table 18). As such, the first LPS monthly estimate for June should provide an accurate impression of the scale of harvest for the year.

Table 18. Mean shortfin mako catch, harvest, and release estimates by month from, 2012-2016. Source: Large Pelagic Survey.

Month	Monthly Catch (Number of sharks)	Percent of Total Catch	Monthly Harvest (Number of sharks)	Percent of Total Harvest	Monthly Releases (Number of sharks)	Percent of Total Releases
June	2,779	43.1%	1,306	53.7%	1,473	36.7%
July	2,165	33.6%	570	23.4%	1,596	39.7%
August	870	13.5%	302	12.4%	568	14.1%
September	428	6.6%	195	8.0%	233	5.8%
October	207	3.2%	60	2.5%	147	3.7%

Pros

- Would increase flexibility in the management of the recreational mako shark fishery.
- Would have fewer negative socioeconomic benefits than establishing a minimum size limit greater than 83 in FL.

Cons

- Could have minimal limited efficiency for management as the majority of shortfin mako shark harvest occurs within the first couple months of the recreational fishing season.
- Could cause confusion with HMS tournaments and permit holders if the minimum size for shortfin mako sharks changes inseason multiple times.
- Could cause socioeconomic impacts to Northeast HMS tournaments and permit holders if the minimum size limit increases to greater than 83 inches FL when the water warms in their fishing area and they are starting to target shortfin mako sharks.
- Increasing the minimum size limit at a size greater than 83 inches FL would impact HMS tournaments if participants cannot land this species.

- Could have negative economic impacts to late season tournaments if they have to reprint tournament brochures and regulations due to an inseason adjustment in the shortfin mako minimum size limit.

2.3 Monitoring Options

ICCAT Recommendation 17-08 suggests improving data collection for shortfin mako sharks. In the HMS commercial fisheries, data collection occurs through the electronic monitoring coverage on each pelagic longline vessel, logbook reporting, observers, and dealer reports of landings. However, NMFS could improve reporting by establishing mandatory reporting through the vessel monitoring system (VMS). In the HMS recreational fishery, data collection occurs through LPS or another recreational reporting database like Marine Recreational Information Program (MRIP) and state catch cards. Since the data collection in the recreational fishery is not as real-time, NMFS is considering some options to help improve the recreational estimates for shortfin mako sharks.

Option 1 – No action. Do not require reporting of shortfin mako sharks outside of current reporting systems.

Under Option 1, no additional reporting requirements would be placed on shortfin mako shark landings in HMS fisheries. HMS commercial fishermen would continue to report through vessel logbooks along with dealer reporting. HMS recreational anglers fishing from Maine to Virginia would continue to be required to report shortfin mako landings and released if intercepted by the LPS, and data would continue to be collected on shortfin mako shark catches by the Access Point Angler Intercept Survey (APAIS), which is part of MRIP. HMS Angling and HMS Charter/ Headboat permit holders would not be required to report their landings of shortfin mako sharks on non-tournament trips, and tournament operators would not be required to report landings associated with shark tournaments unless selected.

Pros

- Would not increase reporting burden on HMS permit holders and HMS tournaments.

Cons

- Logbook reporting could be delayed up to 30 days.
- Reports of shortfin mako sharks in the LPS and APAIS would become less frequent if the minimum size limit is increased and cause less precise estimates of recreational landings, which could increase uncertainty in stock assessments.

Option 2 – Establish mandatory reporting of shortfin mako catches (landings and discards) on VMS

Option 2 would require vessels with an Directed or Incidental shark LAP to report daily the number of shortfin mako sharks retained and discarded dead as well as fishing effort (number of sets and number of hooks). This option is intended to support the inseason monitoring of shortfin mako shark catches. Currently, commercial vessels are required to report shortfin mako shark catch in the HMS logbook. In addition, landings information is reported by dealers and observers record information on catches. However, more timely information on shortfin mako catches, as can be obtained through VMS reporting, could improve real-time inseason monitoring. There is a time lag between the time logbooks are submitted or the field information is reported by the observer during a fishing trip, the time the data are entered into a database, and the time the data are finalized (after a process of quality control) and available for use.

Reporting to NMFS would be similar to bluefin tuna caught on pelagic longline gear as required by regulations at 50 C.F.R. § 635.69(e)(4)(i). For example, each set, as instructed by NMFS, the date and area of the set, the number of hooks and the length of all shortfin mako sharks retained (actual), and the length of all shortfin mako sharks discarded dead or alive (approximate), would need to be reported within 12 hours of completing each pelagic longline haulback via the VMS unit.

Under current HMS regulations, pelagic longline vessels and purse seine vessels are required to have NMFS-approved enhanced mobile transmitting unit (E-MTU) VMS installed, as are vessels with a Directed shark LAP and bottom longline or gillnet gear on board as described at §635.69(a). A requirement to report shortfin mako shark catches on VMS would be an additional reporting requirement for those vessels on their existing systems, while for other commercial vessels the requirement would mean installing VMS to report shortfin mako catches. Eligible commercial vessel owners could receive reimbursement for the cost of purchasing a VMS, contingent on the availability of funds.

Pros

- Supports timely inseason monitoring of catch, which would support implementation of certain other management options (e.g., a shortfin mako shark quota).
- Provides another source of data to verify data from other sources: electronic monitoring, observers, logbooks, or dealers.

Cons

- Creates an additional reporting requirement for vessels with Directed or Incidental shark LAPs.
- Creates a requirement for Directed or Incidental shark LAP vessels who fish commercially with handgear to install VMS.
- May not be necessary given existing reporting requirements (i.e., logbooks, eDealer, electronic monitoring), depending on what other management options VMS reporting would support.

Option 3 – Implement mandatory reporting of shortfin mako shark landings and discards in registered HMS tournaments (ATR)

Existing regulations at 50 CFR 635.5(d) authorize NMFS to select tournaments for reporting. Currently, only billfish and swordfish tournaments are selected for reporting. Under Option 3, NMFS would begin selecting shark tournaments for mandatory reporting of shortfin mako shark landings and discards in registered HMS tournaments; between 2012-2016 an average of 73 tournaments targeted sharks (Table 13). An Atlantic HMS tournament is any fishing competition involving Atlantic HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. Atlantic HMS tournaments are conducted from ports along the U.S. Atlantic coast, Gulf of Mexico, and U.S. Caribbean. Atlantic HMS tournaments vary in size. They may range from relatively small "members-only" club events with as few as ten participating boats (40 – 60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000 – 1,500 anglers).

Under current HMS regulations, participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS. Often, there is a primary species targeted in the tournament, and other species are caught for entry in separate categories. Figure 5 gives a breakdown of the number of tournaments in each state that registered for billfish, sharks, swordfish, or tuna species in 2016. Total numbers of tournaments divided by state for HMS species in 2016 were 182 billfish (top left), 76 shark (top right), 71 swordfish (bottom left), and 184 tuna (bottom right) in Figure 5.

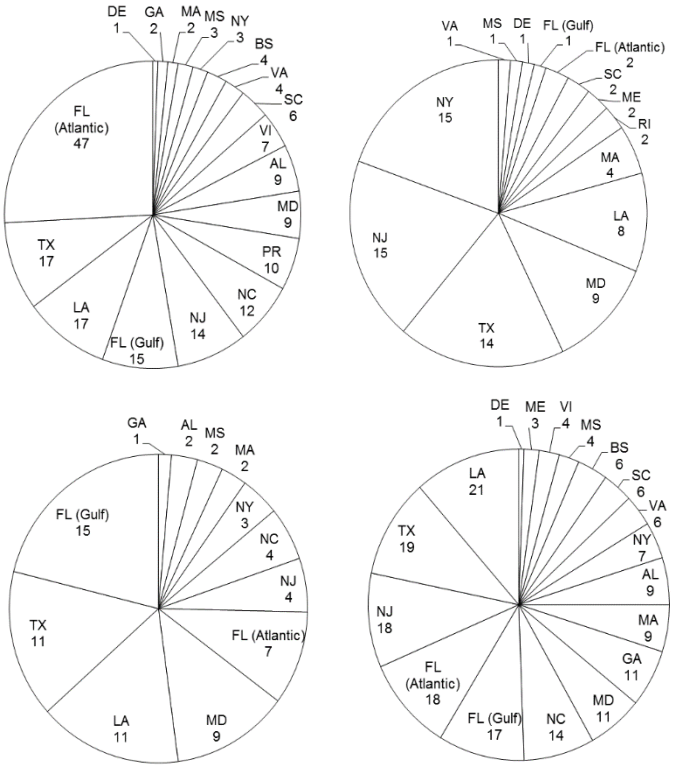

Figure 5. Number of Tournaments in each State that Registered for Billfish (Top Left), Shark (Top Right), Swordfish (Bottom Left), or Tuna (Bottom Right) Species in 2016.

Table 13 gives the breakdown of total number of HMS tournaments, the number of HMS tournaments with shortfin mako sharks in the title or otherwise mentioned by name, the number of HMS tournaments targeting 'Pelagic Sharks/All Shark' tournaments, and the number of HMS tournaments with pelagic sharks Category by Area. From 2012-2016, there were 250 HMS tournaments per year of which 10 specifically mentioned targeting shortfin mako sharks, and 73 reported targeting pelagic sharks which includes shortfin mako sharks.

Within this option, operators of tournaments targeting sharks (Table 13) could be selected by NMFS for reporting, in which case a record of tournament catch and effort would be submitted to NMFS within seven days of the conclusion of the tournament. In 2016, 76 shark tournaments (Table 13) occurred with greatest landing recorded for June, July, and August. Regional landings were greatest for Northeast Atlantic (88 percent), followed by Southeast Atlantic (67 percent), and Gulf of Mexico (70 percent) (Figure 6).

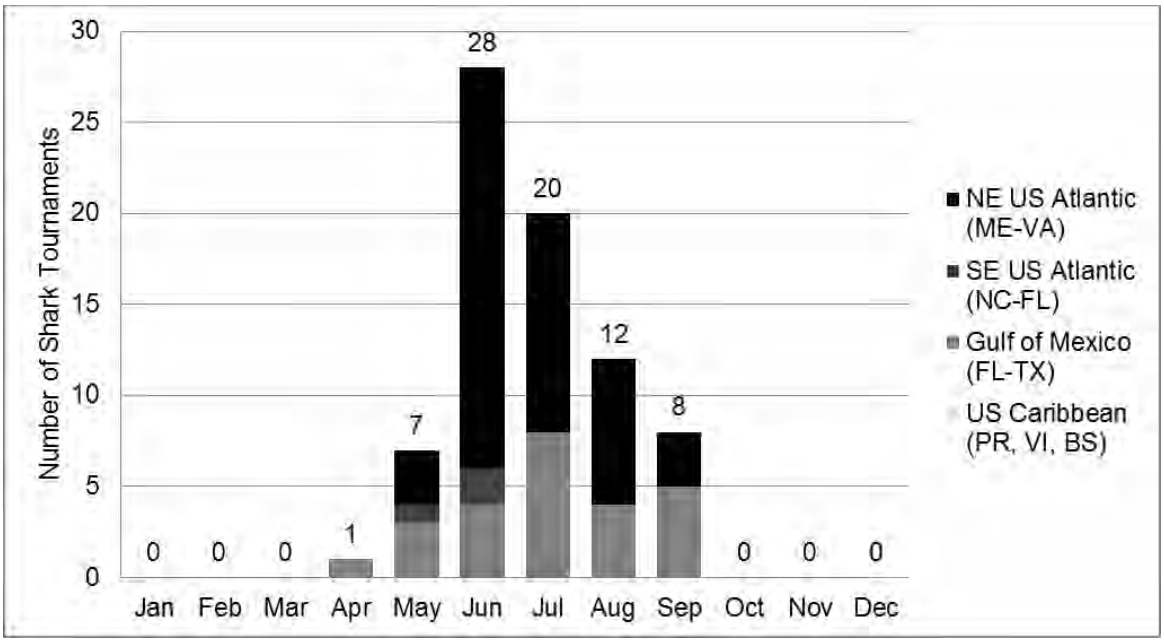

Figure 6. Regional distribution of tournaments that select sharks for 2016 time frame.

Table 19 provides the total numbers of HMS tournaments in 2016 that registered to award points or prizes for the catch or landing of each HMS. Marlin, sailfish, and yellowfin tuna continue to be the most sought after species.

Table 19. Number of Atlantic HMS Tournaments per Species in 2016.

Species		2016
Billfishes	Blue marlin	157
	White marlin	143
	Longbill spearfish	55
	Roundscale spearfish	45
	Sailfish	254
Swordfish		71
Tunas	Bluefin tuna	98
	Bigeye tuna	78
	Albacore tuna	41
	Yellowfin tuna	171
	Skipjack tuna	41
Sharks	Smoothhound	0
	Small coastal sharks	12
	Large Coastal Sharks	27
	Pelagic sharks	76

In Table 20, NMFS shows the number of billfish and swordfish tournaments (all of which are selected for reporting) and the additional number of tournaments that would be selected if shark tournaments are selected for reporting, an increase of 20 percent, based on data from 2016.

Table 20. Analysis of 2016 data showing number of tournaments reporting and the additional number of tournaments that would be required to report if tuna and or sharks are selected for reporting. Source: Atlantic Tournament Registration and Reporting.

	Total Numbers	Percentages
Registered HMS Tournaments	268	-
Billfish and Swordfish Tournaments	189	70%
Tournaments Targeting Sharks	76	28%
Shark Tournaments that Overlap With Billfish and Swordfish Tournaments	38	20%
New Tournaments to Report	38	20%

Pros

- Provides a census of shark tournaments through which accurate records of landing may be obtained.
- The additional information will help improve data that the United States reports to ICCAT.

Cons

- There would be additional burden on tournament operator(s) to collect information on and report shortfin mako shark landings.
- Participants of the tournament would have the added of tracking all interactions of shortfin mako sharks.

Option 4 – Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports)

Under Option 4, NMFS would implement mandatory reporting of all recreational interactions (landed and discarded) of shortfin mako sharks. Under the larger minimum size limit implemented in the emergency rule or being considered in this action, the number of shortfin mako shark landings would decrease significantly. This would also reduce the number of observations of shortfin mako sharks in LPS and other MRIP surveys, resulting in recreational landings estimates that are much more variable and uncertain with significantly higher percent standard errors (PSE). This increased variability in the data would reduce NMFS' ability to effectively monitor the recreational harvest of the stock using traditional intercept surveys alone.

Currently, HMS Angling and Charter/Headboat permit holders are required to report each individual landing of bluefin tuna, billfish, and swordfish within 24 hours to facilitate quota monitoring. Atlantic Tunas General and Harpoon permit holders are also required to make these reports for bluefin tuna. Shark landings have been excluded from this mandatory reporting requirement with the exception of the Maryland and North Carolina Catch Card programs. NMFS has maintained a shortfin mako shark reporting app as an educational tool to encourage the practice of catch-and-release. Additionally, the potential burden associated with mandatory

landings reports for shortfin mako sharks would be significantly reduced under the increased minimum size limits being considered in this rulemaking (Table 21). As such, NMFS is considering expanding mandatory landings reports to include shortfin mako sharks.

Table 21. Estimated reporting burden for shortfin mako shark landings reports under minimum size limits ranging from 54 to 108 inches FL based on average landings from 2012-2016 and a burden estimate of 5 minutes per report. Source: Large Pelagic Survey

Minimum Size Limit	Estimated Number of Responses	Estimated Burden Hours
54 inches FL	2,433	203
72 inches FL	1,317	110
83 inches FL	382	32
90 inches FL	147	13
102 inches FL	23	2
108 inches FL	6	1

HMS permit holders would have a variety of options for reporting shortfin mako shark landings including a phone-in system, internet website, and/or a smartphone app. However, shortfin mako sharks landed in Maryland are already required to be reported through the state reporting stations where anglers submit a state landings report (catch card) and obtain a fish tag. The state reports these landings to NMFS on a bi-weekly (during the bluefin tuna season, June-October) basis, and submits final, complete, annual summary reports at the end of the year. The State of North Carolina has a similar HMS Catch Card program that allows for voluntary reporting of shark landings, but currently does not require them. If mandatory reporting is adopted, anglers in North Carolina could be required to report their shortfin mako shark landings through either the NMFS reporting options, or the State of North Carolina HMS Catch Card reporting program.

Pros

- Would increase data collection on the harvest of the species to support management, and meet reporting requirements for ICCAT.
- Mandatory reporting of shortfin mako landings would provide an alternative source of shortfin mako harvest data from the LPS and MRIP where PSE estimates could become less precise due to less frequent observations in the LPS and MRIP if the minimum size limit is increased to 83 inches FL or greater.

Cons

- Would result in additional reporting burden for HMS anglers.
- Would entail costs for initial setup and monitoring along with some enforcement concerns as recreational landings do not have matching dealer reports to verify compliance with the reporting requirement.
- Would require recreational fishermen to be able to accurately identify shortfin mako sharks from other shark species that would not be required to be reported.

2.4 Rebuilding Program

Since the North Atlantic shortfin mako sharks have been declared to be overfished and subject to overfishing, NMFS must take action to address overfishing in the fishery and to implement conservation and management measures to rebuild overfished stocks within 2 years of making this determination domestically. The United States accounts for about 11 percent of the recent total shortfin mako shark mortality. Thus, NMFS is considering options to address shortfin mako shark overfishing and potentially implement a rebuilding plan domestically or work with ICCAT to implement a rebuilding program.

Option 1 – No action. Do not establish a rebuilding plan for shortfin mako sharks.

Under Option 1, NMFS would not establish a rebuilding plan for shortfin mako sharks and the stock would continue to be overfished with overfishing occurring. However, NMFS could still implement management measure in the HMS recreational and commercial fisheries, consistent with the ICCAT Recommendation.

Pros

- Short-term management measures developed for shortfin mako sharks would assist in avoiding overfishing of the species within Federal waters of the United States.
- No additional management measures beyond the ICCAT Recommendation.

Cons

- Under this option, there is a higher probability that Atlantic shortfin mako sharks would continue to experiencing overfishing.
- If overfishing continues, future ICCAT recommendations could require more severe reductions and cause socioeconomic impacts to HMS permit holders.
- The United States would not meet its obligation under ATCA.

Option 2 – Establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT)

Under Option 2, NMFS would establish a domestic rebuilding plan independent of ICCAT. This option would allow the United States to develop a rebuilding plan domestically to avoid overfishing of shortfin mako sharks in U.S. Federal waters. This option would not feature international cooperation, thus allowing the stock to continue to be overfished, with overfishing occurring.

Pros

- Rebuilding plan would just focus on the overfishing of shortfin mako sharks domestically.
- No additional management measures beyond the ICCAT Recommendation.

Cons

- Would not address the overfishing and overfished status of North Atlantic shortfin mako shark stock at the international level where approximately 90 percent of mortality is occurring.
- The United States would not meet its obligation under ATCA.

Option 3 – Establish the foundation for developing an international rebuilding program for shortfin mako sharks

Under Option 3, NMFS would take action at the international level through ICCAT, the relevant regional fishery management organization, to address overfishing of and rebuild shortfin mako sharks. This rebuilding program would encompass the objectives set forth by ICCAT based on new scientific advice from the SCRS. ICCAT is planning to establish a rebuilding program for shortfin mako sharks in 2019. Under this option, NMFS would continue to implement new management measures for North Atlantic shortfin mako based on the recommendations from ICCAT. Any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically. This option would allow the United States and other international partners to work together to develop an international rebuilding program with a high probability of avoiding overfishing of shortfin mako sharks and rebuilding the stock to within a timeframe that takes into account the biology of the stock.

Pros

- Would work with ICCAT to establish an international rebuilding plan that would consider the impacts to HMS fishermen.
- Would address overfishing at the international level where approximately 90 percent of the mortality occurs and would have ecological benefits for the stock.

Cons

- Could cause socioeconomic impacts to HMS permit holders if the new scientific advice from the SCRS lead to more restrictive management measures.
- If the United States does not implement a rebuilding program, this could cause negative ecological impacts to the North Atlantic shortfin mako stock. International cooperation is needed by all parties to rebuild the stock, which is overfished and experiencing overfishing.

2.5 References

Bishop, S.D.H.; M.P. Francis; C. Duffy and J.C. Montgomery. 2006. Age, growth, maturity, longevity and natural mortality of the shortfin mako shark (*Isurus oxyrinchus*) in New Zealand waters. Marine and Freshwater Research. 57:143-154.

Byrne, M.E., E. Cortes, J.J. Vaudo, G.C.M. Harvey, M. Sampson, B.M. Wetherbee, and M. Shivji. 2017. Satellite telemetry reveals higher fishing mortality rates than previously estimated, suggesting overfishing of an apex marine predator. Proceedings of the Royal Society B 284: 20170658.

Cailliet, G.M., L.K. Martin, J.T. Harvey, D. Kusher, and B.A. Welden. 1983. Preliminary studies on the age and growth of blue, *Prionace glauca*, common thresher, *Alopias vulpinus*, and shortfin mako, *Isurus oxyrhinchus*, sharks from California waters. NOAA Technical Report NMFS 8. U.S. Dept. Comm., Washington DC: 179-188.

Cailliet, G.F. and H.F. Mollet. 1997. Preliminary demographic analysis of the shortfin mako, *Isurus oxyrinchus*. Abstract. 77th Annual Meeting of the American Society of Ichthyologists and Herpetologists.

Campana, S.E., L.J. Natanson, and S. Mykelvoll. 2002. Bomb dating and age determination of large pelagic sharks. Canadian Journal of Fisheries and Aquatic Sciences 59: 450-455.

Campana, S.E., L. Marks, W. Joyce. 2005. The biology and fishery of shortfin mako sharks (*Isurus oxyrhinchus*) in Atlantic Canadian waters. Fisheries Research 73:341-352. doi:10.1016/j.fishres.2005.01.009

Casey, J.G., and N.E. Kohler. 1992. Tagging studies on the shortfin mako shark (*Isurus oxyrinchus*) in the western North Atlantic. Aust. J. Mar. Freshwater Res. 43: 45-60.

Castro, J.I. 1983. The Sharks of North American Waters. Texas A&M University Press, College Station. 180 pp.

Conrath, C.L. and J.A. Musick. 2002. Reproductive biology of the smooth dogfish, Mustelus canis, in the northwest Atlantic Ocean. Environmental Biology of Fishes 64: 367-377.

Gilmore, R.G. 1993. Reproductive biology of Lamnoid sharks. Environ. Biol. Fishes 38:95-114.

Guitart Manday, D. 1975. Las pesquerias pelagico- oceanicas de corto radio de accion en la region noroccidental de Cuba. Academia de Ciencias de Cuba, Instituto de Oceanologia. Serie Oceanologia 31. 26pp.

Heist, E.J., J.A. Musick and J.E. Graves. 1996. Genetic population structure of the shortfin mako (*Isurus oxyrinchus*) inferred from restriction fragment length polymorphism analysis of mitochondrial DNA. Can. J. Fish. Aquat. Sci. 53: 583-588.

ICCAT. 2006-2016. ICCAT Manual. International Commission for the Conservation of Atlantic Tuna. In: ICCAT Publications [on-line]. Updated 2016. [Cited 01/27/]. http://www.iccat.int/en/ICCATManual.asp, ISBN (Electronic Edition): 978-92-990055-0-7

Jensen C., T. Thorpe, M. Moser, J.J. Francesconi, G.A. Hopkins, D. Beresoff, D. 2002. Shark Nursery Areas in North Carolina State Waters. Pgs 61-73 *in* Shark nursery grounds of the Gulf of Mexico and the east coast waters of the United States: an overview. McCandless C.T., H.L. Pratt, Jr., and, N.E Kohler, (eds). An internal report to NOAA's Highly Migratory Species. NOAA Fisheries Narragansett Lab, 28 Tarzwell Drive, Narragansett, Rhode Island 02882, USA.

Jones LM, Driggers WB, Hannan KM, Hoffmayer ER, Jones CM. 2014. Identification, life history and distribution of *Mustelus canis, M. norrisi,* and *M. sinusmexicanus* in the northern Gulf of Mexico. SEDAR Data Workshop, SEDAR 39-DW-22. http://sedarweb.org/docs/wpapers/S39_DW_22_jonesetal_final.pdf

Kohler, N.E., P.A. Turner, J.J. Hoey, L.J. Natanson, and R. Briggs. 2002. Tag and recapture data for three pelagic shark species: Blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrinchus*), and porbeagle (*Lamna nasus*) in the North Atlantic Ocean. Col. Vol. Sci. Pap. ICCAT 54(4): 1231-1260.

Kohler NE, Turner PA, Pezzullo M, McCandless CT. 2014. Mark/Recapture Data for the Smooth Dogfish, Mustelus canis, in the Western North Atlantic from the NMFS Cooperative Shark Tagging Program. 2014 SEDAR Data Workshop Document, SEDAR39-DW-20.

Lessa, R., F. Santana, R. Menni, and Z. Almeida. 1999. Population structure and reproductive biology of the smalltail shark (*Carcharhinus porosus*) off Maranhao (Brazil). Marine and Freshwater Research 50: 383-388.

Maia, A.; N. Queiroz; J.P. Correia; H. Cabral. 2007a. Food habits of the shortfin mako, Isurus oxyrinchus, off the southwest coast of Potugal. Environ. Biol. Fish. 77:157-167.

Maia, A.; N. Queiroz; H.N. Cabral; A.M. Santos; and J.P. Correia. 2007b. Reproductive biology and population dynamics of the shortfin mako, *Isurus oxyrinchus* Rafinesque, 1810, off the southwest Portuguese coast, eastern North Atlantic. Journal of Applied Ichthyology 23:246-251.

MacNeil, M.A., G.B. Skomal, and A.T. Fisk. 2005. Stable isotopes from multiple tissues reveal diet switching in sharks. Marine Ecology Progress Series 302: 199-206.

Mollet H.F., G. Cliff, H.L. Pratt Jr, J.D. Stevens. 2000. Reproductive biology of the female shortfin mako, *Isurus oxyrinchus* Rafinesque, 1810, with comments on the embryonic development of lamnoids. Fishery Bulletin 98(2):299-318.

Moreno, J.A., Parajua, J.I., and Moron, J. 1989. Biologia reproductiva y fenologia de Alopias vulpinus (Bonnaterre, 1788) (Squaliformes: Alopiidae) en el Atlantico nor-oriental y Mediterraneo occidental. Scientia Marina (Barcelona) 53(1):37-46.

Moreno, J.A., and J. Morón. 1992. Reproductive biology of the bigeye thresher shark, *Alopias superciliosus* (Lowe 1839). Aust. J. Mar. Freshwater Res. 43: 77-86.

Natanson, L.J., N.E. Kohler, D. Ardizzone, G.M. Cailliet, S.P. Wintner, and H.F. Mollet. 2006. Validated age and growth estimates for the shortfin mako, *Isurus oxyrinchus*, in the North Atlantic Ocean. Environmental Biology of Fishes 77(3-4): 367-383.

NMFS. 2017. Final Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat (and Environmental Assessment). Atlantic Highly Migratory Species Management Division, National Marine Fisheries Service, Bethesda, MD.

Pratt, Jr., H.L. 1979. Reproduction in the blue shark, Prionace glauca. Fishery Bulletin 77(2):445-470.

Pratt, H.L. and J.G. Casey. 1983. Age and growth of the shortfin mako, Isurus oxyrinchus, using four methods. Canadian Journal of Fisheries and Aquatic Sciences 40(11): 1944-1957.

Schrey, A.W., Heist, E.J., 2003. Microsatellite analysis of population structure in the shortfin mako (Isurus oxyrinchus). Can. J. Fish. Aquat. Sci. 60, 670–675.

SCRS. 2012. 2012 Shortfin Mako Stock Assessment and Ecological Risk Assessment Meeting. June 11-18, 2017. Olhao, Portugal. https://www.iccat.int/Documents/Meetings/Docs/2012_SHK_ASS_ENG.pdf

SCRS. 2017. Report of the 2017 ICCAT Shortfin Mako Assessment Meeting. June 12-16, 2017. Madrid, Spain. https://www.iccat.int/Documents/Meetings/Docs/2017_SMA_ASS_REP_ENG.pdf

SEDAR. 2015. SEDAR 39 Stock Assessment Report: HMS Atlantic Smooth Dogfish Shark. Southeast Data Assessment & Review, Charleston SC. http://sedarweb.org/docs/sar/S39_Atl_smooth_dog_SAR.pdf

Seki, T., Taniuchi, T., Nakano, H., and Shimizu, M. 1998. Age, growth and reproduction of the oceanic whitetip shark from the Pacific Ocean. Fisheries Science 64(1):14-20

Semba, Y., I. Aoki, and K. Yokawa. (2011). Size at maturity and reproductive traits of shortfin mako, Isurus oxyrinchus, in the western and central North Pacific. Mar. Fresh. Res., 62 (1): 20-29.

Silva, A.A., Silva, H.M. and Erzini, K. 1996. Some results on the biology of the blue shark, Prionace glauca, in the North Atlantic based on data form a research cruise of the R/V Arquipelago in Azorean waters: a summary paper, 9 pp. Universidade dos Azores, Horta, Azores, Portugal.

Skomal, G.B. and L.J. Natanson. 2003. Age and growth of the blue shark (Prionace glauca) in the North Atlantic Ocean. Fish. Bull. 101:627-639.

Springer, S. and R.A. Waller. 1969. *Hexanchus vitulus*, a new sixgill shark from the Bahamas. Bull. Mar. Sci. 19: 159-174.

Stevens, J.D. 1983. Observations on reproduction in the shortfin mako Isurus oxyrinchus. Copeia, No. 1; pp 126-130.

Stevens, J.D. and K.J. Mcloughlin. 1991. Distribution, size, and sex composition, reproductive biology and diet of sharks from northern Australia. Austr. J. Mar. Freshwater Res., 42: 151-99.

Stillwell, C.E. and J.G. Casey. 1976. Observations on the bigeye thresher shark, *Alopias superciliosus*, in the western North Atlantic. Fish. Bull. 74:221-225.

Vaudo J.J., M.E. Byrne, B.M. Wetherbee, G.M. Harvey, M.S. Shivji. 2017. Long-term satellite tracking reveals region-specific movements of a large pelagic predator, the shortfin mako shark, in the western North Atlantic Ocean. J Appl Ecol 54(6) 1765-1775 doi: 10.1111/1365-2664.12852

Atlantic States Marine Fisheries Commission

Coastal Sharks Technical Committee Call Summary

Wednesday March 28, 2018

Attendees: Lisa Hollensead (NC), Brent Winner (FL), Wilson Laney (USFWS), Chris Scott (NY), Angel Willey (MD), Carolyn Belcher (GA), Eric Schneider (RI), Karyl Brewster-Geisz (NOAA HMS), Greg Hinks (NJ), Greg Skomal (MA), Julie Neer (SAFMC), Scott Newlin (DE), Matt Gates (CT)
Staff: Kirby Rootes-Murdy

1) **Welcome/Review draft agenda** *(K. Rootes-Murdy*)

   The group nominated Bryan Frazier to become TC Chair and Angel Willey to become TC Vice Chair.

2) **Presentation on Atlantic shortfin mako shark stock assessment and emergency rule (***K. Brewster-Geisz*)

   Karyl Brewster-Geiz presented to the TC a summary of the Atlantic shortfin mako stock assessment and the recently implemented emergency management measures in response to the assessment. At the November 2017 ICCAT Meeting, the recent stock assessment on Atlantic shortfin mako was presented, with a finding that the resource is overfished and overfishing is occurring. The assessment was completed in Summer 2017, and included a new modelling approach (stock synthesis), longer time series of catch data (1950-2015), sex-specific biological parameters, updated length composition information, and new satellite tagging data. The new reference points were in the following ranges: B_{2015}/B_{MSY} = 0.57-0.85 and F_{2015}/F_{MSY} = 1.93-4.38. To address the new stock assessment status, it was determined at the ICCAT Meeting that reductions of approximately 72-79% from current landings levels are needed to prevent further declines in the population and a reduction to 0 metric tons landings are needed to rebuild the resource by 2040. To address the needed reductions in landings, NOAA implemented earlier in March the following measures: an increase in the minimum size limit (fork length) for the recreational fishery from 54" to 83" and a prohibition of landings in the commercial fishery for all gear types with the exception of the pelagic longline fleet. For the pelagic longline vessels that have an HMS permit, electronic monitoring devices are required in order to retain sharks that are dead at haul back; any live sharks must be released. These emergency measures have been implemented on an interim basis through August 2018 and may be extended for up to 6 months at that time. At the next ICCAT Meeting in November 2018 an evaluation of reduction in landings will be evaluated for 2018 and different measures may be recommended to be implemented for member countries; the US would be bound to implement new

recommended measures into place for HMS permit holders. At the same time, NOAA HMS has begun a scoping process for Amendment 11 that puts forth a range of alternatives to address reducing Atlantic shortfin mako fishing mortality in US federal waters.

The TC discussed the emergency measures and how such measures could be implemented in state waters; states can individually move forward with implementing the measures if they chose, but to be compelled to would likely require an Addendum to the FMP. The Board could also take emergency action to compel the states to implement the emergency rule measures; if this approach were to be taken, there are a number of procedural steps including holding at least 4 public hearings that would be required. Next the group discussed how many landings come from state waters relative to landings from federal waters; many were of the opinion that Atlantic shortfin mako commercial landings from state waters constitute a small percentage of overall landings, and that similarly most recreational catch and harvest occurs in federal waters due to the species preference for open ocean habitat/pelagic habits.

The TC was tasked by the Board Chair to review the stock assessment and consider the potential conservation benefit of implementing the emergency measures in state waters. Taking into consideration the likely very low landings levels, the TC indicated that implementing the emergency measures in state waters would likely not have significant impact as most landings are coming from federal waters. Additionally, the timing of the emergency measures- (that they will be up for potential renewal in less than 6 months and may change between now and end of year), would present challenges if the states need to change measures more than once before the end of the year. There were concerns raised by TC members that in not adopting the emergency rule measures in state waters, inconsistency in regulations may create some enforcement challenges for state permitted recreational anglers & for-hire vessels. Many indicated that it would better to provide comments in the scoping process for Amendment 11 and recommend that states individually implement the emergency measures if possible to have more consistency in measures between state and federal waters.

3) **Presentation on sandbar shark stock assessment** (*K. Brewster-Geisz)*

Next Karyl presented a summary of the sandbar shark stock assessment results. A new modeling approach was used (stock synthesis 3) that included replication of the previous assessment (SEDAR 21) that matched the biomass trend over the last 2 decades; the stock status is overfished but overfishing isn't occurring; and that based on the biomass projection the Total Allocation Catch could be increased by approximately 12%. While the Assessment passed peer-review it has not yet been officially adopted yet by NOAA HMS for management use.

The TC was tasked by the Board Chair to review the recent stock assessment and provide recommendation on potential management actions. The Sandbar Shark fishery is research take only; given that there is not a commercial fishery and NOAA HMS has not taken steps to adjust the management program for Sandbar sharks at this time, the TC had no formal recommendations to the Board other than to maintain status quo measures.

4) **Update on Oceanic Whitetip Sharks ESA Status** *(K. Brewster-Geisz)*

Next, the TC was presented information on the new Endangered Species Act (ESA) status (Threatened) for Oceanic Whitetip Sharks. This status change was due to a status review that was initiated by Defenders of Wildlife to list the global species as threatened or endangered under the ESA. The status review took into account life history parameters which include being long lived (up to 20 years), late maturity (6-7 years for both sexes in the Atlantic DPS), lengthy gestation (9-12 months) and low fecundity (5-6 pups with pupping every other year). Additionally the status review found that within the global commercial fishery that fishing mortality is likely too high and that there are inadequate regulations in other parts of the world; this combined with the market demand for shark fins has increased illegal, unreported, and unregulated (IUU) fishing and trafficking. While NOAA has changed the status to threatened under the ESA, there are additional analyses that will need to take place, namely section 7 consultations for relevant fisheries that may interact with the species. These consultations can take time. Such consultation is already underway for NOAA HMS fisheries.

The TC was tasked by the Board Chair to review the status change and provide the Board with any recommendation on potential management responses. The TC noted that the species is generally not found in state waters due to its preferred habitat of Open Ocean in water depths of greater than 184 meters. One TC member noted that most of the ASMFC state are north of the known range (Oceanic whitetip sharks are found worldwide in warm tropical and subtropical waters between 20° North and 20° South latitude, but can be found up to about 30° North and South latitude during seasonal movements to higher latitudes in the summer months[1]). Given there was no proposed management changes at this time by NOAA HMS, the TC had no formal recommendations to the Board other than to maintain status quo measures but to consider moving the species to the prohibited species list once consultations are completed.

[1] 'Oceanic Whitetip Sharks. http://www.nmfs.noaa.gov/pr/species/fish/oceanic-whitetip-shark.html#description

SEDAR

Southeast Data, Assessment, and Review

SEDAR 54

Stock Assessment Report

HMS Sandbar Shark

October 2017

SEDAR
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

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SEDAR

Southeast Data, Assessment, and Review

SEDAR 54

HMS Sandbar Sharks

SECTION I: Introduction

SEDAR
4055 Faber Place Drive, Suite 201
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1. SEDAR PROCESS DESCRIPTION

SouthEast Data, Assessment, and Review (**SEDAR**) is a cooperative Fishery Management Council process initiated in 2002 to improve the quality and reliability of fishery stock assessments in the South Atlantic, Gulf of Mexico, and US Caribbean. SEDAR seeks improvements in the scientific quality of stock assessments and the relevance of information available to address fishery management issues. SEDAR emphasizes constituent and stakeholder participation in assessment development, transparency in the assessment process, and a rigorous and independent scientific review of completed stock assessments.

SEDAR is managed by the Caribbean, Gulf of Mexico, and South Atlantic Regional Fishery Management Councils in coordination with NOAA Fisheries and the Atlantic and Gulf States Marine Fisheries Commissions. Oversight is provided by a Steering Committee composed of NOAA Fisheries representatives: Southeast Fisheries Science Center Director and the Southeast Regional Administrator; Regional Council representatives: Executive Directors and Chairs of the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils; and Interstate Commission representatives: Executive Directors of the Atlantic States and Gulf States Marine Fisheries Commissions.

SEDAR is organized around two workshops and a series of webinars. First is the Data Workshop, during which fisheries, monitoring, and life history data are reviewed and compiled. The second stage is the Assessment Process, which is conducted via a series of webinars, during which assessment models are developed and population parameters are estimated using the information provided from the Data Workshop. Third and final is the Review Workshop, during which independent experts review the input data, assessment methods, and assessment products. The completed assessment, including the reports of all 3 workshops and all supporting documentation, is then forwarded to the Council SSC for certification as 'appropriate for management' and development of specific management recommendations.

SEDAR workshops are public meetings organized by SEDAR staff and the lead Cooperator. Workshop participants are drawn from state and federal agencies, non-government organizations, Council members, Council advisors, and the fishing industry with a goal of including a broad range of disciplines and perspectives. All participants are expected to contribute to the process by preparing working papers, contributing, providing assessment analyses, and completing the workshop report.

SEDAR Review Workshop Panels consist of a chair, 3 reviewers appointed by the Center for Independent Experts (CIE), and three reviewers appointed from the SSC of the Council having jurisdiction over the stocks being assessed. The Review Workshop Chair is appointed by the Council from their SSC. Participating councils may appoint additional representatives of their SSC, Advisory, and other panels as observers.

2. MANAGEMENT OVERVIEW

A SUMMARY OF THE MANAGEMENT OF ATLANTIC LARGE COASTAL SHARKS

Presented to the 2017 Data Workshop of the Sandbar Stock Assessment

2.1 Fishery Management Plans and Amendments

Given the interrelated nature of the shark fisheries, the following section provides an overview of shark management primarily since 1993 through 2016 for sandbar sharks. The following summary, to the extent possible, focuses only on those management actions that likely affect sandbar sharks. The management measures implemented under fishery management plans and amendments are also summarized in Table 1.

The U.S. Atlantic shark fisheries developed rapidly in the late 1970s due to increased demand for their meat, fins, and cartilage worldwide. At the time, sharks were perceived to be underutilized as a fishery resource. The high commercial value of shark fins led to the controversial practice of "finning," or removing the valuable fins from sharks and discarding the carcasses. Growing demand for shark products encouraged expansion of the commercial fishery throughout the late 1970s and the 1980s. Tuna and swordfish vessels began to retain a greater proportion of their shark incidental catch and some directed fishery effort expanded as well.

Preliminary Fishery Management Plan (PMP) for Atlantic Billfish and Sharks

In January 1978, NMFS (National Marine Fisheries Service) published the Preliminary Fishery Management Plan (PMP) for Atlantic Billfish and Sharks (43 FR 3818), which was supported by an Environmental Impact Statement (EIS) (42 FR 57716). This PMP was a Secretarial effort. The management measures contained in the plan were designed to:

1. Minimize conflict between domestic and foreign users of billfish and shark resources;
2. Encourage development of an international management regime; and
3. Maintain availability of billfishes and sharks to the expanding U.S. fisheries.

Primary shark management measures in the Atlantic Billfish and Shark PMP included:

- Mandatory data reporting requirements for foreign vessels;
- A hard cap on the catch of sharks by foreign vessels, which when achieved would prohibit further landings of sharks by foreign vessels;
- Permit requirements for foreign vessels to fish in the Fishery Conservation Zone (FCZ) of the United States;
- Radio checks by foreign vessels upon entering and leaving the FCZ;

- Boarding and inspection privileges for U.S. observers; and
- Prohibition on intentional discarding of fishing gears by foreign fishing vessels within the FCZ that may pose environmental or navigational hazards.

In the 1980s, the Regional Fishery Management Councils were responsible for the management of Atlantic highly migratory species (HMS), including sharks. Thus, in 1985 and 1988, the five Councils finalized joint FMPs for swordfish and billfish, respectively. As catches accelerated through the 1980s, shark stocks started to show signs of decline. Peak commercial landings of large coastal and pelagic sharks were reported in 1989. In 1989, the five Atlantic Fishery Management Councils asked the Secretary of Commerce (Secretary) to develop a Shark Fishery Management Plan (FMP). The Councils were concerned about the late maturity and low fecundity of sharks, the increase in fishing mortality, and the possibility of the resource being overfished. The Councils requested that the FMP cap commercial fishing effort, establish a recreational bag limit, prohibit finning, and begin a data collection system.

On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990 (Pub. L. 101-627). This law amended the Magnuson Fishery Conservation and Management Act (later renamed the Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act) and gave the Secretary the authority (effective January 1, 1992) to manage HMS in the exclusive economic zone (EEZ) of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea under authority of the Magnuson-Stevens Act (16 U.S.C. §1811). This law also transferred from the Fishery Management Councils to the Secretary, effective November 28, 1990, the management authority for HMS in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. §1854(f)(3)). At this time, the Secretary delegated authority to manage Atlantic HMS to NMFS.

1993 Fishery Management Plan for Sharks of the Atlantic Ocean (1993 FMP)

In 1993, the Secretary of Commerce, through NMFS, implemented the FMP for Sharks of the Atlantic Ocean. The management measures in the 1993 FMP included:

- Establishing a fishery management unit (FMU) consisting of 39 frequently caught species of Atlantic sharks, separated into three groups for assessment and regulatory purposes (Large Coastal Sharks (LCS), Small Coastal Sharks (SCS), and pelagic sharks)[1];
- Establishing calendar year commercial quotas for the LCS and pelagic sharks and dividing the annual quota into two equal half-year quotas that applied to the following two fishing periods – January 1 through June 30 and July 1 through December 31;
- Establishing a recreational trip limit of four sharks per vessel for LCS or pelagic shark species groups;

[1] At that time, sandbar sharks were managed within the large coastal shark complex.

- Requiring that all sharks not taken as part of a commercial or recreational fishery be released uninjured;
- Establishing a framework procedure for adjusting commercial quotas, recreational bag limits, species size limits, management unit, fishing year, species groups, estimates of maximum sustainable yield (MSY), and permitting and reporting requirements;
- Prohibiting finning by requiring that the ratio between wet fins/dressed carcass weight not exceed five percent;
- Prohibiting the sale by recreational fishermen of sharks or shark products caught in the Economic Exclusive Zone (EEZ);
- Requiring annual commercial permits for fishermen who harvest and sell shark products (meat products and fins);
- Establishing a permit eligibility requirement that the owner or operator (including charter vessel and headboat owners/operators who intend to sell their catch) must show proof that at least 50 percent of earned income has been derived from the sale of the fish or fish products or charter vessel and headboat operations or at least $20,000 from the sale of fish during one of three years preceding the permit request;
- Requiring trip reports by permitted fishermen and persons conducting shark tournaments and requiring fishermen to provide information to NMFS under the Trip Interview Program; and,
- Requiring NMFS observers on selected shark fishing vessels to document mortality of marine mammals and endangered species.

At that time, NMFS identified LCS as overfished and established the commercial quota at 2,436 metric tons (mt) dressed weight (dw) based on a 1992 stock assessment. Under the rebuilding plan established in the 1993 FMP, the LCS quota was expected to increase in 1994 and 1995 up to the MSY estimated in the 1992 stock assessment (3,800 mt dw).

In 1994, under the rebuilding plan implemented in the 1993 FMP, the LCS quota was increased to 2,570 mt dw. Additionally, a new stock assessment was completed in March 1994. This stock assessment focused on LCS, suggested that recovery to the levels of the 1970s could take as long as 30 years, and concluded that "increases in the [Total Allowable Catch (TAC)] for sharks [are] considered risk-prone with respect to promoting stock recovery." A final rule that capped quotas for LCS at the 1994 levels was published on May 2, 1995 (60 FR 21468).

1999 Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (1999 FMP)

In June 1996, NMFS convened another stock assessment to examine the status of LCS stocks. The 1996 stock assessment found no clear evidence that LCS stocks were rebuilding and concluded that "[a]nalyses indicate that recovery is more likely to occur with reductions in effective fishing mortality rate of 50 [percent] or more." In addition, in 1996, amendments to the Magnuson-Stevens Act modified the definition of overfishing and established new provisions to

halt overfishing and rebuild overfished stocks, minimize bycatch and bycatch mortality to the extent practicable, and identify and protect essential fish habitat. Accordingly, in 1997, NMFS began the process of creating a rebuilding plan for overfished HMS, including LCS, consistent with the new provisions. In addition, in 1995 and 1997, new quotas were established for LCS and SCS (see Section 2.0 below). In June 1998, NMFS held another LCS stock assessment. The 1998 stock assessment found that LCS were overfished and would not rebuild under 1997 harvest levels. Based in part on the results of the 1998 stock assessment, in April 1999, NMFS published the final 1999 FMP, which included numerous measures to rebuild or prevent overfishing of Atlantic sharks in commercial and recreational fisheries. The 1999 FMP amended and replaced the 1993 FMP. Management measures related to sharks that changed in the 1999 FMP included:

- Reducing commercial LCS quotas;
- Establishing ridgeback (e.g., sandbar *Carcharhinus plumbeus*) and non-ridgeback (e.g., blacktip (*Carcharhinus limbatus*) categories of LCS;
- Implementing a commercial minimum size for ridgeback LCS;
- Reducing recreational retention limits for all sharks;
- Establishing a recreational minimum size for all sharks except Atlantic sharpnose;
- Established essential fish habitat (EFH) for 39 species of sharks;
- Implementing limited access in commercial fisheries;
- Establishing a shark public display quota;
- Establishing new procedures for counting dead discards and state landings of sharks after Federal fishing season closures against Federal quotas; and
- Establishing season-specific over- and underharvest adjustment procedures.

The implementing regulations were published on May 28, 1999 (64 FR 29090). However, in 1999, a court enjoined implementation of the 1999 regulations, as they related to the ongoing litigation on the 1997 quotas. As such, many of the regulations in the 1999 FMP had a delayed implementation or were never implemented. These changes are explained below under Section 2.0.

2003 Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks (Amendment 1)

In 2002, additional LCS stock assessments were conducted. Based on these assessments, NMFS re-examined many of the shark management measures in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks. The changes in Amendment 1 affected all aspects of shark management. The final management measures (December 24, 2003, 68 FR 74746) selected in Amendment 1 included, among other things:

- Re- aggregating the large coastal shark complex;
- Using maximum sustainable yield as a basis for setting commercial quotas;

- Eliminating the commercial minimum size;
- Establishing regional commercial quotas and trimester commercial fishing seasons, adjusting the recreational bag and size limits, establishing gear restrictions to reduce bycatch or reduce bycatch mortality;
- Establishing a time/area closure off the coast of North Carolina to reduce fishing mortality of dusky sharks and juvenile sandbar sharks;
- Updating EFH identifications for five species of sharks, including sandbar shark; and,
- Changing the administration for issuing permits for display purposes.

2006 Consolidated HMS FMP

NMFS issued two separate FMPs in April 1999 for the Atlantic HMS fisheries. The 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks combined, amended, and replaced previous management plans for swordfish and sharks, and was the first FMP for tunas. Amendment 1 to the Billfish Management Plan updated and amended the 1988 Billfish FMP. The 2006 Consolidated HMS FMP consolidated the management of all Atlantic HMS into one comprehensive FMP, adjusted the regulatory framework measures, continued the process for updating HMS EFH, and combined and simplified the objectives of the previous FMPs.

In 2005, NMFS released the draft Consolidated HMS FMP. In July 2006, the final Consolidated HMS FMP was completed and the implementing regulations were published on October 2, 2006 (71 FR 58058). Measures that were specific to the shark fisheries included:

- Mandatory workshops and certifications for all vessel owners and operators that have pelagic longline (PLL) or bottom longline (BLL) gear on their vessels and that had been issued or were required to be issued any of the HMS limited access permits (LAPs) to participate in HMS longline and gillnet fisheries. These workshops provide information and ensure proficiency with using required equipment to handle release and disentangle sea turtles, smalltooth sawfish, and other non-target species;
- Mandatory Atlantic shark identification workshops for all federally permitted shark dealers to train shark dealers to properly identify shark carcasses;
- Differentiation between PLL and BLL gear based upon the species composition of the catch onboard or landed;
- The requirement that the 2nd dorsal fin and the anal fin remain on all sharks through landing; and,
- Prohibition on the sale or purchase of any HMS that was offloaded from an individual vessel in excess of the retention limits specified in §§ 635.23 and 635.24.

2008 Amendment 2 to the 2006 Consolidated HMS FMP

In 2005/2006, a new stock assessment was conducted on the LCS complex, sandbar, blacktip, porbeagle, and dusky sharks. Based on the results of these assessments, NMFS amended the 2006 Consolidated HMS FMP. On April 10, 2008, NMFS released the Final EIS for Amendment 2 to the Consolidated HMS FMP. The assessment for sandbar shark indicated that the species was overfished with overfishing occurring. NMFS implemented management measures consistent with the recent stock assessment for sandbar, among other things. The implementing regulations were published on June 24, 2008 (73 FR 35778; corrected version published July 15, 2008; 73 FR 40658). Management measures implemented in Amendment 2 included:

- Initiating a rebuilding plan for sandbar sharks consistent with the stock assessment;
- Prohibiting the retention of sandbar sharks in the recreational fisheries and in the commercial fisheries unless participants were part of the shark research fishery (see Table
- Implementing a commercial quota of 87.9 mt dw for sandbar sharks, which could be harvested only by a limited number of participants in the shark research fishery who had 100 percent observer coverage and specific gear and fishing restrictions.;
- Requiring that all Atlantic sharks be offloaded with fins naturally attached;
- Collecting shark life history information via the implementation of a shark research fishery; and,
- Implementing time/area closures recommended by the South Atlantic Fishery Management Council.

2010 Amendment 5a to the 2006 Consolidated HMS FMP (Amendment 5a)

In 2011, a new stock assessment was conducted on sandbar, blacknose, and dusky sharks. Based on the results of these assessments, NMFS amended the 2006 Consolidated HMS FMP. On October 7, 2011, NMFS published a notice announcing our intent to prepare a proposal for Amendment 5 to the 2006 Consolidated HMS FMP with an Environmental Impact Statement (EIS) in accordance with the requirements of the NEPA (76 FR 62331). NMFS made stock status determinations for sandbar, dusky, and blacknose sharks based on the results of the Southeast Data, Assessment, and Review (SEDAR) 21 process. Determinations in the October 2011 notice included that sandbar sharks were still overfished, but no longer experiencing overfishing.

After reviewing all of the comments received on the proposed rule, NMFS decided to analyze further those measures pertaining to dusky sharks in a separate, but related FMP amendment, EIS, and proposed rule. For clarity in referring to the two related rulemaking processes, the FMP amendment for non-dusky shark species included in draft Amendment 5--specifically, scalloped hammerhead, sandbar, blacknose, and Gulf of Mexico blacktip sharks--

was called "Amendment 5a," and the FMP amendment for dusky sharks was referred to as "Amendment 5b."

On July 3, 2013, NMFS published a final rule (78 FR 40318) to implement Amendment 5a, which included shark fishery management measures and established the scalloped hammerhead shark rebuilding program. While Amendment 5a did not change any sandbar-specific requirements, the requirements that changed could affect the bycatch of sandbar sharks. Specifically, the final rule established several new regional shark management groups and quotas for the commercial fishery and a new minimum size limit for recreational fishermen for hammerhead sharks. This final rule addressed annual regional quotas for the aggregated LCS, hammerhead sharks, and Gulf of Mexico blacktip, blacknose, and non-blacknose sharks. Amendment 5a implemented regional quota linkages between management groups whose species are often caught together in the same fisheries to prevent exceeding the newly established quotas through discarded bycatch. In addition, Amendment 5a established a new minimum size limit for the large hammerhead shark species (great, smooth, and scalloped) of 78 inches (6.5 feet) fork length (FL). The size limit for other shark species, including sandbar sharks, and the retention limits did not change.

2015 Amendment 6 to the 2006 Consolidated HMS FMP (Amendment 6)

On August 20, 2015, NMFS published a final rule (80 FR 50074) for Amendment 6 to the 2006 Consolidated Atlantic HMS FMP that, among other things, adjusted the commercial sandbar shark research fishery quota from 116.6 mt dw to 90.7 mt dw. The final action also included:

- Modifying retention limits for LCS;
- Creating a new management boundary for SCS in the Atlantic region;
- Creating subregional commercial quotas for LCS in the Gulf of Mexico region;
- Modifying quota linkages between blacknose and non-blacknose SCS in both the Atlantic and Gulf of Mexico regions;
- Modifying the TACs and commercial quotas for non-blacknose SCS in both the Atlantic and Gulf of Mexico regions,
- Modifying vessel upgrading restrictions.

As a result of these modifications to the commercial quotas and the creation of a management boundary in the Atlantic region, the non-blacknose SCS fisheries in the Gulf and Atlantic regions were re-opened. The proposed rule for this action published on January 20, 2015 (80 FR 2648) and the public comment period ended on April 3, 2015.

2016 Amendment 10 to the 2006 Consolidated HMS FMP (Amendment 10)

On October 14, 2016, NMFS published the availability of Draft Amendment 10 on essential fish habitat (EFH) and an associated Environmental Assessment (EA) (81 FR 62100). Draft Amendment 10 proposes to update and revise existing HMS EFH; proposes to modify existing HAPCs or designate new HAPCs for bluefin tuna, and sandbar, lemon, and sand tiger

sharks, as necessary; and analyzes fishing and non-fishing impacts on EFH by considering environmental and management changes and new information since 2009. New information on the biology, distribution, habitat requirements, life history characteristics, migratory patterns, spawning, pupping, and nursery areas of Atlantic HMS is being considered when updating Atlantic HMS EFH designations (comment period ends on December 22, 2016). EFH and HAPC designations are intended to focus conservation efforts and bring heightened awareness to the importance of HMS habitat.

Table 1 FMP Amendments and regulations affecting sandbar sharks

Effective Date	FMP/Amendment	Description of Action
January 1978	Preliminary Fishery Management Plan (PMP) for Atlantic Billfish and Sharks	• Mandatory data reporting requirements for foreign vessels; and, • Established a hard cap on the catch of sharks by foreign vessels, which when achieved would prohibit further landings of sharks by foreign vessels
Most parts effective April 26, 1993, such as quotas, complexes, etc. Finning prohibition effective May 26, 1993. Need to have permit, report landings, and carry observers effective July 1, 1993.	FMP for Sharks of the Atlantic Ocean	• Established a fishery management unit (FMU) consisting of 39 frequently caught species of Atlantic sharks, separated into three groups for assessment and regulatory purposes (LCS, SCS, and pelagic sharks); • Established calendar year commercial quotas for the LCS (2,436 mt dw) and pelagic sharks (580 mt dw) and divided the annual quota into two equal half-year quotas that apply to the following two fishing periods – January 1 through June 30 and July 1 through December 31; • Establishing a recreational trip limit of 4 LCS & pelagic sharks/vessel ; • Prohibited finning by requiring that the ratio between wet fins/dressed carcass weight not exceed five percent; • Prohibited the sale by recreational fishermen of sharks or shark products caught in the Economic Exclusive Zone (EEZ); • Required annual commercial permits for fishermen who harvest and sell shark (meat products and fins); and, • Requiring trip reports by permitted fishermen and persons conducting shark tournaments and requiring fishermen to provide information to NMFS under the Trip Interview Program. Other management measures included: establishing a framework procedure for adjusting commercial quotas, recreational bag limits, species size limits, management unit, fishing year, species groups, estimates of maximum sustainable yield (MSY), and permitting and reporting requirements; establishing a permit eligibility requirement that the owner or operator (including charter vessel and headboat owners/operators who intend to sell their catch); and requiring NMFS observers on selected shark fishing vessels to document mortality of marine mammals and endangered species.
July 1, 1999 -Limited access permits issued immediately;	FMP for Atlantic Tunas, Swordfish and Sharks	• Implemented limited access in commercial fisheries; • Reduced commercial LCS to 1,285 mt dw ; • Reduced recreational retention limits for all sharks to 1 shark/vessel/trip except for Atlantic sharpnose (1 Atlantic sharpnose/person/trip); • Established a recreational minimum size for all sharks except Atlantic sharpnose (4.5 feet); • Established a shark public display quota (60 mt ww);

Effective Date	FMP/Amendment	Description of Action
application and appeals processed over the next year (measures in italics were delayed)		• Established new procedures for counting dead discards and state landings of sharks after Federal fishing season closures against Federal quotas; and established season-specific over- and underharvest adjustment procedures *(effective January 1, 2003)*; • Established ridgeback and non-ridgeback categories of LCS (annual quotas of 783 mt dw for non-ridgeback LCS & 931 mt dw for ridgeback LCS; *effective January 1, 2003; suspended after 2003 fishing year*); and, • Implemented a commercial minimum size for ridgeback LCS (*suspended*).
February 1, 2004, except LCS and SCS quotas, and recreational retention and size limits, which were delayed	Amendment 1 to the FMP for Atlantic Tunas, Swordfish and Sharks	• Aggregated the large coastal shark complex; • Eliminated the commercial minimum size; • Established gear restrictions to reduce bycatch or reduce bycatch mortality (allowed only handline and rod and reel in recreational shark fishery); • Used maximum sustainable yield as a basis for setting commercial quotas (LCS quota=1,017 mt dw) (*effective December 30, 2003*); • Adjusted the recreational bag and size limits (allowed 1 bonnethead/person/trip in addition to 1 Atlantic sharpnose/person/trip with no size limit for bonnethead or Atlantic sharpnose) (*effective December 30, 2003*); • Established regional commercial quotas and trimester commercial fishing seasons (*trimesters not implemented until January 1, 2005; 69 FR 6964*); and, • Established a time/area closure off the coast of North Carolina (*effective January 1, 2005*). Other management measures included: establishing a mechanism for changing the species on the prohibited species list; updating essential fish habitat identifications for five species of sharks; requiring the use of non-stainless steel corrodible hooks and the possession of line cutters, dipnets, and approved dehooking device on BLL vessels; requiring vessel monitoring systems (VMS) for fishermen operating near the time/area closures off North Carolina and on gillnet vessels operating during the right whale calving season and, changing the administration for issuing display permits.
November 1, 2006, except for workshops	Consolidated HMS FMP	• Differentiation between PLL and BLL gear based upon the species composition of the catch onboard or landed; • The requirement that the 2nd dorsal fin and the anal fin remain on all sharks through landing; • Mandatory workshops and certifications for all vessel owners and operators that have PLL or BLL gear on their vessels for fishermen with HMS LAPs (*effective January 1, 2007*); and • Mandatory Atlantic shark identification workshops for all Federally permitted shark dealers (*effective January 1, 2007*).
July 24, 2008	Amendment 2 to the 2006 Consolidated HMS FMP	• Initiating rebuilding plan for sandbar sharks consistent with stock assessments; • Established a shark research fishery which collects shark life history information; • Implemented a sandbar research annual quota of 87.9 mt dw; sandbar retention only allowed within shark research fishery (see Table X for research fishery requirements); • Prohibiting the retention of sandbar sharks for recreational fishermen and commercial fishermen outside the shark research fishery;

Effective Date	FMP/Amendment	Description of Action
		• Required that all Atlantic sharks be offloaded with fins naturally attached; and, • Implemented BLL time/area closures recommended by the South Atlantic Fishery Management Council. • Other management measures included: modifying reporting requirements (dealer reports must be received by NMFS within 10 days of the reporting period), and modifying timing of shark stock assessments.
July 3, 2013	Amendment 5a to the 2006 Consolidated HMS FMP	• Implemented regional quota linkages between management groups whose species are often caught together in the same fisheries to prevent exceeding the newly established quotas through discarded bycatch. • Established a new minimum size limit for the large hammerhead shark species (great, smooth, and scalloped) of 78 inches (6.5 feet) fork length (FL). • The size limit for other shark species, including sandbar sharks, and the retention limits remained the same.
August 18, 2015	Amendment 6 to the 2006 Consolidated HMS FMP	Amendment 6 adjusted the annual commercial sandbar shark research fishery quota to 90.7 mt dw. The final action also: • Modified retention limits for LCS; • Created a new management boundary for SCS in the Atlantic region; • Created sub-regional commercial quotas for LCS in the Gulf of Mexico region; • Modified quota linkages between blacknose and non-blacknose SCS in both the Atlantic and Gulf of Mexico regions; • Modified the TACs and commercial quotas for non-blacknose SCS in both the Atlantic and Gulf of Mexico regions, • Modified vessel upgrading restrictions.
October 14, 2016	Draft Amendment 10 to the 2006 Consolidated HMS FMP	• Proposes updates and revisions to existing HMS EFH; • Proposes to modify existing HAPCs or designate new HAPCs for bluefin tuna, and sandbar, lemon, and sand tiger sharks, as necessary; and • Analyzes fishing and non-fishing impacts on EFH by considering environmental and management changes and new information since 2009.

2.2 Emergency and Other Major Rules

Rules in Relation to 1993 FMP

A number of difficulties arose in the initial year of implementation of the 1993 FMP that resulted in a short season and low ex-vessel prices. First, the January to June semi-annual LCS quota was exceeded shortly after implementation of the FMP, and that portion of the commercial fishery was closed on May 10, 1993. The LCS fishery reopened on July 1, 1993, with an adjusted quota of 875 mt dw (see Table 3 below). Derby-style fishing, coupled with what some participants observed to be an unusual abundance or availability of sharks, led to an intense and short fishing season for LCS, with the fishery closing within one month. Although fin prices remained strong throughout the brief season, the oversupply of shark carcasses led to reports of record low prices. The closure was significantly earlier than expected, and a number of commercial fishermen and dealers indicated that they were adversely affected. The intense

season also complicated the task of monitoring the LCS quota and closing the season with the required advance notice.

To address these problems, a commercial trip limit of 4,000 lb for permitted vessels for LCS was implemented on December 28, 1993 (58 FR 68556), and a control date for the Atlantic shark fishery was established on February 22, 1994 (59 FR 8457). A final rule to implement additional measures authorized by the 1993 FMP published on October 18, 1994 (59 FR 52453), which:

- Clarified operation of vessels with a Federal commercial permit;
- Established the fishing year;
- Consolidated the regulations for drift gillnets;
- Required dealers to obtain a permit to purchase sharks;
- Required dealer reports;
- Established recreational bag limits;
- Established quotas for commercial landings; and
- Provided for commercial fishery closures when quotas were reached.

A final rule that capped quotas for LCS (2,570 mt dw) at the 1994 levels was published on May 2, 1995 (60 FR 21468).

In response to a 1996 LCS stock assessment, in 1997, NMFS reduced the LCS commercial quota by 50 percent to 1,285 mt dw and the recreational retention limit to two LCS, SCS, and pelagic sharks combined per trip with an additional allowance of two Atlantic sharpnose sharks per person per trip (62 FR 16648, April 2, 1997). On May 2, 1997, the Southern Offshore Fishing Association (SOFA) and other commercial fishermen and dealers sued the Secretary of Commerce (Secretary) on the April 1997 regulations.

In May 1998, NMFS completed its consideration of the economic effects of the 1997 LCS quotas on fishermen and submitted the analysis to the court. NMFS concluded that the 1997 LCS quotas may have had a significant economic impact on a substantial number of small entities and that there were no other available alternatives that would both mitigate those economic impacts and ensure the viability of the LCS stocks. Based on these findings, the court allowed NMFS to maintain those quotas while the case was settled in combination with litigation mentioned below regarding the 1999 FMP.

Rules in Relation to the 1999 FMP

The implementing regulations for the 1999 FMP were published on May 28, 1999 (64 FR 29090). At the end of June 1999, NMFS was sued several times by several different entities regarding the commercial and recreational management measures in the 1999 FMP. Due to the overlap of one of those lawsuits with the 1997 litigation, on June 30, 1999, NMFS received a

court order enjoining it from enforcing the 1999 regulations with respect to Atlantic shark commercial catch quotas and fish-counting methods (including the counting of dead discards and state commercial landings after Federal closures), which were different from the quotas and fish counting methods prescribed by the 1997 Atlantic shark regulations. Due to the injunction, NMFS was unable to implement measures that would have established limited access in commercial fisheries, ridgeback and non-ridgeback categories of LCS, with sandbar sharks being placed in the ridgeback category, a commercial minimum size of 4.5 ft for ridgeback LCS, including sandbar sharks, and a reduced commercial LCS annual quota of 1,285 mt dw.

On September 25, 2000, the United States District Court for the District of Columbia ruled against the plaintiffs regarding the commercial pelagic shark management measures, stating that the regulations were consistent with the Magnuson-Stevens Act and the Regulatory Flexibility Act. On September 20, 2001, the same court ruled against different plaintiffs regarding the recreational shark retention limits in the 1999 FMP, again stating that the regulations were consistent with the Magnuson-Stevens Act. This recreational shark retention limits established a recreational minimum size for all sharks of 4.5 ft for all sharks, including sandbar sharks, except Atlantic sharpnose.

On November 21, 2000, SOFA *et al*. and NMFS reached a settlement agreement for the May 1997 and June 1999 lawsuits. On December 7, 2000, the United States District Court for the Middle District of Florida entered an order approving the settlement agreement and lifting the injunction. The settlement agreement required, among other things, an independent (*i.e*., non-NMFS) review of the 1998 LCS stock assessment. The settlement agreement did not address any regulations affecting recreational shark fisheries, which included establishing a recreational minimum size of 4.5 ft for all sharks, including sandbar sharks, except Atlantic sharpnose. The injunction was lifted, on January 1, 2001 (66 FR 55) and on March 6, 2001, NMFS published an emergency rule implementing the settlement agreement (66 FR 13441). This emergency rule expired on September 4, 2001, and established the LCS annual quota (including sandbar sharks) (1,285 mt dw) at 1997 levels.

In late 2001, the Agency received the results of the independent peer review of the 1998 LCS stock assessment. These peer reviews found that the 1998 LCS stock assessment was not the best available science for LCS. Taking into consideration the settlement agreement, the results of the peer reviews of the 1998 LCS stock assessment, current catch rates, and the best available scientific information (not including the 1998 stock assessment projections), NMFS implemented another emergency rule for the 2002 fishing year that suspended certain measures. Under the 1999 regulations pending completion of new LCS and SCS stock assessments and a peer review of the new LCS stock assessment (66 FR 67118, December 28, 2001; extended 67 FR 37354, May 29, 2002). Specifically, NMFS maintained the 1997 LCS commercial quota (1,285 mt dw), suspended the commercial ridgeback LCS minimum size, suspended counting dead discards and state landings after a Federal closure against the quota, and replaced season-

specific quota accounting methods with subsequent-season quota accounting methods. That emergency rule expired on December 30, 2002.

On May 28, 2002 (67 FR 36858), NMFS announced the availability of a modeling document that explored the suggestions of the CIE and NRC peer reviews on LCS. Then NMFS held a 2002 LCS stock assessment workshop in June 2002. On October 17, 2002, NMFS announced the availability of the 2002 LCS stock assessment and the workshop meeting report (67 FR 64098). The results of this stock assessment indicated that the LCS complex was still overfished and overfishing was occurring. Additionally, the 2002 LCS stock assessment found that sandbar sharks were overfished, but that overfishing was not occurring.

Based on the results of the 2002 LCS stock assessment, NMFS implemented an emergency rule to ensure that the commercial management measures in place for the 2003 fishing year were based on the best available science (67 FR 78990, December 27, 2002; extended 68 FR 31987, May 29, 2003). Specifically, the emergency rule implemented the LCS ridgeback/non-ridgeback split established in the 1999 FMP (the ridgeback quota was set at 783 mt dw and the non-ridgeback quota was set at 931 mt dw), suspended the commercial ridgeback LCS minimum size, and allowed both the season-specific quota adjustments and the counting of all mortality measures to go into place. Additionally, NMFS announced its intent to conduct an EIS and amend the 1999 FMP (67 FR 69180, November 15, 2002).

The emergency rule was an interim measure to maintain the status of LCS pending the re-evaluation of management measures in the context of the rebuilding plan through the amendment to the 1999 FMP. The emergency rule for the 2003 fishing year implemented for the first and only time the classification system (ridgeback/non-ridgeback LCS) finalized in the 1999 FMP. Table 5 indicates which LCS were considered ridgeback and which non-ridgeback. NMFS also implemented for the first time a provision to count state landings after a Federal closure and to count dead discards against the quota. To calculate the commercial quotas for these groups, NMFS took the average landings for individual species from 1999 through 2001 and either increased them or decreased them by certain percentages, as suggested by scenarios presented in the stock assessment. Because the stock assessment scenarios suggested that an increase in catch for blacktip sharks would not cause overfishing and that maintaining the sandbar sharks would not increase overfishing (the two primary species in the LCS fishery), this method resulted in an increase in the overall quota for the length of the emergency rule. During the comment period on the emergency rule and scoping for this amendment, NMFS received comments regarding, among other things, the quota levels under the rule, concern over secondary species and discards, the ability of fishermen to target certain species, and impacts of the different season length for ridgeback and non-ridgeback LCS. NMFS responded to these comments when extending the emergency rule and further considered these comments when examining the alternatives presented in the Amendment to the 1999 FMP.

NMFS received the results of the peer review of the 2002 LCS stock assessment in December 2002. These reviews were generally positive.

Rules in Relation to 2003 Amendment 1

Based on the 2002 LCS stock assessment, NMFS re-examined many of the shark management measures in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks. The changes in Amendment 1 affected all aspects of shark management, including management of sandbar sharks which were part of the LCS complex. Shortly after the final rule for Amendment 1 was published, NMFS conducted a rulemaking that adjusted the percent quota of LCS for each region, changed the seasonal split for the North Atlantic based on historical landing patterns of LCS, and finalized a method of changing the split between regions and/or seasons as necessary to account for changes in the fishery over time, and established a method to adjust from semi-annual to trimester seasons (November 30, 2004, 69 FR 6954).

Rules to Reduce Bycatch and Bycatch Mortality in the Atlantic PLL Fishery

Pelagic longline is not a primary gear used to target LCS or SCS; however, sandbar and dusky sharks, in particular, are often caught on PLL gear, which targets swordfish and tuna. Therefore, regulations affecting the PLL fishery could also result in changes in dusky and/or sandbar catches. In the 1999 FMP, NMFS committed to implement a closed area to PLL gear that would effectively protect small swordfish. NMFS began to work towards this goal shortly after the publication of the 1999 FMP. After the publication of the 1999 FMP, NMFS was sued by several entities who felt, among other things, that the Agency had not done enough to reduce bycatch in HMS fisheries. As a result, NMFS expanded the goal of the rule to reduce all bycatch and bycatch mortality, to the extent practicable, in the HMS PLL fishery. The following objectives were developed to guide agency action for this goal:

- Maximize the reduction in finfish bycatch;
- Minimize the reduction in the target catch of swordfish and other species;
- Consider impacts on the incidental catch of other species to minimize or reduce incidental catch levels; and
- Optimize survival of bycatch and incidental catch species.

NMFS published the final rule implementing the first regulatory amendment to the 1999 FMP on August 1, 2000 (65 FR 47214), which closed three large areas (DeSoto Canyon, Florida East Coast, and Charleston Bump) and prohibited the use of live bait in the Gulf of Mexico. The DeSoto Canyon closure was effective on November 1, 2000. The other closures were effective March 1, 2001. Given that shark, such as sandbar sharks, are often caught on PLL gear, the reduction of three commercially important areas minimized the incidental catch and bycatch. mortality of non-target species such as sandbar sharks.

During the course of this rulemaking, the PLL fleet exceeded the Incidental Take Statement (ITS) for sea turtles established during the Endangered Species Act (ESA) Section 7 Consultation for the 1999 FMP. That, combined with new information on sea turtles and the

uncertainty regarding what the closures would mean for sea turtles, resulted in NMFS implementing certain measures to avoid jeopardy by reducing sea turtle bycatch in the PLL fishery. On July 6, 2004 (69 FR 40734), NMFS required the use of circle hooks for its entire US pelagic longline fleet. Although the use of circle hooks was initially adopted to protect sea turtles, research showed that their use can benefit other bycatch species (i.e., blue marlin).

Shark Rules After 2006 Consolidated HMS FMP

On February 16, 2006, NMFS published a temporary rule (71 FR 8223) to prohibit, through March 31, 2006, any vessel from fishing with any gillnet gear in the Atlantic Ocean waters between 32°00' N. Lat. (near Savannah, GA) and 27°51' N. Lat. (near Sebastian Inlet, FL) and extending from the shore eastward out to 80°00' W. long under the authority of the Atlantic Large Whale Take Reduction Plan (ALWTRP) (50 CFR 229.32 (g)) and ESA. NMFS took this action based on its determination that a right whale mortality was the result of an entanglement by gillnet gear within the Southeast U.S. Restricted Area in January of 2006.

In 2007, NMFS expanded the equipment required for the safe handling, release, and disentanglement of sea turtles caught in the Atlantic shark BLL fishery (72 FR 5633, February 7, 2007). As a result, the equipment required for BLL vessels is now consistent with the requirements for the PLL fishery (e.g., vessels must carry dehookers and line cutters). Furthermore, this action implemented several year-round BLL closures to protect EFH to maintain consistency with the Caribbean Fishery Management Council.

On September 16, 2011 (76 FR 57709), NMFS published a NOI that announced NMFS' intent to prepare an EIS and FMP Amendment that would consider catch shares for the Atlantic shark fisheries. The NOI also established a control date for eligibility to participate in an Atlantic shark catch share program, announced the availability of a white paper describing design elements of catch share programs in general and issues specific to the Atlantic shark fisheries, and requested public comment on the implementation of catch shares in the Atlantic shark fisheries. NMFS received comments on a variety of modifications to the existing management structure for the Atlantic shark fisheries, including programs such as catch shares, limited access privilege programs (LAPPs), individual fishing quotas (IFQs), and/or sectors. In addition, fishermen requested sandbar sharks landings be included when determining the landings history of fishermen for allocation purposes and that for any individuals quota provided, the current sandbar research quota be equally distributed to all qualified shark fishermen and allowed to be landed.

On December 2, 2011 (76 FR 75492), NMFS published a final rule that changed VMS requirements in Atlantic HMS fisheries. All vessels with Atlantic HMS permits that are required to use VMS, including vessels with pelagic longline gear on board, vessels with bottom longline gear on board in the vicinity of the mid-Atlantic closed area (between 33º N and 36º 30' N) from January 1 to July 31, and vessels with shark gillnet gear on board fishing between November 15

and April 15, must comply with the new requirements. The purpose of this final action was to facilitate enhanced communication with HMS vessels at sea, provide HMS fishery participants with an additional means of sending and receiving information at sea, ensure that HMS VMS units are consistent with the current VMS technology and type approval requirements that apply to newly installed units, and to provide NMFS enforcement with additional information describing gear onboard and target species, such as interactions with prohibited species such as sandbar and/or dusky sharks.

On October 14, 2016, NMFS published the availability of Draft Amendment 10 on essential fish habitat (EFH) and an associated Environmental Assessment (EA) (81 FR 62100). Draft Amendment 10 proposes to update and revise existing HMS EFH; proposes to modify existing HAPCs or designate new HAPCs for bluefin tuna, and sandbar, lemon, and sand tiger sharks, as necessary; and analyzes fishing and non-fishing impacts on EFH by considering environmental and management changes and new information since 2009

Table 2 Chronological list of most of the Federal Register publications relating to Atlantic large coastal sharks, when appropriate specific to sandbar sharks.

Federal Register Cite	Date	Rule or Notice
Pre 1993		
48 FR 3371	1/25/1983	Preliminary management plan with optimum yield and total allowable level of foreign fishing for sharks
56 FR 20410	5/3/1991	NOA of draft FMP; 8 hearings
57 FR 1250	1/13/1992	NOA of Secretarial FMP
57 FR 24222	6/8/1992	Proposed rule to implement FMP
57 FR 29859	7/7/1992	Correction to 57 FR 24222
1993		
58 FR 21931	4/26/1993	Final rule and interim final rule implementing FMP
58 FR 27336	5/7/1993	Correction to 58 FR 21931
58 FR 27482	5/10/1993	LCS commercial fishery closure announcement
58 FR 40075	7/27/1993	Adjusts 1993 second semi-annual quotas
58 FR 40076	7/27/1993	LCS commercial fishery closure announcement
58 FR 46153	9/1/1993	Notice of 13 public scoping meetings
58 FR 59008	11/5/1993	Extension of comment period for 58 FR 46153
58 FR 68556	12/28/1993	Interim final rule implementing trip limits
1994		
59 FR 3321	1/21/1994	Extension of comment period for 58 FR 68556
59 FR 8457	2/22/1994	Notice of control date for entry
59 FR 25350	5/16/1994	LCS commercial fishery closure announcement
59 FR 33450	6/29/1994	Adjusts second semi-annual 1994 quota
59 FR 38943	8/1/1994	LCS commercial fishery closure announcement
59 FR 44644	8/30/1994	Reopens LCS fishery with new closure date
59 FR 48847	9/23/1994	Notice of public scoping meetings
59 FR 51388	10/11/1994	Rescission of LCS closure
59 FR 52277	10/17/1994	Notice of additional scoping meetings
59 FR 52453	10/18/1994	Final rule implementing interim final rule in 1993 FMP
59 FR 55066	11/3/1994	LCS commercial fishery closure announcement
1995		
60 FR 2071	1/6/1995	Proposed rule to adjust quotas
60 FR 21468	5/2/1995	Final rule indefinitely establishes LCS quota at 1994 level
60 FR 27042	5/22/1995	LCS commercial fishery closure announcement
60 FR 30068	6/7/1995	Announcement of Shark Operations Team meeting
60 FR 37023	7/19/1995	Adjusts second semi-annual 1995 quota
60 FR 38785	7/28/1995	ANPR - Options for Permit Moratoria
60 FR 44824	8/29/1995	Extension of ANPR comment period
60 FR 49235	9/22/1995	LCS commercial fishery closure announcement
60 FR 61243	11/29/1995	Announces Limited Access Workshop
1996		
61 FR 21978	5/13/1996	LCS commercial fishery closure announcement
61 FR 37721	7/19/1996	Announcement of Shark Operations Team meeting.
61 FR 39099	7/26/1996	Adjusts second semi-annual 1996 quota
61 FR 43185	8/21/1996	LCS commercial fishery closure announcement
61 FR 67295	12/20/1996	Proposed rule to reduce Quotas/Bag Limits

Federal Register Cite	Date	Rule or Notice
61 FR 68202	12/27/1996	Proposed rule to establish limited entry (Draft Amendment 1 to 1993 FMP)
1997		
62 FR 724	1/6/1997	NOA of Draft Amendment 1 to 1993 FMP
62 FR 1705	1/13/1997	Notice of 11 public hearings for Amendment 1
62 FR 1872	1/14/1997	Extension of comment period and notice of public hearings for proposed rule on quotas
62 FR 4239	1/29/1997	Extension of comment period for proposed rule on quotas
62 FR 8679	2/26/1997	Extension of comment period for Amendment 1 to 1993 FMP
62 FR 16647	4/7/1997	Final rule reducing quotas/bag limits
62 FR 16656	4/7/1997	LCS commercial fishery closure announcement
62 FR 26475	5/14/1997	Announcement of Shark Operations Team meeting
62 FR 26428	5/14/1997	Adjusts second semi-annual 1997 LCS quota
62 FR 27586	5/20/1997	Notice of Intent to prepare an supplemental environmental impact statement
62 FR 27703	5/21/1997	Technical Amendment regarding bag limits
62 FR 38942	7/21/1997	LCS commercial fishery closure announcement
1998		
63 FR 14837	3/27/1998	LCS commercial fishery closure announcement
63 FR 19239	4/17/1998	NOA of draft consideration of economic effects of 1997 quotas
63 FR 27708	5/20/1998	NOA of final consideration of economic effects of 1997 quotas
63 FR 29355	5/29/1998	Adjusts second semi-annual 1998 LCS quota
63 FR 41736	8/5/1998	LCS commercial fishery closure announcement
63 FR 57093	10/26/1998	NOA of draft 1999 FMP
1999		
64 FR 3154	1/20/1999	Proposed rule for draft 1999 FMP
64 FR 14154	3/24/1999	LCS commercial fishery closure announcement
64 FR 29090	5/28/1999	Final rule for 1999 FMP
64 FR 30248	6/7/1999	Fishing season notification
64 FR 37700	7/13/1999	Technical amendment to 1999 FMP final rule
64 FR 37883	7/14/1999	Fishing season change notification
64 FR 47713	9/1/1999	LCS fishery reopening
64 FR 52772	9/30/1999	Notice of Availability of outline for National Plan of Action for sharks
64 FR 53949	10/5/1999	LCS closure postponement
64 FR 66114	11/24/1999	Fishing season notification
2000		
65 FR 16186	3/27/2000	Revised timeline for National Plan of Action for sharks
65 FR 35855	6/6/2000	Fishing season notification and 2nd semi-annual LCS quota adjustment
65 FR 47214	8/1/2000	Final rule closing Desoto Canyon, Florida East Coast, and Charleston Bump and requiring live bait for PLL gear in Gulf of Mexico
65 FR 47986	8/4/2000	Notice of Availability of National Plan of Action for sharks
65 FR 38440	6/21/2000	Implementation of prohibited species provisions and closure change
65 FR 60889	10/13/2000	Final rule closed NED and required dipnets and line clippers for PLL vessels
65 FR 75867	12/5/2000	Fishing season notification
2001		
66 FR 55	1/2/2001	Implementation of 1999 FMP pelagic shark quotas

Federal Register Cite	Date	Rule or Notice
66 FR 10484	2/15/2001	NOA of Final National Plan of Action for the Conservation and Management of Sharks
66 FR 13441	3/6/2001	Emergency rule to implement settlement agreement
66 FR 33918	6/26/2001	Fishing season notification and 2nd semi-annual LCS quota adjustment
66 FR 34401	6/28/2001	Proposed rule to implement national finning ban
66 FR 36711	7/13/2001	Emergency rule implementing 2001 BiOp requirements
66 FR 46401	9/5/2001	LCS fishing season extension
66 FR 48812	9/24/2001	Amendment to emergency rule (66 FR 13441) to incorporate change in requirement for handling and release guidelines
66 FR 67118	12/28/2001	Emergency rule to implement measures based on results of peer review and fishing season notification
2002		
67 FR 6194	2/11/2002	Final rule implementing national shark finning ban
67 FR 8211	2/22/2002	Correction to fishing season notification 66 FR 67118
67 FR 30879	5/8/2002	Notice of availability of SCS stock assessment
67 FR 36858	5/28/2002	Notice of availability of LCS sensitivity document and announcement of stock evaluation workshop in June
67 FR 37354	5/29/2002	Extension of emergency rule and fishing season announcement
67 FR 45393	7/9/2002	Final rule to implement measures under 2001 BiOp (gangion placement measure not implemented), including HMS shark gillnet measures
67 FR 64098	10/17/2002	Notice of availability of LCS stock assessment and final meeting report
67 FR 69180	11/15/2002	Notice of intent to conduct an environmental impact assessment and amend the 1999 FMP
67 FR 72629	12/6/2002	Proposed rule regarding EFPs
67 FR 78990	12/27/2002	Emergency rule to implement measures based on stock assessments and fishing season notification
2003		
68 FR 1024	1/8/2003	Announcement of 4 public hearings on emergency rule
68 FR 1430	1/10/2003	Extension of comment period for proposed rule on EFPs
68 FR 3853	1/27/2003	Announcement of 7 scoping meetings and notice of availability of Issues and Options paper
68 FR 31983	5/29/2003	Emergency rule extension and fishing season notification
68 FR 45196	8/1/2003	Proposed rule and NOA for draft Amendment 1 to 1999 FMP
68 FR 47904	8/12/2003	Public hearing announcement for draft Amendment 1 to 1999 FMP
68 FR 51560	8/27/2003	Announcement of HMS AP meeting on draft Amendment 1 to 1999 FMP
68 FR 54885	9/19/2003	Rescheduling of public hearings and extending comment period for draft Amendment 1 to 1999 FMP
68 FR 64621	11/14/2003	NOA of availability of Amendment 1
68 FR 66783	11/28/2003	NOI for SEIS
68 FR 74746	12/24/2003	Final Rule for Amendment 1
2004		
69 FR 6621	02/11/04	Proposed rule for PLL fishery
69 FR 10936	3/9/2004	SCS fishery closure
69 FR 19979	4/15/2004	VMS type approval notice
69 FR 26540	5/13/2004	N. Atlantic Quota Split Proposed Rule

Federal Register Cite	Date	Rule or Notice
69 FR 28106	5/18/2004	VMS effective date proposed rule
69 FR 30837	6/1/2004	Fishing season notice
69 FR 33321	6/15/2004	N. Atlantic Quota Split Final Rule
69 FR 40734	07/06/04	Final rule for PLL fishery
69 FR 44513	07/26/04	Notice of sea turtle release/protocol workshops
69 FR 47797	8/6/2004	Technical amendment correcting changes to BLL gear requirements
69 FR 49858	08/12/04	Advanced notice of proposed rulemaking; reducing sea turtle interactions with fishing gear
69 FR 51010	8/17/2004	VMS effective date final rule
69 FR 56024	9/17/2004	Regional quota split proposed rule
69 FR 6954	11/30/2004	Regional quota split final rule and season announcement
69 FR 71735	12/10/2004	Correction notice for 69 FR 6954
2005		
70 FR 11922	3/10/2005	2nd and 3rd season proposed rule
70 FR 21673	4/27/2005	2nd and 3rd season final rule
70 FR 24494	5/10/2005	North Carolina Petition for Rulemaking
70 FR 29285	5/20/2005	Notice of handling and release workshops for BLL fishermen
70 FR 48804	8/19/2005	Proposed rule Draft Consolidated HMS FMP
70 FR 48704	8/19/2005	NOA of Draft EIS for Draft Consolidated HMS FMP
70 FR 52380	9/2/2005	Correction to 70 FR 48704
70 FR 53146	9/7/2005	Cancellation of hearings due to Hurricane Katrina
70 FR 54537	9/15/2005	Notice of LCS data workshop
70 FR 55814	9/23/2005	Cancellation of Key West due to Hurricane Rita
70 FR 58190	10/5/2005	Correction to 70 FR 54537
70 FR 58177	10/5/2005	Extension of comment period for Draft Consolidated HMS FMP
70 FR 58366	10/6/2005	1st season proposed rule
70 FR 72080	12/1/2005	1st season final rule, fishing season notification
70 FR 73980	12/14/2005	Final Agency decision on petition for rulemaking to amend mid-Atlantic closed area
70 FR 76031	12/22/2005	Notice for Large Coastal Shark 2005/2006 Stock Assessment Workshop
70 FR 76441	12/27/2005	Rescheduling and addition of public hearings for Consolidated HMS FMP
2006		
71 FR 8223	2/16/2006	Temporary rule prohibiting gillnet gear in areas around the Southeast U.S. Restricted Area
71 FR 8557	2/17/2006	Proposed Rule for third and second trimester seasons
71 FR 12185	3/9/2006	Notice for Large Costal Shark Review Workshop
71 FR 15680	3/29/2006	Proposed rule for gear operation and deployment for BLL and gillnet fishery and complementary closure
71 FR 16243	3/31/2006	Final rule for second and third trimester seasons
71 FR 26351	5/4/2006	Scientific research permit for pelagic shark research
71 FR 30123	5/25/2006	Notice of availability of stock assessment of dusky sharks
71 FR 41774	7/24/2006	Notice of availability of final stock assessment for Large Costal Sharks
71 FR 58058	10/2/2006	Final Rule for the HMS Consolidated Fishery Management Plan
71 FR 58058	10/2/2006	1st season proposed rule
71 FR 62095	10/23/2006	Notice of shark dealer identification workshops and protected species safe handling and release workshops
71FR 64213	11/1/2006	Extension of comment period regarding the 2007 first trimester season proposed rule

Federal Register Cite	Date	Rule or Notice
71 FR 65086	11/7/2006	Notice of Intent to prepare Amendment 2 to the 2006 Consolidated HMS FMP and status determination for sandbar, blacktip, dusky, the LCS complex, and porbeagle sharks based on the latest stock assessments
71 FR 65087	11/7/2006	Notice of Intent to prepare Amendment 1 to the 2006 Consolidated HMS FMP for Essential Fish Habitat for Some Atlantic Highly Migratory Species
71 FR 66154	11/13/2006	Extension of comment period regarding the 2007 first trimester season proposed rule
71 FR 68561	11/27/2006	Notice of shark dealer identification workshops and protected species safe handling and release workshops
71 FR 75122	12/14/2006	Final Rule and Temporary Rule for the 2007 first trimester season and south Atlantic quota modification
71 FR 75714	12/18/2006	Notice of shark dealer identification workshops and protected species safe handling and release workshops
2007		
72 FR 123	1/3/2007	Notice of public hearings for scoping for Amendment 2 to the 2006 Consolidated HMS FMP
72 FR 5633	2/7/2007	Final rule for gear operation and deployment for BLL and gillnet fishery and complementary closures
72 FR 7417	2/15/2007	Revised list of equipment models for careful release of sea turtles in the PLL and BLL fisheries
72 FR 8695	2/27/2007	Notice of new VMS type approval for HMS fisheries and other programs
72 FR 10480	3/8/2007	Proposed rule for second and third trimester seasons
72 FR 11335	3/13/2007	Schedule of public protected resources dehooking workshops and Atlantic shark identification workshops
72 FR 20765	4/26/2007	Final rule for second and third trimester season
72 FR 32836	6/14/2007	Schedule of public protected resources dehooking workshops and Atlantic shark identification workshops
72 FR 34632	6/25/2007	Final rule prohibiting gillnet gear from November 15-April 15 between NC/SC border and 29°00'N.
72 FR 41392	7/27/2007	Proposed rule for Amendment 2 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan
72 FR 52552	9/14/2007	Schedules for Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
72 FR 55729	10/1/2007	Proposed rule for 2008 first trimester quotas
72 FR 56330	10/3/2007	Amendment 2 to the Consolidated FMP – extension of comment period
72 FR 57104	10/5/2007	Final rule amending restriction in the Southeast U.S. Monitoring Area
72 FR 67580	11/29/2007	Final rule for 2008 first trimester quotas
2008		
73 FR 11621	3/4/2008	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
73 FR 19795	4/11/2008	Proposed rule for renewal of Atlantic tunas longline limited access permits; and, Atlantic shark dealer workshop attendance requirements
73 FR 25665	5/7/2008	Stock Status Determinations; Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for Amendment 3 to the 2006 Consolidated HMS FMP
73 FR 32309	6/6/2008	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops

Federal Register Cite	Date	Rule or Notice
73 FR 35778	6/24/2008	Final rule for Amendment 2 to the 2006 Consolidated HMS FMP and fishing season notification
73 FR 35834	6/24/2008	Shark research fishery; Notice of intent; request for applications
73 FR 38144	7/3/2008	Final rule for renewal of Atlantic tunas longline limited access permits; and, Atlantic shark dealer workshop attendance requirements
73 FR 40658	7/15/2008	Final rule for Amendment 2 to the 2006 Consolidated HMS FMP and fishing season notification; correction/republication
73 FR 47851	8/15/2008	Effectiveness of collection-of-information requirements to implement fins-on check box on Southeast dealer form
73 FR 51448	9/3/2008	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
73 FR 53408	9/16/2008	Notice of public meeting, public hearing, and scoping meetings regarding the AP meeting and various other hearings/meetings
73 FR 53851	9/17/2008	Atlantic Shark Management Measures; Changing the time and location of a scoping meeting
73 FR 63668	10/27/2008	Proposed rule for 2009 shark fishing season
2009		
74 FR 8913	2/27/2009	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
74 FR 27506	6/10/2009	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
74 FR 30479	6/26/2009	Inseason action to close the commercial non–sandbar large coastal shark fisheries in the shark research fishery and Atlantic region
74 FR 46572	9/10/2009	Notice of Atlantic shark identification workshops and protected species safe handling, release, and identification workshops
74 FR 51241	10/6/2009	Inseason action to close the commercial sandbar shark research fishery
74 FR 55526	10/28/2009	Proposed rule for 2010 shark fishing season
74 FR 56177	10/30/2009	Notice of intent for 2010 shark research fishery; request for applications
2010		
75 FR 29991	5/28/2010	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling Release, and Identification Workshops
75 FR 52510	8/26/2010	Notice for Fisheries of the Gulf of Mexico and South Atlantic; Southeast Data, Assessment, and Review for Highly Migratory Species Fisheries; Sandbar, Dusky, and Blacknose Sharks
75 FR 53665	9/1/2010	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling Release, and Identification Workshops
75 FR 54598	9/8/2010	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identifications Workshops; Correction
75 FR 57235	9/20/2010	Advance Notice of Proposed Rulemaking for Atlantic Shark Management Measures
75 FR 57240	9/20/2010	Proposed Rule for 2011 Commercial Fishing Season and Adaptive Management Measures for the Atlantic Shark Fishery
75 FR 57259	9/20/2010	Notice of Intent for Atlantic Shark Management Measures: 2011 Research Fishery
75 FR 62690	10/13/2010	Inseason Action to Close the Commercial Non-sandbar Large Coastal Shark Research Fishery
75 FR 70216	11/17/2010	Fisheries of the Gulf of Mexico and South Atlantic; Southeast Data, Assessment, and Review (SEDAR); Assessment Process Webinar for Highly Migratory Species (HMS) Fisheries Sandbar, Dusky, and Blacknose Sharks
75 FR 74693	12/1/2010	Notice of Schedules for Atlantic Shark Identification Workshops and

Federal Register Cite	Date	Rule or Notice
		Protected Species Safe Handling, Release, and Identification Workshop
75 FR 75416	12/3/2010	Inseason Action to Close the Commercial Non-Sandbar Large Coastal Shark Fishery in the Atlantic Region
2011		
76 FR 5340	1/31/2011	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release and Identification Workshops, Correction
76 FR 13985	3/15/2011	Notice of Public Meeting for the Fisheries of the Gulf of Mexico and South Atlantic; Southeast Data, Assessment, and Review (SEDAR)
76 FR 34209	6/13/2011	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
76 FR 36071	6/21/2011	Proposed rule for Atlantic Highly Migratory Species; Vessel Monitoring Systems
76 FR 37750	6/28/2011	Proposed Rule for Atlantic Highly Migratory Species; Electronic Dealer Reporting Requirement
76 FR 38107	6/29/2011	Correction on Proposed Rule for Atlantic Highly Migratory Species; Electronic Dealer Reporting Requirement
76 FR 38598	7/1/2011	Notice of Atlantic Highly Migratory Species; Vessel Monitoring Systems
76 FR 44501	7/26/2011	Inseason Action To Close the Commercial Non-Sandbar Large Coastal Shark Research Fishery
76 FR 57709	9/16/2011	Notice of Intent for Catch Shares in the Atlantic Shark Fisheries
76 FR 59661	9/27/2011	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshop
76 FR 61092	10/3/2011	Notice of Availability of Stock Assessment Reports for Dusky, Sandbar, and Blacknose Sharks in the U.S. Atlantic and Gulf of Mexico
76 FR 62331	10/7/2011	Notice of Stock Status Determinations
76 FR 64074	10/17/2011	Notice of Schedules for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops; Correction
10/24/2016	10/24/2011	Atlantic Highly Migratory Species; Advisory Panel for Atlantic Highly Migratory Species Southeast Data, Assessment, and Review Workshop
76 FR 65673	10/24/2011	Notice of Stock Status Determinations
76 FR 67149	10/31/2011	Notice of Intent for 2012 Research Fishery Participants
76 FR 67121	10/31/2011	Proposed Rule for 2012 Atlantic Shark Commercial Fishing Season
76 FR 72383	11/23/2011	Atlantic Highly Migratory Species; Atlantic Shark Management Measures; Notice of Workshops
76 FR 72678	11/25/2011	Notice of Intent to Issue Exempted Fishing, Scientific Research, Display, and Chartering Permits; Letters of Acknowledgements
2012		
77 FR 3393	1/24/2012	Final Rule to Establish the Quotas and Opening Dates for the 2012 Atlantic Shark Commercial Fishing Season
77 FR 8218	2/14/2012	NMFS Announces a Public Meeting for Selected Participants of the 2012 Shark Research Fishery
77 FR 31562	5/29/2012	NMFS Considers Adding Gulf of Mexico Sharks to Amendment 5 to the 2006 Consolidated HMS FMP
77 FR 35357	6/13/2012	NMFS Announces the Opening Date of the Commercial Atlantic Region Non-Sandbar Large Coastal Fishery
77 FR 39648	7/5/2012	Inseason Action to Close the Commercial Non-Sandbar Large Coastal Shark Fishery in the Gulf of Mexico Region
77 FR 61562	10/10/2012	Proposed Rule to Establish the Quotas and Opening Dates for the 2013 Atlantic Shark Commercial Fishing Season

Federal Register Cite	Date	Rule or Notice
77 FR 67631	10/13/2012	Notice of Intent for Applications to the 2013 Shark Research Fishery
77 FR 73608	12/11/2012	Public Hearings for Draft Amendment 5 to the 2006 Consolidated HMS FMP
77 FR 75896	12/26/2012	Final Rule Regarding the 2013 Atlantic Shark Commercial Fishing Season
2013		
78 FR 279	1/3/2013	Two Additional Public Hearings and a Change in Date of One Public Hearing for Draft Amendment 5 to the 2006 Consolidated HMS FMP
78 FR 14515	3/6/2013	Public Meeting for Selected Participants of the 2013 Shark Research Fishery
78 FR 24743	4/26/2013	Availability of the Final EIS for Amendment 5a to the 2006 Consolidated HMS FMP
78 FR 25685	5/2/2013	Proposed Rule to Implement Provisions of the Shark Conservation Act of 2010
78 FR 40318	7/3/2013	Final Rule for Amendment 5a to the 2006 Consolidated HMS FMP and Closure of the Gulf of Mexico Blacktip Shark Management Group
78 FR 52487	8/23/2013	Proposed Rule to Establish the Quotas and Opening Dates for the 2014 Atlantic Shark Commercial Fishing Season
78 FR 65974	11/4/2013	Nominations for the Atlantic HMS SEDAR Pool
78 FR 70018	11/22/2013	Notice of Intent for Applications to the 2014 Shark Research Fishery
78 FR 70500	11/26/2013	Final Rule Regarding the 2014 Atlantic Shark Commercial Fishing Season
2014		
79 FR 12155	3/4/2014	Public Meeting for Selected Participants of the 2014 Shark Research Fishery
79 FR 30064	5/27/2014	Notice of Intent to Prepare an EA for Amendment 6 to the 2006 Consolidated HMS FMP
79 FR 54252	9/11/2014	Proposed Rule to Establish the Quotas and Opening Dates for the 2015 Atlantic Shark Commercial Fishing Season
79 FR 64750	10/31/2014	Notice of Intent for Applications to the 2014 Shark Research Fishery
79 FR 71331	12/2/2014	Final Rule to Establish the Quotas and Opening Dates for the 2015 Atlantic Shark Commercial Fishing Season
79 FR 73555	12/11/2014	Nominations for the Atlantic HMS SEDAR Pool
2015		
80 FR 2648	1/20/2015	Proposed Rule for Amendment 6 to the 2006 Consolidated Atlantic HMS FMP
80 FR 2916	1/21/2015	Notice of Intent for Applications from the Gulf of Mexico Region to the 2015 Shark Research Fishery
80 FR 3221	1/22/2015	Public Meeting for Selected Participants of the 2015 Shark Research Fishery
80 FR 12394	3/9/2015	Notice to Reschedule the Manteo, NC Public Hearing for Draft Amendment 6 to the 2006 Consolidated HMS FMP
80 FR 50074	8/18/2015	Final Rule for Amendment 6 to the 2006 Consolidated Atlantic HMS FMP
80 FR 49974	8/18/2015	Proposed Rule to Establish the Quotas and Opening Dates for the 2016 Atlantic Shark Commercial Fishing Season
80 FR 68513	11/5/2015	Notice of Intent for Applications to the 2016 Shark Research Fishery
80 FR 74999	12/1/2015	Final Rule to Establish the Quotas and Opening Dates for the 2016 Altantic Shark Commercial Fishing Season
2016		
81 FR 1941	1/14/2016	Notice of Public Meeting for Selected Participants of the 2016 Shark Research Fishery
81 FR 59167	8/29/2016	Proposed Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2017 Atlantic Shark Commercial Fishing Season

Table 3 List of Large Coastal Shark Seasons, 1993-2016

Note: SB=sandbar shark; NSB=non-sandbar LCS; GOM = Gulf of Mexico; ATL = Atlantic.

Year	Open dates	Quota (mt dw)
1993	Jan. 1 - May 15	1,218
	July 1 - July 31	875
1994	Jan. 1 - May 17	1,285
	July 1 - Aug 10 Sept. 1 - Nov. 4	1,318
1995	Jan. 1 - May 31	1,285
	July 1 - Sept. 30	968
1996	Jan. 1 - May 17	1,285
	July 1 - Aug. 31	1,168
1997	Jan. 1 - April 7	642
	July 1 - July 21	326
1998	Jan. 1 - Mar. 31	642
	July 1 - Aug. 4	600
1999	Jan. 1 - Mar. 31	642
	July 1 - July 28 Sept. 1 - Oct. 15	585
2000	Jan. 1 - Mar. 31	642
	July 1 - Aug. 15	542
2001	Jan. 1 - Mar. 24	642
	July 1 - Sept. 4	697
2002	Jan. 1 - April 15	735.5
	July 1 - Sept. 15	655.5
2003	Jan. 1 - April 15 (Ridgeback LCS) Jan. 1 - May 15 (Non-ridgeback LCS)	391.5 (Ridgeback LCS) 465.5 (Non-ridgeback LCS)
	July 1 - Sept. 15 (All LCS)	424 (Ridgeback LCS) 498 (Non-ridgeback LCS)
2004	GOM: Jan. 1 - Feb. 29 S. Atl: Jan 1 - Feb. 15 N. Atl: Jan 1 - April 15	190.3 244.7 18.1
	GOM: July 1 - Aug. 15 S. Atl: July 1 - Sept. 30 N. Atl: July 1 - July 15	287.4 369.5 39.6
2005	GOM: Jan 1 - Feb 28 S. Atl: Jan. 1 - Feb 15 N. Atl: Jan. 1 - April 30	156.3 133.3 6.3
	GOM: July 6 - July 23 S. Atl: July 6 - Aug 31 N. Atl: July 21 - Aug 31	147.8 182 65.2
	GOM: Sept. 1 - Oct. 31 S. Atl: Sept 1 - Nov. 15 N. Atl: Sept 1 - Sept. 15	167.7 187.5 4.9
2006	GOM: Jan 1 - April 15 S. Atl: Jan 1 - Mar. 15 N. Atl: Jan 1 - April 30	222.8 141.3 5.3
	GOM: July 6 – July 31 S. Atl: July 6 – Aug. 16 N. Atl: July 6 – Aug. 6	180 151.7 66.3

Year	Open dates	Quota (mt dw)
	GOM: Sept.1 – Nov. 7 S. Atl: Sept.1 – Oct. 3 N. Atl: Closed	225.6 50.3 Closed
2007	GOM: January 1 – January 15 S. Atl: Closed N. Atl: January 1 – April 30	62.3 Closed (-112.9) 7.9
	GOM: September 1 – September 22 S. Atl: July 15 – August 15 N. Atl: July 6 – July 31	83.1 163.1 69.0
	GOM: merged with 2nd season S. Atl: merged with 2nd season N. Atl: CLOSED	
2008	GOM: CLOSED to July 23 S. Atl: CLOSED to July 23 N. Atl: CLOSED to July 23	Closed (51) Closed (16.3) Closed (10.7)
	SB Research: July 24 - Dec. 31	87.9
2009	SB: Jan 23 – Oct 14	87.9
2010	SB: Jan 5 – Dec 31	87.9
2011	SB: Jan 1 – Dec 31	87.9
2012	SB: Jan 24 – Dec 31	87.9
2013	SB: Jan 1 – Dec 31	116.6
2014	SB: Jan 1 – Dec 31	116.6
2015	SB: Jan 1 – Dec 31	116.6 / 90.7
2016	SB: Jan 1 – Dec 31	90.7

Table 4 List of species that are LCS and LCS that later became a prohibited species

Common name	Species name	Notes
LCS		
Ridgeback Species		
Sandbar	*Carcharhinus plumbeus*	
Silky	*Carcharhinus falciformis*	
Tiger	*Galeocerdo cuvier*	
Non-Ridgeback Species		
Blacktip	*Carcharhinus limbatus*	
Spinner	*Carcharhinus brevipinna*	
Bull	*Carcharhinus leucas*	
Lemon	*Negaprion brevirostris*	
Nurse	*Ginglymostoma cirratum*	
Scalloped hammerhead	*Sphyrna lewini*	

Common name	Species name	Notes
Great hammerhead	*Sphyrna mokarran*	
Smooth hammerhead	*Sphyrna zygaena*	
Prohibited Species		
Sand tiger	*Odontaspis taurus*	Part of LCS complex until 1997
Bigeye sand tiger	*Odontaspis noronhai*	Part of LCS complex until 1997
Whale	*Rhincodon typus*	Part of LCS complex until 1997
Basking	*Cetorhinus maximus*	Part of LCS complex until 1997
White	*Carcharodon carcharias*	Part of LCS complex until 1997
Dusky	*Carcharhinus obscurus*	Part of LCS complex until 1999
Bignose	*Carcharhinus altimus*	Part of LCS complex until 1999
Galapagos	*Carcharhinus galapagensis*	Part of LCS complex until 1999
Night	*Carcharhinus signatus*	Part of LCS complex until 1999
Caribbean reef	*Carcharhinus perezi*	Part of LCS complex until 1999
Narrowtooth	*Carcharhinus brachyurus*	Part of LCS complex until 1999

Table 5 Summary of current large coastal shark regulations

Requirement for Sandbar Research Fishery	Retention Limits	Quotas	Other Requirements
Inside the Commercial Shark Research Fishery	Trip limit is specific to each vessel and owner(s) combination and is listed on the Shark Research Permit.	Quota from 2008-2012: 87.9 mt dw Quota from 2013-Aug. 17, 2015: 116.6 mt dw Quota as of Aug. 18, 2015 – 90.7 mt dw	- Need Shark Research Fishery Permit -100 percent observer coverage when participating in research fishery - Adjusted quotas (established through Dec. 31, 2016) may be further adjusted based on future overharvests, if any.
Outside the Commercial Shark Research Fishery	No retention outside of the Commercial Shark Research Fishery allowed.	NA	.
All Commercial Shark Fisheries	**Gears Allowed:** Gillnet; Bottom/Pelagic Longline; Rod and Reel; Handline; Bandit Gear		
	Authorized Species: Non-sandbar LCS (silky (not authorized for PLL), blacktip, spinner, bull, lemon, nurse, great hammerhead (not authorized for PLL), scalloped hammerhead (not authorized for PLL), smooth hammerhead (not authorized for PLL), and tiger sharks), pelagic sharks (porbeagle, common thresher, shortfin mako, oceanic whitetip (not authorized for PLL), and blue sharks), and SCS (bonnethead, finetooth, blacknose, and Atlantic sharpnose sharks)		
	Landings condition: All sharks (sandbar, non-sandbar LCS, SCS, and pelagic sharks) must have *fins naturally attached* through offloading; fins can be cut slightly for storage but must remain attached to the carcass via at least a small amount of uncut skin; shark carcasses must remain in whole or log form through offloading. Sharks can have the heads removed but the tails must remain naturally attached.		
	Permits Required: Commercial Directed or Incidental Shark Permit		
	Reporting Requirements: All commercial fishermen must submit commercial logbooks; all dealers must report weekly		
All Recreational Shark Fisheries	**Gears Allowed:** Rod and Reel; Handline		
	Authorized Species: Non-ridgeback LCS (blacktip, spinner, bull, lemon, nurse, great hammerhead, scalloped hammerhead, smooth hammerhead); tiger sharks; pelagic sharks (porbeagle, common thresher, shortfin mako, oceanic whitetip, and blue sharks); and SCS (bonnethead, finetooth, blacknose, and Atlantic sharpnose sharks)		
	Landing condition: Sharks must be landed with head, fins, and tail naturally attached		
	Retention limits: 1 shark > 54" FL vessel/trip, plus 1 Atlantic sharpnose and 1 bonnethead per person/trip (no minimum size, except for great hammerhead, smooth hammerhead, scalloped hammerhead which have a recreational minimum size of 78" FL)		
	Permits Required: HMS Angling; HMS Charter/Headboat; and, General Category Permit Holders (fishing in a shark tournament), General Commercial Swordfish Permit Holders (fishing in a shark tournament)		
	Reporting Requirements: Participate in MRIP and LPS if contacted		

Definitions of Acronyms in Table 1: Fork Length (FL); Highly Migratory Species (HMS); Large Coastal Sharks (LCS); Large Pelagic Survey (LPS); Marine Recreational Information Program (MRIP); Small Coastal Sharks (SCS).

Table 6. Summary of Shark Fishery Management Measures (2008-2016)

Management Measure	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of Vessels	11	7	7	10	5	6	5	7	6
Number of Trips per Month	2	2	2	3-Feb	1	1	1	1	1
Captain's Meeting Held	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Retention Limits	2,750 lbs dw (of which no more than 2,000 lbs dw can be sandbar sharks)	45 sandbar/trip inside research fishery	33 sandbar per trip 33 non-sandbar LCS per trip	33 sandbar per trip 33 non-sandbar LCS per trip	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed	None. All sharks, except for prohibited species, brought to vessel dead must be landed
Gear Restrictions				Hook restriction: ≤ 500 hooks per set	Set limit: one longline set per trip	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit
					Hook restriction: ≤ 150 or fewer hooks on board	Hook restriction: ≤ 500 hooks on board	Hook restriction: ≤ 500 hooks on board	Hook restriction: ≤ 500 hooks on board	Hook restriction: ≤ 500 hooks on board

Gear Restrictions					*Amendment 1* Set limit: two non-concurrent longline sets per trip: 1st set ≤ 75 hooks; soak time no more than 2 hours; 2nd set ≤ 150 hooks; no soak time limit Hook restriction: ≤ 250 hooks on board *Amendment 2*				
					Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit Hook restriction: ≤ 500 hooks on board				

Individual Vessel Quota		None. All landings counted towards the overall sandbar and LCS research quotas Sandbar: 87.9 mt dw Non-sandbar LCS: 37.5 mt dw		None. All landings counted towards the overall sandbar and LCS research quotas Sandbar: 87.9 mt dw Non-sandbar LCS: 37.5 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 14.06 mt dw Non-sandbar LCS: 6.0 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 15.5 mt dw Non-sandbar LCS: 6.7 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 18.6 mt dw Non-sandbar LCS: 8.0 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 13.3 mt dw Non-sandbar LCS: 5.7 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 14.5 mt dw Non-sandbar LCS: 8.0 mt dw
	None. All landings counted towards the overall sandbar and LCS research quotas Sandbar: 87.9 mt dw Non-sandbar LCS: 37.5 mt dw								

Mid-Atlantic Closed Area			Vessels could fish in the closed area	Vessels could fish in the closed area	Vessels could fish in the closed area	Vessels could not fish in the closed area	Vessels could fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)	Vessels could fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)	Vessels could fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)

2.3 Control Date Notices

February 22, 1994 (59 FR 8457), September 16, 2011 (76 FR 57709)

Management Program Specifications

Table 7 General management information for the sandbar shark

Species	Sandbar shark (*Carcharhinus plumbeus*)
Management Unit	Atlantic Ocean, Gulf of Mexico, and Caribbean Sea
Management Unit Definition	All federal waters within U.S. EEZ of the western north Atlantic Ocean, including the Gulf of Mexico and the Caribbean Sea.
Management Entity	NMFS, Highly Migratory Species Management Division
Management Contacts **SERO / Council**	Karyl Brewster-Geisz N/A
Current stock exploitation status	Overfishing not occurring
Current stock biomass status	Overfished

Table 8 Specific management criteria for sandbar shark

Criteria	Value
Current Relative Biomass Level	SSF_{2009}/SSF_{MSY} = 0.51 – 0.72
Domestic Minimum Stock Size Threshold	301,821 – 1,190,419 (based on SSF_{MSY}
Years to Rebuild	66
Current Relative Fishing Mortality	F_{2009}/F_{MSY} = 0.29 - 2.62
Maximum Fishing Mortality Threshold	0.004 - 0.06
B_{MSY}	SSF_{MSY} = 349,330 - 1,377,800 (numbers of sharks)

Table 9 Stock Projection Information for Sandbar Sharks

	Value
First year under current rebuilding program	2008
End year under current rebuilding program	2070
First Year of Management based on this assessment	2020
Projection Criteria during interim years should be based on (e.g., exploitation or harvest)	F=0; Fixed Harvest =220 mt ww (current TAC) = 158.3 mt dw
Projection criteria values for interim years should be determined from (e.g., terminal year, avg of X years)	Average landings of previous 2 years (2014, 2015)

2.4 Quota Calculations

Sandbar Sharks

Table 10 Quota calculation details for sandbar sharks.

Current Quota Value	Commercial Quota = 90.7 mt dw (as of Aug. 18, 2015)
Next Scheduled Quota Change	-
Annual or averaged quota ?	Annual quota
If averaged, number of years to average	-
Does the quota include bycatch/discard ?	No, but the quota is a subset of overall TAC of 158.3 mt dw; the rest of the TAC is partitioned between dead discards and recreational harvest

How is the quota calculated - conditioned upon exploitation or average landings?

The quota was determined based on the TAC calculated during SEDAR 11 (158.3 mt dw). To determine the proportion of the 158.3 mt dw TAC for sandbar that would be available for the commercial fishery, NMFS accounted for mortality of sandbar sharks in all sectors of recreational and commercial fisheries. NMFS first determined the commercial TAC by subtracting the average number of recreational sandbar shark landings (27 mt dw) per year from the 158.3 mt dw TAC, resulting in a commercial TAC of 131.3 mt dw (Table 11). NMFS then determined the available commercial quota by subtracting discards in the HMS PLL fishery and non-HMS fisheries (*e.g.*, the snapper-grouper and tilefish fisheries) as well as the set-aside for display and research quota. NMFS also accounted for landings recorded in the Coastal Fisheries Logbook by fishermen who did not have valid or current HMS shark permits. NMFS subtracted dead discards/landings from non-permit holders and recreational fishermen because it is assumed that mortality will continue regardless of directed fishery management measures. The total landings and discards from each of these data sources can be found in Table 11). Based on that TAC, the HMS Management Division subtracted average annual recreational harvest from 2003-2005 (27 mt dw) and discards from 2003-2005 (14.7 mt dw), resulting in a commercial quota of 116.6 mt dw (calculations in Table 11).

Table 11 Calculation of sandbar quota (Source: Amendment 2 EIS; p. Appendix 1).

	mt dw
Total sandbar shark TAC	158.3
Average Annual Recreational Landings	27
Resultant Commercial TAC (158.3 mt dw – 27 mt dw)	**131.3 (7,147.3* sandbar sharks)**
Average annual number of sandbars landed/discarded by non-HMS permit holders in Coastal Fisheries Logbook	6.1
Average annual number of sandbars discarded by incidental permit holders in Coastal Fisheries Logbook	2.3
Average annual number of dead discards on PLL gear in the HMS Logbook	4.3
Public display quota	1
Research quota	1
All gillnet discards	0.018
Extrapolated number of discards in snapper-grouper and tilefish BLL fishery based on BLL observer program	0
Total discards	*14.7*
Resultant sandbar shark quota (131.3 mt dw – 14.7 mt dw)	**116.6 (6,346.9* sandbar sharks)**

*assumes an average commercial sandbar shark weight of 40.5 lb dw (Cortés and Neer, 2005)

However, large overharvests during 2007 resulted in the HMS Management Division reducing the commercial quota to 87.9 mt dw during 2008-2012 to account for the overharvests. The quota was increased to 116.6 mt dw during 2013 –Aug. 17 of 2015. On August 18, 2015, the HMS Management Division reduced the commercial quota to 90.7 mt dw with the implementation of Amendment 6.

As described in Amendment 2, the retention limit for LCS was in part based on how many sandbar sharks would be discarded dead from the number of shark trips that were expected to interact with sandbar sharks. In Amendment 6, NMFS used a portion of the unharvested sandbar shark research fishery quota to account for sandbar shark discards that might occur with a higher LCS retention limit and adjusting the sandbar shark research fishery quota accordingly.

To calculate the adjustment to the sandbar shark research fishery quota necessary in order to increase the LCS retention limit, NMFS used the average number of directed shark trips (592 directed shark trips), the Atlantic region catch composition ratio of 1:8.8 for retention limit calculations, and the observed dead discard rate of sandbar sharks (31.5 percent) in the Atlantic region.

NMFS used the following steps to calculate the adjustment to the sandbar shark research fishery quota. First, NMFS divided the current retention limit of 55 LCS other than sandbar sharks per trip by the LCS catch composition ratio from the Atlantic region (8.8:1; 8.8 LCS other than sandbar sharks per 1 sandbar shark) to determine the potential number of sandbar shark discards per trip (Column A in Table 12). Under the current retention limit of 55 LCS other than sandbar sharks per trip, this resulted in 6.2 sandbar sharks being discarded per trip (55 LCS other than sandbar sharks per trip divided by 8.8 = 6.2 sandbar sharks per trip). Next, the sandbar shark discards per trip in Column A in Table 12 was

multiplied by the average number of directed shark trips (592 trips) to determine the potential number of sandbar sharks discarded per year by shark fishermen targeting LCS (Column B in Table 12). This resulted in potential discards of 3,696 sandbar sharks being discarded live or dead per year (6.2 sandbar sharks per trip * 592 trips per year = 3,696 sandbar sharks per year). Third, to determine the number of sandbar sharks discarded dead (Column C), NMFS multiplied the number of sandbar sharks discarded per year in Column B by the observed dead discard rate of sandbar sharks (31.5 percent) in the Atlantic region from the commercial bottom longline observer program. This resulted in potential dead discards of sandbar sharks per year of 1,166 sharks (3,696 sandbar sharks discarded per year * 0.315 sandbar sharks observed dead = 1,166 sandbar sharks discarded dead per year). Fourth, to determine the total weight of the dead discards of sandbar sharks, NMFS used the average weight of 49.0 lb dw based on the 2010/2011 stock assessment, which is the most recent stock assessment for sandbar sharks. This resulted in 57,113 lb dw, or 25.9 mt dw of dead discards of sandbar sharks (Column D in Table 12; 1,166 dead sandbar sharks per year * 49.0 lb dw = 57,113 lb dw of dead sandbar sharks / 2,204.6 lb = 25.9 mt dw). Last, to compensate for the additional mortality of sandbar sharks in directed shark fishing trips, NMFS adjusted the sandbar shark research fishery quota by subtracting the additional mortality from the current baseline quota. This resulted in a sandbar research fishery quota of 199,943 lb dw, or 90.7 mt dw (257,056 lb dw baseline sandbar shark research quota – 57,113 lb dw additional mortality of sandbar sharks = 199,943 lb dw, or 90.7 mt dw new baseline sandbar shark research quota) (Column E in Table 12).

Table 12. Adjusted sandbar shark quota in the Atlantic shark research fishery based on the current commercial retention limit. **Note:** Dead discard rate is 31.5 percent; average weight of sandbar sharks = 49.0 lb dw; baseline sandbar shark research fishery quota is 116.6 mt dw (257,056 lb dw). (Source: Amendment 6 EIS; p. 14-16)

Current Retention Limit	**(A)** Sandbar Shark Discards per Retention Limit (Number of Sharks)	**(B)** Sandbar Shark Discards (Number of sharks)	**(C)** Sandbar Shark Dead Discards (Number of Sharks)	**(D)** Sandbar Shark Quota Adjustment	**(E)** Sandbar Shark Research Fishery Quota Under the Different Alternatives
55	6.2	3,696	1,166	25.9 mt dw (57,113 lb dw)	90.7 mt dw (199,943 lb dw)

Does the quota include bycatch/discard estimates? If so, what is the source of the bycatch/discard values? What are the bycatch/discard allowances?

The commercial quota does not include bycatch/discards estimates. Such estimates are removed before the commercial quota is calculated.

Are there additional details of which the analysts should be aware to properly determine quotas for this stock?

The quota is adjusted each year through a season rule. Overharvests are deducted from the following year. No overharvests have been experienced for sandbar sharks since implementation of Amendment 2 in 2008. Table 13 shows the history of shark quotas adjusted for under and overharvest. The commercial sandbar shark quota is not adjusted for underharvests as underharvests do not apply to stocks that have been determined to be overfished, have overfishing occurring, or an unknown stock status.

2.5 Management and Regulatory Timeline

The following tables provide a timeline of Federal management actions by fishery. It should be noted that federally permitted fishermen must follow federal regulations unless state regulations are more restrictive.

Table 13 Annual commercial sandbar shark regulatory summary (managed in the LCS complex until 2008 when separate quota and sandbar shark research fishery established under Amendment 2 except in 2003 where it was managed as a ridgeback).

		Fishing Year			Possession Limit
Year	*Base Quota (LCS complex)*	*N. Atlantic*	*S. Atlantic*	*Gulf*	*All regions*
1993	2,436 mt dw	One region; calendar year with two fishing periods			No trip limit
1994	2,346 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip
1995	2,570 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip
1996	2,570 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip
1997	1,285 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip
1998	1,285 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip
1999	1,285 mt dw	One region; calendar year with two fishing periods (but fishing season open and closed twice during 2nd season-see Table 3)			4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders*
2000	1,285 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2001	1,285 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2002	1,285 mt dw	One region; calendar year with two fishing periods			4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2003	783 mt dw	One region; calendar year with two fishing periods but ridgeback and non-ridgeback split-see Table 3)			4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2004	1,107 mt dw	Regions† with two fishing seasons	Regions† with two fishing seasons	Regions† with two fishing seasons	4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2005	1,107 mt dw	Trimesters/Regions†	Trimesters/Regions†	Trimesters/Regions†	4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2006	1,107 mt dw	Trimesters/Regions†	Trimesters/Regions†	Trimesters/Regions†	4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2007	1,107 mt dw	Trimesters/Regions†	Trimesters/Regions†	Trimesters/Regions†	4,000 lb dw LCS combined/trip; 5 LCS for incidental permit holders
2008**	87.9 mt dw	One region; calendar year			2,750 lb dw of LCS/trip of which no more than 2,000 lb dw could be sandbar inside research fishery; trip limit= 0 outside research fishery
2009**	87.9 mt dw	One region; calendar year			45 sandbar/trip inside research fishery; trip limit= 0 outside research fishery
2010**	87.9 mt dw	One region; calendar year			33 sandbar/trip inside research fishery; trip limit= 0 outside research fishery
2011**	87.9 mt dw	One region; calendar year			33 sandbar/trip inside research fishery; trip limit= 0 outside research fishery
2012**	87.9 mt dw	One region; calendar year			no trip limit inside research fishery; trip limit = 0 outside research fishery
2013**	116.6 mt dw	One region; calendar year			no trip limit inside research fishery; trip limit = 0

			outside research fishery
2014**	116.6 mt dw	One region; calendar year	no trip limit inside research fishery; trip limit = 0 outside research fishery
2015**	90.7 mt dw	One region; calendar year	no trip limit inside research fishery; trip limit = 0 outside research fishery
2016**	90.7 mt dw	One region; calendar year	no trip limit inside research fishery; trip limit = 0 outside research fishery

*Limited Access Permits (LAPs) were implemented for the shark and swordfish fisheries under 1999 FMP; †Regions = Gulf of Mexico, South Atlantic, and North Atlantic.

**Sandbar specific quota; Sharks required to be offloaded with all fins naturally attached under Amendment 2

Table 14 Annual recreational sandbar shark regulatory summary (managed in the LCS complex until 2008 recreational retention prohibited under Amendment 2).

Year	Fishing Year	Size Limit	Bag Limit
1993	Calendar Year	No size limit	4 LCS or pelagic sharks/vessel
1994	Calendar Year	No size limit	4 LCS or pelagic sharks/vessel
1995	Calendar Year	No size limit	4 LCS or pelagic sharks/vessel
1996	Calendar Year	No size limit	4 LCS or pelagic sharks/vessel
1997	Calendar Year	No size limit	2 LCS/SCS/pelagic sharks combined/vessel
1998	Calendar Year	No size limit	2 LCS/SCS/pelagic sharks combined/vessel
1999	Calendar Year	No size limit	2 LCS/SCS/pelagic sharks combined/vessel
2000	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2001	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2002	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2003	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2004	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2005	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2006	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2007	Calendar Year	Minimum size =4.5 ft	1 LCS/SCS/pelagic shark combined/vessel/trip
2008*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2009*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2010*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2011*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2012*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2013*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2014*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2015*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip
2016*	Prohibited	N/A	1 LCS/SCS/pelagic shark combined/vessel/trip

*Retention prohibited in recreational fishery under Amendment 2.

Table 15: Sandbar Recreational Regulatory History
prepared by: Delisse Ortiz

Year	Quota (units)	ACL (units)	Days Open	Fishing Season	season start date (first day implemented)	season end date (last day effective)	reason for closure	Size limit (TL, natural, or maximum)	size limit start date	size limit end date	Retention Limit (# fish)	Retention Limit Start Date	Retention Limit End Date	Aggregate Retention Limit[1] (# fish)	Aggregate Retention Limit Start Date	Aggregate Retention Limit End Date
1993	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec
1994	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec
1995	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec
1996	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec	4 LCS or pelagic sharks/vessel [A]	1-Jan	31-Dec
1997	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec
1998	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec
1999	NA	NA	365	Open	1-Jan	31-Dec	NA	None	NA	NA	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec	2 LCS/SCS/pelagic sharks combined/vessel [B]	1-Jan	31-Dec
2000	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec
2001	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec
2002	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C]	1-Jan	31-Dec
2003	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C,D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec
2004	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C,D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec
2005	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C,D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec
2006	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C,D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec
2007	NA	NA	365	Open	1-Jan	31-Dec	NA	Minimum size =4.5 ft [C,D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec	1 LCS/SCS/pelagic shark combined/vessel/trip [C, D]	1-Jan	31-Dec
2008 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2009 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2011 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2012 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2013 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2014 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2015 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA
2016 [E]	NA	NA	NA	Closed	1-Jan	31-Dec	No retention alllowed [E]	NA	NA	NA	NA	NA	NA	NA	NA	NA

1 = The aggregate recreational bag limit includes several species(LCS: including sandbar, silky, tiger, blacktip, spinner, bull, lemon, nurse, scalloped hammerhead, great hammerhead, and smooth
A = Established a recreational trip limit of 4 LCS or pelagic sharks per vessel (1993 FMP for Sharks of the Atlantic Ocean; effective April 26, 1993);
B= Reduced recreational retention limit for all sharks to 2 LCS/SCS/pelagic sharks combined per trip (effective April 2, 1997)
C = Reduced recreational retention limits for all sharks to 1 shark per vessel per trip except for Atlantic sharpnose (1 Atlantic sharpnose/person/trip) and established a recreational minimum size for all sharks except Atlantic sharpnose (4.5 feet) (1999 FMP for Atlantic Tunas, Swordfish and Sharks; effective date July 1, 1999);
D= Adjusted the recreational bag and size limits (allowed 1 bonnethead/person/trip in addition to 1 Atlantic sharpnose/person/trip with no size limit for bonnethead or Atlantic sharpnose) (Amendment 1 to the FMP for Atlantic Tunas, Swordfish and Sharks ; effective December 30, 2003);
E = Retention of sandbar sharks prohibited in recreational fishery (Amendment 2, effective July 24, 2008).

Note:

Table 16. State Shark Regulations

State	Confirmed by State?	pre-1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alabama	No	no shark regulations	First shark regulations implemented: state shark fishery closes with the federal shark fishery		By 1998: only short lines in state waters; time/area and size restrictions on the recreational use of gillnets						By Feb 2004: Recreational daily bag limit - 2 sharpnose/person/day; all other species - 1fish/person/day; Recreational minimum size all sharks (except sharpnose) - 54" FL		By May 2006: Recreational & Commercial non-sharpnose min size – 54" FL or 30" dressed; Prohibition: Atlantic angel, bigeye thresher, dusky, longfin make, sand tiger, basking, whale, white, and nurse sharks		By Oct 2008: no new regs	Recreational & commercial sharpnose bag limit dropped to 1 sharpnose per person per day; no shark fishing on weekends, Memorial Day, Independence Day, or Labor Day	Recreational & commercial: bag limit – 1 sharpnose/person/day and 1 bonnethead/person/day; no min size; all other sharks – 1/person/day; min size – 54" FL or 30" dressed; state waters close when federal season closes; no shark fishing on weekends, Memorial Day, Independence Day, or Labor Day; Prohibited species: dusky, sand tiger, bigeye sand tiger, basking, whale, and white sharks; Restrictions of chumming and shore-based angling if creating unsafe bathing conditions; Regardless of open or closed season, gillnet fishermen targeting other fish may retain sharks with a dressed weight not exceeding 10% of total catch	no new shark regulations	no new shark regulations	no new shark regulations	Great hammerhead, smooth hammerhead, scalloped hammerhead 1/person/day - 78" FL; all other sharks – 1/person/day; min size – 54" FL or 30" dressed; Commercial - no size limit and no possession limit on any non-prohibited species.	no new shark regulations	no new shark regulations
Connecticut	Yes	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	no shark regulations	July: No possession or landing of large coastal shark species by any commercial fishing gear or for commercial purposes.	Feb: Commercial possession of prohibited Small Coastal Sharks: Atlantic sharpnose, finetooth, blacknose, bonnethead until a 2010 quota is set by NMFS; Sandbar shark take prohibited in the commercial and recreational fisheries per ASMFC FMP except under Scientific Collection Permit	– Prohibited species same as federal regulations; No commercial fishing for large coastal sharks; No commercial small coastal shark fishing until further notice	no new shark regulations	no new shark regulations	Great hammerhead, smooth h	Prohibited species same as federal regulations; Possession of sandbar shark (Carcharhinus plumbeus) prohibited except by permit for research and display purposes	Prohibited species same as federal regulations; Possession of sandbar sharks prohibited except by permit for research and display purposes. No commercial fishing for large coastal sharks; No commercial small coastal shark fishing until further notice
Delaware	Yes	no shark regulations	no shark regulations	no shark regulations	Commercial shark fishermen must hold a federal shark permit even when fishing in state waters, therefore, state regulations match federal regulations; sharks must be landed with meat and fins intact, but head can be removed; any shark not kept must be released in a manner that maximizes survival; taking of basking, white, whale, sand tiger, and bigeye sand tiger prohibited; seasonal gillnet restrictions. Recreational regulations: no more than two sharks per vessel except that 2 sharpnose can also be landed; prohibition on finning and filleting or taking of the 5 prohibited species	no new shark regulations	Creel limit on regulated sharks of 1 shark per vessel per day; creel limit for sharpnose is 2 sharks per day; minimum size on regulated sharks is 54 inches FL; fins must be naturally attached; 14 prohibited species added (Atlantic angel shark, bigeye sixgill shark, bigeye thresher, bignose shark, Caribbean reef shark, Caribbean sharpnose shark, dusky shark, Galapagos shark, longfin mako, narrowtooth shark, night shark, sevengill shark, sixgill shark, smalltail shark)	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	ASMFC Plan	ASMFC Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	Sharks – ASMFC Coastal Shark Plan	Sharks – ASMFC Coastal Shark Plan; Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	Sharks – ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan
Florida	Yes	1992: first shark-specific regulations: must hold federal shark permit; commercial and recreational possession limit of 1 shark per person per day or 2 sharks per vessel per day, whichever is less (virtually no commercial shark fishery in state waters); prohibition on landing fins withour corresponding carcass; released sharks should be released in a manner that maximizes survival; recreationally caught sharks cannot be transerred at sea; recreatioanlly cuagth sharks cannot be sold; prohibition on harvest, landing and sale of basking and whale sharks; state shark fishery closes with federal shark fishery; 1994: prior to landing, fins cannot be removed from a shark harvested in state waters; fishermen returning from federal waters with sharks or shark parts harvested in federal waters, cannot fish in state waters; 1995: ban on the use of entanglement nets larger than 500 square feet	No new shark regulations	No new shark regulations	By 1998: ban on longlines; 1998: Added sand tiger, bigeye sandtiger, and white sharks to prohibited species list; prohibition on filleting sharks at sea.	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	March: Same prohibited species as federal regulations, except Caribbean sharpnose is not included	No new shark regulations	No new shark regulations	No new shark regulations	Jan: Commercial/recreational min size – 54" except no min. size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose; Allowable gear – hook and line only; prohibition on the removal of shark heads and tails in state waters; prohibition on harvest of sandbar, silky, and Caribbean sharpnose sharks in state waters; March: prohibition on all harvest of lemon sharks in state waters.	– 54" except no min. size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose; Commercial/recreational possession limit – 1 shark/person/day, max. 2 sharks/vessel on any vessel with 2 or more persons on board; Allowable gear – hook and line only; State waters close to commercial harvest when adjacent federal waters close; Federal permit required for commercial harvest, so federal regulations apply in state waters unless state regulations are more restrictive; Finning, removing heads and tails, and filleting prohibited; Prohibited species same as federal regulations plus prohibition on harvest of lemon and sandbar sharks in state waters, direct and continuous transit through state waters to place of landing of lemon sharks and sandbar sharks legally caught in federal waters is allowed.	no new shark regulations	no new shark regulations	Great hammerhead, smooth h	no new shark regulations	It is unlawful to harvest any shark with the use of any multiple hook in conjunction with live or dead natural bait and unlawful to harvest shark by snagging (snatch hooking)
Georgia	Yes	1950s: ban on gillnets and longlines; All finfish spp. must be landed with head and fins intact	No new shark regulations	No new shark regulations	First shark regulation: prohibition on taking sand tiger sharks; Small Shark Composite (Atl. Sharpnose, bonnethead, spiny dogfish) 30"TL min. size;Creel: 2/person/day All other sharks 2/person/day or 2 /boat/day, whichever is less. 54"TL min. size, only one shark over 84" TL	No new shark regulations	Sharks may not be landed in Georgia if harvested using gillnets	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	No new shark regulations	Recreational: 1 shark from the Small Shark Composite (bonnethead, sharpnose, and spiny dogfish, min size 30" FL; All other sharks - 1 shark/person or boat, whichever is less, min size 54" FL, Prohibited Species: sand tiger sharks, sandbar, silky, bigeye sandtiger, whale, basking, white, dusky, bignose, Galapagos, night, reef, narrowtooth, Caribbean sharpnose, smalltail, Atlantic angel, longfin mako, bigeye thresher, sharpnose sevengill, bluntnose sixgill, and bigeye sixgill.	Commercial/Recreational: 1 shark from the Small Shark Composite (bonnethead, sharpnose, and spiny dogfish, min size 30" FL; All other sharks - 1 shark/person or boat, whichever is less, min size 54" FL, Prohibited Species: sand tiger sharks, sandbar, silky, bigeye sandtiger, whale, basking, white, dusky, bignose, Galapagos, night, reef, narrowtooth, Caribbean sharpnose, smalltail, Atlantic angel, longfin mako, bigeye thresher, sharpnose sevengill, bluntnose sixgill, and bigeye sixgill; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using gill nets	Commercial/Recreational: 2/person/boat for sharks from the Small Shark Composite (bonnethead, sharpnose, and spiny dogfish, min size 30" FL; All other sharks - 2 shark/person or boat, whichever is less, min size 48" FL; unlawful to have in possession more than one shark greater than eighty-four inches (84") total length; Prohibited Species: same as federal, plus silky sharks; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using gillnets	Commercial/Recreational: 1/person/boat for sharks from the Small Shark Composite (bonnethead, sharpnose, and spiny dogfish, min size 30" FL; All other sharks - 1 shark/person or boat, whichever is less, min size 54" FL Prohibited Species: same as federal, plus silky sharks; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using gillnets; ASMFC Coastal Shark Plan	no new shark regulations	Commercial/Recreational: 1/person for sharks from the Small Shark Composite (bonnethead, Atlantic sharpnose, and spiny dogfish), min size 30" FL. All other sharks - 1 shark/person or boat, whichever is less, min size 54" FL. Hammerheads (great, scalloped and smooth)- 1/person, minimum size – 78" FL. Prohibited Species: same as federal, plus silky sharks; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using gillnets; ASMFC Coastal Shark Plan; Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	no new shark regulations	no new shark regulations
Louisiana	No			Ban on entanglement nets	No new shark regulations						By Feb 2004: Minimum size - 54" except sharpnose; Possession limit - 1 fish/vessel/trip; Trip limit 4,000 lbs dw LCS; Reference to federal regulations; State waters closed to rec/commercial April 1 through June 30		By May 2006: Recreational: min size – 54" FL, except Atlantic sharpnose and bonnethead; bag limit - 1 sharpnose/person/day; all other sharks – 1 fish/person/day; Commercial: 4,000 lb LCS trip limit, no min size; Com & Rec Harvest Prohibited: 4/1-6/30; Prohibition: same as federal regulations		By Oct 2008: Commercial: 33 per vessel per trip limit, no min size	No new shark regulations	Recreational: min size – 54" FL, except Atlantic sharpnose and bonnethead; bag limit - 1 sharpnose/person/trip, all other sharks – 1 fish/person/day; Commercial: 33 per vessel per trip limit; no min size; Com & rec harvest prohibited: 4/1- 6/30; Prohibited species: same as federal regulations; Fins must remain naturally attached to carcass though off-loading	Commercial shark fishing requires annual state shark permit. Owners/operators of vessels other than those taking sharks in compliance with state or federal commercial permits are restricted to no more than one shark from either the large coastal, small coastal, or pelagic group per vessel per trip within or without Louisiana waters.	no new shark regulations	no new shark regulations	Commercial: 33/vessel/day limit (36/vessel/day by mid-2013); no min size; Com & rec harvest prohibited: Apr 1 - Jun 30	Commercial: 36/vessel/day limit; no min size; Com & rec harvest prohibited: Apr 1 - Jun 30; Prohibited species: same as federal regulations; Fins must remain naturally attached to carcass though offloading.	; Commercial: 45/vessel/day limit; no min size; Com & rec prohibited: Apr 1 - Jun 30; Prohibited species: same as federal regulations; Fins must remain naturally attached to carcass though off-loading. Commercial shark fishing requires annual state shark permit. Owners/operators of vessels other than those taking sharks in compliance with state or federal commercial permits are restricted to no more than one shark from either the large coastal, small coastal, or pelagic group per vessel per trip within or without Louisiana waters, except Atlantic sharpnose and bonnethead which are allowed at one/person/day.
Maine	No	No shark regulations	No shark regulations	No shark regulations	By 1998: large state water closures to gillnets resulting in virtually no gillnet fishery; 1998: no shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	Maximum 5 % fin-to-carcass ratio	– Fins of coastal sharks can be removed at sea, but fin weight may not exceed 5% of the carcass weight	Prohibited species same as federal, plus silky and sandbar; commercial harvest of porbeagle sharks prohibited in state waters, porbeagle cannot be landed after federal quota closes; sharks must be landed with head, fins, and tail naturally attached to the carcass	Commercial harvest of sharks (except spiny dogfish) in state waters prohibited; finning prohibited; sharks harvested elsewhere but landed in Maine, or sharks landed recreationally, must be landed with head, fins, and tail naturally attached to the carcass; porbeagle cannot be landed commercially after federal quota closes dealers who purchase sharks must obtain a federal dealer permit. Recreational anglers must possess a federal HMS angling permits	no new shark regulations	Great hammerhead, smooth h	no new shark regulations	no new shark regulations
Maryland	No		4000 lb shark limit per person per day; fins must accompany carcass and not exceed 5% fin-to-carcass ratio, state shark fishery closes with federal shark fishery		Size limit of 58 inches FL or a carcass less than 31 inches; recreational bag limit of one shark per person per day; by 1998: maximum gillnet mesh size of 6 inches; no longlining in tidal waters.						By Feb 2004: minimum FL reduced to 54 inches, carcass length the same (31 inches); recreational catch limit of 1 shark per person per day; reference to federal regs 50 CFR 635.	ASMFC Coastal Shark Plan	By May 2006: no new shark regulations		By Oct 2008: no new shark regulations	ASMFC Plan	Sharks – ASMFC Coastal Shark Plan		ASMFC Coastal Shark Plan	Recreational catch required to be tagged; ASMFC Coastal Shark Plan	Recreational catch required to be tagged; ASMFC Coastal Shark Plan; all recreationally harvested sharks must have heads, tails, and fins attached naturally to the carcass through landing; all commercially harvested sharks other than smoothhounds must have tails and fins attached naturally to carcass through landing; smoothhound sharks harvested commercially may have dorsal, pectoral and caudal fins removed (caudal fins may not exceed 4% of total dressed weight of smoothhound shark carcasses on board; dorsal and pectoral fins may not exceed 8% of total dressed weight of smoothhound shark carcasses on board); Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	no new shark regulations	no new shark regulations
Massachusetts	No	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations		By May 2006: Prohibition on harvest, catch, take, possession, transportation, selling or offer to sell any basking, dusky, sand tiger, or white sharks.		By Oct 2008: no new shark regulations	No new shark regulations	ASMFC Coastal Shark Plan except that the tails and fins of smooth dogfish must remain attached through landing	ASMFC Coastal Shark Plan (no shark species may be landed with tails or fins removed 322 CMR 6.37(3)(d))	ASMFC Coastal Shark Plan (no shark species may be landed with tails or fins removed 322 CMR 6.37(3)(d))	ASMFC Coastal Shark Plan (no shark species may be landed with tails or fins removed 322 CMR 6.37(3)(d))	ASMFC Coastal Shark Plan (no shark species may be landed with tails or fins removed 322 CMR 6.37(3)(d)); Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	Sharks – ASMFC Coastal Shark Plan (no shark species may be landed with tails or fins removed 322 CMR 6.37(3)(d))	Commercial - During the period of May 15-July 15 an individual may not harvest the species listed in §A(6) and (7) of this regulation from State waters or transport the species listed in §A(6) and (7) of this regulation in State waters, unless the shark was harvested from federal waters provided:
Mississippi	No			prohibit taking and possession of sand tiger, bigeye sand tiger, whale, basking, and white sharks; Recreational: bag limit of 4 small coastal sharks (Atlantic sharpnose, Caribbean sharpnose, finetooth, blacknose, smalltail, bonnethead and Atlantic angel shark) per person per day; limit of 3 large coastal and pelagic sharks, in aggregate per vessel per day, same prohibited species as commercial fishers; minimum size of 25 inches total length for small coastal sharks and 37 inches total length for large coastal sharks							By Feb 2004: no new shark regulations		By May 2006: no new shark regulations		By Oct 2008: Recreational bag limit - LCS/Pelagics 1/person up to 3/vessel; SCS 4/person; Commercial & Prohibited Species - Reference to federal regulations		Recreational: min size - LCS/Pelagics 37" TL; SCS 25" TL; bag limit - LCS/Pelagics 1/person/day up to 3/vessel/day; SCS 4/person/day; Commercial and prohibited species – same as federal regulations; Prohibition on finning	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	It is unlawful for commercial fishermen to possess sandbar sharks. Prohibition on finning
New Hampshire	No	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No commercial take of porbeagle	Prohibited sharks listed; Federal Dealer permit required for all shark dealers; Porbeagle sharks can only be taken by recreational fishing; Head, fins and tail must remain attached to all shark species through landing	no new shark regulations	no take, landings, or possession of prohibited shark species; NH Wholesale Marine Species License and a Federal Dealer permit required for all dealers purchasing listed sharks; Porbeagle sharks can only be taken by recreational fishing; Head, fins and tail must remain attached to all shark species through landing	no new shark regulations	Great hammerhead, smooth h	no new shark regulations	no new shark regulations
New Jersey	No				No shark-specific regulations; by 1998: no longline fishing; restrictions on the use of gillnets						By Feb 2004: commercial/recreational possession limit of 2 sharks per vessel; prohibition on finning; dorsal fin to pre-caudal pit must be at least 23 inches in length; total length must be 48 inches in length		By May 2006: no sale during federal closures; Finning prohibited; Prohibited Species: basking, bigeye sand tiger, sand tiger, whale and white sharks		By Oct 2008: no new shark regulations	No new shark regulations	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	Sharks – ASMFC Coastal Shark Plan	Sharks – ASMFC Coastal Shark Plan; Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	Sharks – ASMFC Coastal Shark Plan	Sharks ASMFC Coastal Shark Plan

New York	No				By 1998: prohibition on finning sharks; no other shark regulations							By Feb 2004: reference to federal regs 50 CFR part 635; prohibited sharks listed		By May 2006: no new shark regulations		By Oct 2008: no new shark regulations	No new shark regulations		ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	Sharks – ASMFC Coastal Shark Plan; Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	Shark Plan. Separate requirement that No person shall possess, sell, offer for sale, trade, or distribute a shark fin, provided, however, that this prohibition shall not apply to any shark fin that was taken from a spiny dogfish (Squalus acanthias), smooth dogfish (Mustelus canis), or blacknose shark lawfully caught by a licensed commercial fisherman; a shark fin may be possessed by any person if the shark was lawfully caught and the person has a recreational marine fishing registration or a license or permit from the department for bona	A SMFC Coastal Plan. Non-stainless, non-offset circle hooks must be used when taking sharks.
North Carolina	Yes	1998: prohibition on finning 1993 – 7,500 lbs per trip, dogfish exempt; unlawful to land fins without carcass; fins no more than 10%; unlawful to land dried fins; required record keeping; Recreational - bag limit is 1 per day 1992 – Reduced fins to no more than 7%.	No new shark regulations	No sharks, except Atlantic sharpnose and pelagic sharks, can be taken by commercial gear in state waters; fins must be landed with the carcass; maximum 5% fin-to-carcass ratio; fishers cannot possess or land dried shark fins	No new shark regulations	No new shark regulations	One shark per vessel per day with commercial gear (except Atlantic sharpnose and dogfish) while federal waters are open for species group; 84 inch maximum size limit except for tiger, thresher, bigeye thresher, shortfin mako and hammerhead species; must be landed with head, tail and fins intact; Recreational – bag limit is 1 per person per day with a minimum size of 54" (none on Atlantic sharpener) and a maximum of 84" (except for tiger, thresher, bigeye thresher, shortfin mako and hammerhead species). Prohibited species – basking, white, sand tiger and whale sharks	No new shark regulations	No new shark regulations	April: Prohibited sidgeharks (sandbar, silky, and tiger sharks) from Large Coastal Group	No new shark regulations	No new shark regulations	Open seasons and species groups (same as federal; 4000 lb trip limit for LCS; retain fins with carcass through point of landing; longline shall only be used to harvest LCS during open season, shall not exceed 600 yds or have more than 50 hooks (state waters reopened to commercial fishing); Recreational: LCS (54" FL min size) – no more than 1 shark/vessel/day or 1 shark/person/day, SCS (no min size) – no more than 1 fourteath or blacknose shark/vessel/day and no more than 1 Atlantic sharpnose and 1 bonnethead/person/day, pelagics (no min size) - 1 shark/vessel/day. Same prohibited shark species as federal regulations	No new shark regulations	July: Adopted federal regulations of 33 Large Coastal sharks per trip and fins must be naturally attached to carcass	Fins must be naturally attached to shark carcass		ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	no new shark regulations	Great hammerhead, smooth	no new shark regulations	no new shark regulations
Puerto Rico	Yes	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations		Year-round closed season on some sharks Shark "finning" is prohibited. PR regulations indicate the need for compliance by local fishers with federal shark regulations	no new shark regulation	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations		Director may impose restrictions for size, season, areas, quantity, etc. via proclamation; ASMFC Coastal Shark IFMP; additionally: LL in the shark fishery shall not exceed 600 yds or have more than 60 hooks	no new shark regulations	no new shark regulations	Director may impose restrictions for size, season, areas, quantity, etc. via proclamation; ASMFC Coastal Shark IFMP; additionally: LL in the shark fishery shall not exceed 600 yds or have more than 60 hooks	no new shark regulations	no new shark regulations
Rhode Island	No	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulations	No shark regulation		ASMFC Coastal Shark Plan	Swordfish or billfish, tuna, and shark are covered under the federal Atlantic HMS regulations (50 CFR, Part 635). Fishers who capture these species are required to comply with said regulation; billfish captured incidentally with long line must be released by cutting the line close to the billfish, avoiding the removal of the fish from the water; in the case of tuna and swordfish, fishers shall obtain a permit according to the requirements of the federal government; Year-round closed season on some sharks	no new shark regulations	no new shark regulations	Sharks – ASMFC Coastal Shark Plan; Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	no new shark regulations	no new shark regulations
South Carolina	No				By 1998: federal regs adopted by reference; use of gillnets prohibited in the shark fishery							By Feb 2004: retention limit of 2 Atlantic sharpener per person per day and 1 bonnethead per person per day; no trim size for recreationally caught bonnethead sharks; reference to federal commercial regulations and closures		By May 2006: non-Atlantic sharpener/bonnethead sharks – 1 shark/boat/trip, min size – 54" FL		By Oct 2008: no new shark regulations	No new shark regulations		Refer to federal regulations; Gillnets may not be used in the shark fishery in state waters; State permit required for shark fishing in state waters	no new shark regulations	no new shark regulations	no new shark regulations	Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	no new shark regulations	no new shark regulations
Texas	Yes	Sept. 1989: Bag limit set at five sharks per day for both rec and commercial anglers; Sept 1992: Bag limit increased to ten sharks per day. Trotlines were added as allowable gear for sharks.		1997: Commercial bag limit of 4 sharks; possession limit of 35 sharks; no min or max size. Recreational bag, possession, and lack of size restrictions same as commercial	1998: commercial fishing for sharks can only be done with rod and reel; no entanglement nets								Sept: Commercial/Recreational retention limit: 1 fish/person/day; Commercial/Recreational possession limit is twice the daily bag limit (i.e., 1 fish/person/day); Commercial/Recreational maximum size 24 in TL		By May 2006: no new shark regulations		By Oct 2008: no new shark regulations	Sept: Min size 24" TL for Atlantic sharpener, blacktip, and bonnethead sharks and 64" TL for all other lawful sharks. Prohibited species: same as federal regulations		Refer to federal regulations; Gillnets may not be used in the shark fishery in state waters; State permit required for shark fishing in state waters Commercial/recreational: bag limit: 1 shark/person/day; Commercial/recreational possession limit is twice the daily bag limit (i.e., 2 sharks/person/day); min size 24" TL for Atlantic sharpener, blacktip, and bonnethead sharks and 64" TL for all other lawful sharks. Prohibited species: same as federal regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations
Virginia	No	1994: no longlines in state waters; recreational bag limit of 1 shark per person per day; established a commercial trip limit of__; 1993: mandatory reporting of all shark landings		7500 lb commercial trip limit; minimum size of 38 inches FL or 31 inches carcass length (but can keep up to 200 lbs dw of sharks per day less than 31 inches carcass length); prohibition on finning; recreational: possession limit of 1 shark per person per day	By 1998: no longlining in state waters	no new shark regulation	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations	no new shark regulations		By May 2006: Recreational: bag limit – 1 LCS, SCS, or pelagic shark/vessel/day with a min size of 54" FL or 30" CL; 1 Atlantic sharpener and bonnethead/person/day with no min size; Commercial: possession limit – 4000 lb dw/day, min size - 58" FL or 31" CL west of the COLREGS line and no min size limit east of the COLREGS line; Prohibitions: fillet at sea, finning, longlining, same prohibited shark species as federal regulations	no new shark regulations	no new shark regulations	ASMFC Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan - Great hammerhead, smooth hammerhead, scalloped hammerhead recreational minimum size of 78" FL	Sharks – ASMFC Coastal Shark Plan	ASMFC Coastal Shark Plan

3. ASSESSMENT HISTORY AND REVIEW

The sandbar shark was first assessed individually in 1998 and later in 2002, 2006, and 2011. Prior to that, it was part of the Large Coastal Shark complex, which was first assessed in 1991 and subsequently updated in 1994, 1996, and 1998. In the 1998 Shark Evaluation Workshop (NMFS 1998), a Bayesian surplus production modeling approach was used to assess sandbar sharks, concluding that the 1998 stock size was 58-70% of the stock size at MSY. The 2002 Stock Evaluation Workshop saw the use of multiple assessment methodologies, which resulted in contradictory conclusions on stock status, but the report (Cortés et al. 2002) noted that the status of the resource had improved compared to the conclusions from the 1998 assessment. It was noted, however, that when averaged over the range of models judged plausible, overfishing of the resource could be occurring but current biomass was near or somewhat above that producing MSY.

The first assessment of sandbar sharks under the SEDAR framework took place in 2006 (SEDAR 11, NMFS 2006). Although up to 5 models were initially presented, it was decided that an age-structured production model would be used as the base model given that catch and age-specific biological and selectivity information were available. The 2006 assessment concluded that the stock was overfished (SSF_{2004}/SSF_{MSY}=0.72-0.85; range of base and sensitivity model runs) with overfishing occurring (F_{2004}/F_{MSY}=1.73-18.3; range of base and sensitivity model runs). The main changes between the 2002 and 2006 assessments included differences in the CPUE series used, a maturity ogive shifted towards older ages in 2006, the use of age-specific values of M in 2006 vs. a fixed M at age in 2002, and differing assumptions relating to virgin conditions and historic exploitation.

SEDAR 21 (in 2011) assessed sandbar sharks with the state-space, age-structured production model (ASPM) as the primary assessment modeling approach. Probabilities obtained through likelihood profiling of the base run indicated that there was a 69 % probability that the stock in 2009 was overfished and an 86% probability that there was no overfishing in 2009. Of the 16 sensitivity runs explored, all estimated an overfished status (with the exception of a run that used fishery-independent indices only), and all runs estimated that the stock was not undergoing overfishing, except for two runs (hierarchical index with equal weights and high M run). Following the completion of the assessment, The Review Panel identified seven additional sensitivity runs to better understand how assessment outputs were related to key model assumptions. All runs still indicated that the stock was overfished (SSF_{2009}/SSF_{MSY} ranged from 0.51 to 0.72) and undergoing overfishing (F_{2009}/F_{MSY} ranged from 0.29 to 0.93), with the exception of a low productivity run which estimated overfishing. The main changes between the 2006 and 2011 assessments included: the 2011 assessment started in 1960 (vs. 1975 in the 2006 assessment), catches spanned 1960-2009 (vs. 1975-2004) and commercial catches were split into the Gulf of Mexico and Atlantic (vs. one single commercial series), there were 11 indices, 5 of them new to SEDAR 21 and all of which were reanalyzed (vs. 8 indices in SEDAR 11), there

were 4 selectivities for catches, 3 of which were new (vs. 3), and 8 selectivities for indices (vs. 2), there were new biological parameters, including a new von Bertalanffy growth curve with a more rapid growth coefficient K=0.12 (vs. 0.09), lifespan was shorter at 27 years (vs. 40), there was a new maturity-at-age ogive that was shifted to younger ages, with a median maturity of 13 years (vs. 19), the Data Workshop Panel agreed on a longer reproductive cycle of 2.5 years as a compromise between 2 and 3 years (vs. 2 in SEDAR 11), and new estimates of natural mortality at age were produced, with lower values for the younger ages and higher values for the older ages. These changes affected the potential productivity/resiliency of the stock in different directions: the higher K, shorter lifespan, and maturity ogive shifted to the left can be associated with a more productive stock, but at the same time there were 13 fewer years during which females can produce offspring and at a slower rate of every 2.5 years.

References

Cortés, E., L. Brooks, and G. Scott. 2002. Stock assessment of large coastal sharks in the U.S. Atlantic and Gulf of Mexico. Sustainable Fisheries Division Contribution SFD-02/03-177. 222 pp.

NMFS (National Marine Fisheries Service). 1998. Report of the Shark Evaluation Workshop. NOAA/NMFFS Panama City Laboratory.

NMFS (National Marine Fisheries Service). 2006. Southeast Data, Assessment and Review (SEDAR) 11. Large Coastal Shark complex, blacktip and sandbar shark stock assessment report. NOAA/NMFS Highly Migratory Species Division, Silver Spring, MD.

NMFS (National Marine Fisheries Service). 2011. Southeast Data, Assessment and Review (SEDAR) 21. Large Coastal Shark complex, blacktip and sandbar shark stock assessment report. NOAA/NMFS Highly Migratory Species Division, Silver Spring, MD.

4. SEDAR ABBREVIATIONS

ABC	Allowable Biological Catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
ADMB	AD Model Builder software program
ALS	Accumulated Landings System; SEFSC fisheries data collection program
AMRD	Alabama Marine Resources Division
ASMFC	Atlantic States Marine Fisheries Commission
B	stock biomass level
BAM	Beaufort Assessment Model

BMSY	value of B capable of producing MSY on a continuing basis
CFMC	Caribbean Fishery Management Council
CIE	Center for Independent Experts
CPUE	catch per unit of effort
EEZ	exclusive economic zone
F	fishing mortality (instantaneous)
FMSY	fishing mortality to produce MSY under equilibrium conditions
FOY	fishing mortality rate to produce Optimum Yield under equilibrium
FXX% SPR	fishing mortality rate that will result in retaining XX% of the maximum spawning production under equilibrium conditions
FMAX	fishing mortality that maximizes the average weight yield per fish recruited to the fishery
F0	a fishing mortality close to, but slightly less than, Fmax
FL FWCC	Florida Fish and Wildlife Conservation Commission
FWRI	(State of) Florida Fish and Wildlife Research Institute
GA DNR	Georgia Department of Natural Resources
GLM	general linear model
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
GULF FIN	GSMFC Fisheries Information Network
HMS	Highly Migratory Species
LDWF	Louisiana Department of Wildlife and Fisheries
LGL	LGL Ecological Research Associates
M	natural mortality (instantaneous)
MARMAP	Marine Resources Monitoring, Assessment, and Prediction
MDMR	Mississippi Department of Marine Resources
MFMT	maximum fishing mortality threshold, a value of F above which overfishing is deemed to be occurring
MRFSS	Marine Recreational Fisheries Statistics Survey; combines a telephone survey of households to estimate number of trips with creel surveys to estimate catch and effort per trip

MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold, a value of B below which the stock is deemed to be overfished
MSY	maximum sustainable yield
NC DMF	North Carolina Division of Marine Fisheries
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
OY	optimum yield
SAFMC	South Atlantic Fishery Management Council
SAS	Statistical Analysis Software, SAS Corporation
SC DNR	South Carolina Department of Natural Resources
SEAMAP	Southeast Area Monitoring and Assessment Program
SEDAR	Southeast Data, Assessment and Review
SEFIS	Southeast Fishery-Independent Survey
SEFSC	Fisheries Southeast Fisheries Science Center, National Marine Fisheries Service
SERO	Fisheries Southeast Regional Office, National Marine Fisheries Service
SPR	spawning potential ratio, stock biomass relative to an unfished state of the stock
SSB	Spawning Stock Biomass
SS	Stock Synthesis
SSC	Science and Statistics Committee
TIP	Trip Incident Program; biological data collection program of the SEFSC and Southeast States.
TPWD	Texas Parks and Wildlife Department
Z	total mortality, the sum of M and F

SEDAR

Southeast Data, Assessment, and Review

SEDAR 54

HMS Sandbar Shark

SECTION II: Assessment Process Report

October 2017

SEDAR
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

Table of Contents

1 INTRODUCTION

1.1 WORKSHOP TIME AND PLACE

The SEDAR 54 Assessment Process was held via a series of webinars between May 2017 and August 2017.

1.2 TERMS OF REFERNCE

1. Conduct a stock assessment of Sandbar Shark using Stock Synthesis (SS) with data through 2015 using the same data inputs used in the SEDAR 21 benchmark assessment model to the fullest extent appropriate. Document any differences between SS and the previous model.
2. Evaluate the input data listed below compared to the SEDAR 21 assessment model data and document any changes or deviations with respect to those data:
    - Updated life history information (age and growth and reproductive parameters)
    - The relative abundance indices vetted in SEDAR 21 and used in the baseline scenario
    - Updated commercial and recreational discard information
    - Updated length composition information
    - Any new data sources that may have become available since SEDAR 21 was conducted and that may be used with Stock Synthesis.

    Provide updated input data tables, as appropriate, including any catch (e.g., commercial, recreational, discards) in both weight and number.
3. Provide model parameter estimates and their variances, model uncertainties, diagnostics to determine model performance, including fit to data and convergence, and estimates of stock status and management benchmarks. Provide criteria used to identify the base model run and conduct model sensitivity analysis to address uncertainty in data inputs and model configuration, including model runs that represent plausible alternate states of nature previously identified and vetted in SEDAR 21, as well as other model uncertainties identified during the assessment.
4. Project future stock conditions regardless of the status of the stock. Develop new rebuilding schedules, only if there is new and unexpected information about the status of the stock. Stock projections shall be developed in accordance with the following:

    A) If the stock is overfished and no new rebuilding schedule is warranted, then utilize projections to evaluate current rebuilding plan (started in 2008, projected to end in 2070):

        - F resulting in 50% and 70% probability of rebuilding by 2070
        - Fixed level or removals (TAC) allowing rebuilding of stock by 2070 with 50% and 70% probability

    B) If the stock is overfished and a new rebuilding schedule is warranted, then utilize projections to determine:

        - Provide the estimated generation time for the stock.
        - Year in which F=0 results in a 70% probability of rebuilding (Year $F=0_{p70}$)
        - Target rebuilding year (Year $F=0_{p70}$ + 1 generation time) ($Year_{rebuild}$)

- F resulting in 50% and 70% probability of rebuilding by $Year_{rebuild}$
- Fixed level or removals (TAC) allowing rebuilding of stock with 50% and 70% probability

C) Otherwise, utilize a P* approach to determine:

- The F needed and corresponding removals associated with a 70% probability of overfishing not occurring (P* = 0.3)

D) If data or other issues preclude classic projections (i.e. A, B or C above), explore alternate projection models to provide management advice.

5. Develop a stock assessment report to address these TORs and fully document the input data, methods, and results.

1.3 LIST OF PARTICIPANTS

Workshop Panel

Joel Rice, Lead Analyst ..... NMFS Consultant
Peter Barile..... DSF, Inc.
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Enric Cortes ..... NMFS Panama City
Dean Courtney ..... NMFS Panama City
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Cami McCandless ..... NMFS Narragansett
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Delisse Ortiz..... HMS

Adam Pollack.....NMFS Pascagoula
Gray Redding.....NMFS
Carrie Soltanoff.....NMFS
Jackie Wilson.....HMS

1.4 LIST OF DATA WORKSHOP WORKING PAPERS & REFERNCE DOCUMENTS

Document #	Title	Authors	Date Submitted
Documents Prepared for the Assessment			
SEDAR54-WP-01	Updated life history parameters for sandbar sharks, *Carcharhinus plumbeus*	William B. Driggers III, Bryan S. Frazier, John K. Carlson, Bethany M. Deacy, Michael P. Enzenauer and Andrew N. Piercy	8 May 2017
SEDAR54-WP-02	Updated catch rates of sandbar sharks (*Carcharhinus plumbeus)* in the northwest Atlantic Ocean from the Shark Bottom Longline Observer Program, 1994-2015	John K. Carlson and Alyssa N. Mathers	3 May 2017
SEDAR54-WP-03	Standardized catch rates of sandbar sharks from the Large Pelagics Rod and Reel Survey 1986-2015	John Walter and Craig A. Brown	7 April 2017
SEDAR54-WP-04	Sandbar Shark Abundance Indices from NMFS Bottom Longline Surveys in the Northern Gulf of Mexico	Adam G. Pollack, David S. Hanisko and G. Walter Ingram, Jr.	19 May 2017
SEDAR54-WP-05	Standardized catch rates for sandbar sharks from the U.S. pelagic longline observer program using generalized linear mixed models	Enric Cortés and Xinsheng Zhang	15 May 2017
SEDAR54-WP-06	Example Implementation of a Hierarchical Cluster Analysis and Cross-correlations of Selected CPUE Indices for the SEDAR 54 Assessment	Dean Courtney	20 Sept 2017
SEDAR54-WP-07			

Final Stock Assessment Reports		
SEDAR54-SAR1	HMS Sandbar Shark	SEDAR 54 Panel

1.5 STATEMENT ADDRESSING EACH TERM OF REFERENCE

Terms of Reference.

1. *Conduct a stock assessment of Sandbar Shark using Stock Synthesis (SS) with data through 2015 using the same data inputs used in the SEDAR 21 benchmark assessment model to the fullest extent appropriate. Document any differences between SS and the previous model.*

This report documents the stock assessment of sandbar shark using the modeling framework Stock Synthesis. Descriptions of the data used in the current assessment and the differences in that data from SEDAR 21 are provided in Section 2. A replication analysis that reproduced SEDAR 21 results with Stock Synthesis is provided in Sections 3.1.1 and 3.1.2. A continuity analysis that updated the catch data, the indices of abundance, and certain biological parameters is provided in Section 3.1.3. The base case assessment model methods, results and sensitivity analyses are described in Section 3.2. The base case data sources are summarized in Section 3.2.2. The software and general assessment approach are summarized in Sections 3.2.3 and 3.2.4. Base case model results are provided in Section 3.2.5. Retrospective and Markov Chain Monte Carlo (MCMC) analyses conducted for the base case model are provided in Section 3.2.6. Sensitivity runs representing alternative state of nature scenarios are provided in Section 3.2.7. An investigation of model structure uncertainty using profile likelihoods for the base case and selected alternate states of nature is provided in Section 3.2.8. Reference points for the base case and selected alternative states of nature are provided in Section 3.2.9. Projections for the base case and selected alternative states of nature are provided in Section 3.2.10. Assessment research recommendations are provided in Section 3.3.

2. Evaluate the input data listed below compared to the SEDAR 21 assessment model data and document any changes or deviations with respect to those data:

- *Updated life history information (age and growth and reproductive parameters)*
- *The relative abundance indices vetted in SEDAR 21 and used in the baseline scenario*
- *Updated commercial and recreational discard information*
- *Updated length composition information*
- *Any new data sources that may have become available since SEDAR 21 was conducted and that may be used with SS*

Provide updated input data tables, as appropriate, including any catch (e.g., commercial, recreational, discards) in both weight and number.

Changes to the biology and fishery inputs used for SEDAR 21 were evaluated in recognition of updated information that had become available since the last assessment. These changes are documented in Section 2. The main changes included:

a) The von Bertalanffy growth curves were updated based on the work by Hale and Baremore (2013) combined with new samples of smaller animals that became available (J. Carlson, unpublished data). Maximum age was also updated from 27 to 31 years based on the new growth curve and a bomb radiocarbon dating and mark-recapture study by Andrews et al. (2011).
b) New estimates of natural mortality were produced for this analysis with the same indirect estimators used in SEDAR 21 using updated life history estimates.
c) The estimate of steepness was updated to 0.3 from 0.29 based on a recalculation of the parameter based on the updated life history inputs
d) Updated indices of relative abundance. The previous analyses have for the most part been extended until 2015 (from 2009), with exceptions noted in section 2.
e) Commercial and recreational catches and discards have been re-computed or re-estimated using the same methods as previously used.
f) Length composition for 3 fisheries and 11 CPUE series were integrated into the assessment.

3. Provide model parameter estimates and their variances, model uncertainties, diagnostics to determine model performance, including fit to data and convergence, and estimates of stock status and management benchmarks. Provide criteria used to identify the base model run and conduct model sensitivity analysis to address uncertainty in data inputs and model configuration, including model runs that represent plausible alternate states of nature previously identified and vetted in SEDAR 21, as well as other model uncertainties identified during the assessment.

All modeling methods are described in Section 3; the results of the replication analysis and continuity analysis are presented in Section 3.1. The base case model configuration and results are described in section 3.2. Measures of overall model fit are provided in Section 3.2.5 along with estimates of model parameters, and associated measures of uncertainty Information on the evaluation of uncertainty, including sensitivity runs, is described in Sections 3.2.6, 3.2.7, and 3.2.8; information on benchmarks and reference points is in section 3.2.9.

4. Project future stock conditions regardless of the status of the stock. Develop new rebuilding schedules, only if there is new and unexpected information about the status of the stock. Stock projections shall be developed in accordance with the following:

A) If the stock is overfished and no new rebuilding schedule is warranted, then utilize projections to evaluate current rebuilding plan (started in 2008, projected to end in 2070):

- *F resulting in 50% and 70% probability of rebuilding by 2070*
- *Fixed level or removals (TAC) allowing rebuilding of stock by 2070 with 50% and 70% probability*

B) If the stock is overfished and a new rebuilding schedule is warranted, then utilize projections to determine:

- *Provide the estimated generation time for the stock.*
- *Year in which F=0 results in a 70% probability of rebuilding (Year F=0p70)*
- *Target rebuilding year (Year F=0p70 + 1 generation time) (Year rebuild)*
- *F resulting in 50% and 70% probability of rebuilding by Year rebuild*
- *Fixed level or removals (TAC) allowing rebuilding of stock with 50% and 70% probability*

C) Otherwise, utilize a P approach to determine:*

- *The F needed and corresponding removals associated with a 70% probability of overfishing not occurring (P* = 0.3)*

D) If data or other issues preclude classic projections (i.e. A, B or C above), explore alternative projection models to provide management advice.

Details and results of the projections are explained in section 3.2.10. The base case model results fell within item A of this TOR. Stochastic projections were carried out at levels of TAC that were estimated to allow rebuilding of the stock by 2070 with 50% and 70% probability. Forecast probabilities were calculated via MCMC analysis with the forecast module internal to SS3. This method carries forward the uncertainty in the estimated model parameters, but did not forecast recruitment variability. Alternative configurations of the base case led to estimations of stock status where items B and C may apply. In these situations, projections using TACs estimated to meet the criteria specified in the TORs were carried out via MCMC analysis in the same fashion as for the base case projections.

5. Develop a stock assessment report to address these TORs and fully document the input data, methods, and results.

This is the present document.

2 DATA REVIEW AND UPDATE

2.1 REPLICATION AND COUNTINUITY DATA SETS

Prior to undertaking the analysis for SEDAR 54 a reproduction of the previous base case assessment (SEDAR 21), termed a replication analysis, was completed. Following the replication analysis, a series of continuity analyses were conducted that sequentially incorporated new catch inputs and extended the catches through the updated time frame from 1960-2015 (as opposed to 1960-2009),

and incorporated updated estimates of life history parameters. These changes are documented in section 3.1. In general, all data inputs (catches, CPUE series, life history inputs, selectivities) used for the replication analysis were the same as those used in SEDAR 21. For the continuity analyses, the inputs were updated in a stepwise manner.

2.2 NEW DATA SOURCES CONSIDERED (FOR NEW ANALYSES)

2.2.1 Life History

The life history inputs used in the assessment are presented in Tables 2.1 and 2.2. These include age and growth, as well as several parameters associated with reproduction, including sex ratio, reproductive frequency, fecundity by length, maturity at age, and month of pupping, and age-specific natural mortality. Stock synthesis uses most life history characteristics as constants (inputs) and others are estimated parameters, which can be assigned priors and initial values, or estimated via initial conditions and associated minimum and maximum values. Differences between the input data for SEDAR 21 and SEDAR 54 included updated natural mortality, growth curve, and maximum age information (Tables 2.1 and 2.2). The main changes included:

a) The von Bertalanffy growth curves were updated based on the work by Hale and Baremore (2013) combined with new samples of smaller animals that became available (J. Carlson, unpublished data). Maximum age was also updated from 27 to 31 years based on the new growth curve and a bomb radiocarbon dating and mark-recapture study by Andrews et al. (2011).
b) New estimates of natural mortality were produced for this analysis with the same indirect estimators used in SEDAR 21 using updated life history estimates.
c) The estimate of steepness was updated to 0.3 from 0.29 based on a recalculation of the parameter based on the updated life history inputs
d) Updated indices of relative abundance. The previous analyses have for the most part been extended until 2015 (from 2009), with exceptions noted in section 2.
e) Commercial and recreational catches and discards have been re-computed or re-estimated using the same methods as previously used.
f) Length composition for 3 fisheries and 11 CPUE series were integrated into the assessment.

2.2.2 Catch Data

No changes were introduced to the methods to develop the catch series used in SEDAR 21, though the input data was updated. This section (2.2.2) references the SEDAR 21 Data Workshop (DW)

and Assessment Workshop (AW) Reports and working paper SEDAR21-DW-09, which describe in detail the methods used to estimate the catch series for SEDAR 54. The catch trends from SEDAR 21 (in numbers) and SEDAR 54 (in numbers) differ slightly in their overlapping years (Figure 2.1). The same four fisheries (F1, F2, F3, and F4) that were used in SEDAR 21 have been maintained in this analysis, and are described below. Landings for commercial fisheries, which are typically reported in dressed weight, are converted to whole weight with a conversion factor of 1.39 (whole weight =1.39*dressed weight), which is consistent with previous analyses.

F1 and F2 Commercial landings

Commercial landings data used in the assessment are presented in Table 2.3 and Figure 2.2. A full description of the landings and how they were calculated is given in the SEDAR 21 DW Report and SEDAR21-DW-09. Briefly, the commercial catch series was split into a Gulf of Mexico (F1 GOM) and an Atlantic (F2 ATL) component to reflect capture of animals of different sizes in the two areas and assign separate selectivity patterns to each area. Computation of these two separate catch series proceeded as follows. First, for 1991-2015, commercial landings were split into GOM and ATL using the percentage by region and year from the general canvass data (1991-2012) or from the HMS eDealer database (2013-2015). Secondly, prior to 1991 there were only regional landings data for 1987-1990, but the annual percentages oscillated widely from one area to another so for 1960-1990, total commercial landings were apportioned into GOM and ATL using the average percent composition by region for the first five years with more reliable data (1991-1995). Unreported commercial catches in 1986-1991 were split into the two regions using the percent composition reported on page 3 of SEDAR21-DW-09. These values represent landings only for the commercial fisheries.

F3 Recreational and Mexican catches

The recreational catch data used in the assessment are presented in Table 2.3 and Figure 2.2. A full description of the catches and how they were computed is given in the SEDAR 21 DW Report and SEDAR21-DW-09. Briefly, annual catch estimates are the sum of estimates reported in the MRFSS/MRIP (fish landed [A] and discarded dead [B1]), Headboat survey (fish landed) and Texas Parks and Wildlife Department survey (fish landed). The only changes with respect to SEDAR 21 were that catches were extended to 2015 (from 2009 in SEDAR 21); for 2004-2015, MRIP estimates, which have replaced MRFSS, were used; and catches were also expressed in weight. For

the Mexican catches, sandbar sharks caught in the states of Tamaulipas and Veracruz in Mexico that were assumed to have come from the USA were as reported in the previous assessment until 2000 and came from online fisheries statistics from Conapesca for 2001-2008 (see the SEDAR 21 DW Report and SEDAR21-DW-09 for the methods pertaining to the derivation of these catches). The only changes with respect to SEDAR 21 were that catches were extended to 2015 using Conapesca fisheries statistics available online for 2009-2013 (catches for 2014 and 2015 were assumed equal to the mean of those in 2011-2013). Landings are provided in weight in the Mexican fishery statistics. Values represent landings and dead discards for the recreational fishery and reported landings for the Mexican fishery.

F4 Menhaden Fishery Discards

This was the only series of commercial discards incorporated into the assessment (Table 2.3 and Figure 2.2) and has a very small magnitude (less than 800 fish in any year). A full description of the derivation of these estimates is given in the SEDAR 21 DW Report and SEDAR21-DW-09. The only changes with respect to SEDAR 21 were that catches were extended to 2015 using updated effort data (number of vessels) in the purse seine menhaden fishery in the Gulf of Mexico.

2.2.3 Indices of Abundance

The indices and their temporal coverages are listed in Table 2.4 and shown in Figure 2.3, and the values and the estimated coefficients of variation (CVs) are in Tables 2.5 and 2.6. Aside from having been updated to 2015, the majority of the indices of abundance are unchanged in their methodology or data sources from SEDAR 21. There were four exceptions. The first exception is that S9, the COASTSPAN SE LL index, now replaces the old GA and SC COASTSPAN indices and adds the FL COASTSPAN index. The GA and SC COASTSPAN indices were removed and the years 1988 and 1999 eliminated because they were uncertain. The second exception is that S11, the SEAMAP SE LL index, is combined with the GA red drum index starting in 2007. The third change is that the index from the SEFSC Shark Bottom Longline Observer Program was split in 2007 to reflect a change in reporting requirements (see below for details). Finally, the Panama City Gillnet index was dropped from the analysis based on the advice from the author of that paper due to the very low occurrence of sandbar sharks in that index (approximately 2-3 per year). The following is an overview of the available indices of abundance; each description is preceded by the name of the

index, the corresponding paper from SEDAR 21 that details the methods, and the name of the survey in SEDAR 54.

Large Pelagic Survey (SEDAR21-DW-44) S1 LPS

The original paper presented an update to two abundance indices for sandbar (*Carcharhinus plumbeus*) and dusky sharks (*Carcharhinus obscurus*) sharks off the coast of the United States from Virginia through Massachusetts that were developed using data obtained during interviews of rod and reel anglers in 1986-2009. The analysis was updated using data through 2015. Subsets of the data were analyzed to assess effects of factors such as month, area fished, boat type (private or charter), interview type (dockside or phone) and fishing method on catch per unit effort. Standardized catch rates were estimated through generalized linear models by applying delta-Poisson error distribution assumptions. A stepwise approach was used to quantify the relative importance of the main factors explaining the variance in catch rates. The same models used in the indices constructed in 2004 and 2009 were used in this paper for the binomial and Poisson.

SEFSC Shark Bottom Longline Observer Program (SEDAR21-DW-02) S2 And S3

Catch rate series were developed from the data collected by on-board observers in the shark bottom longline fishery for the period 1994-2015 for sandbar sharks. All series were subjected to a Generalized Linear Model (GLM) standardization technique that treats the proportion of sets with positive catches (i.e., where at least one shark was caught) assuming a binomial error distribution with a logit link function, and the catch rates of sets with positive catches assuming a lognormal error distribution with a log link function separately. Historically, vessels in this fishery primarily targeted sandbar shark. With the introduction of the shark research fishery in 2008, vessels outside the research fishery were not permitted to target or land sandbar sharks. This change in management regulations likely influences the time series of abundance for sandbar shark such that vessels fishing in the research fishery should be modeled separately from those outside the research fishery. Therefore, two indices of abundance were created from this data series; 1994-2007 for all vessels and 2008-2015 for vessels in the research fishery. While observations of vessels outside the research fishery were made from 2008-2015, the low sample size in some years combined with the change in targeting practices precluded including those data. Year, depth and area were significant as a main effect in most models. The relative

abundance index over both time periods showed a flat trend in abundance since 1994 for sandbar shark with some increase in later years.

VIMS Longline (SEDAR21-DW-18) S4 VA LL

The Virginia Institute of Marine Science (VIMS) has conducted a fishery-independent longline survey during summer months since 1974. Data for sandbar sharks captured in the survey between 1975 and 2015 were analyzed. Most of the sandbar sharks encountered by the survey were immature, with females composing almost all of the mature sandbar catch. Nominal and standardized catch rates were presented. CPUE decreased from the early 1980s to minima in 1992. CPUE then slightly increased and has oscillated since. The previous assessment (in 2004) included a Data Workshop including an Indices working group which recommended removal of all years where less than five standard stations were sampled, thus these years were removed and analyses were conducted on the new data sets. Removal of these years did not change explanatory factors in the models.

NMFS Southeast Bottom Longline (SEDAR21-DW-39) S5 NMFS LLSE

The Southeast Fisheries Science Center (SEFSC) Mississippi Laboratories has conducted standardized bottom longline surveys in the Gulf of Mexico, and off the east coast of the United States since 1995. The objective of this longline survey was to provide fisheries independent data for stock assessment for as many species as possible. This survey was used to develop abundance indices for sandbar sharks for in the GOM and Atlantic. To develop standardized indices of annual average CPUE for sandbar sharks for both the GOM and Atlantic, a delta-lognormal model, as described by Lo *et al.* (1992), was employed. For the SEDAR 54 assessment one index of abundance was developed that was based on all of the data.

NMFS COASTSPAN Longline (SEDAR21-DW-27) S6 CST NELL

This document detailed the young of the year (YOY), age 1+ juvenile and the total juvenile sandbar shark catch from the Northeast Fisheries Science Center (NEFSC), Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) survey conducted in Delaware Bay. Catch per unit effort (CPUE) in number of sharks per 50-hook set per hour was used to examine the relative abundance of juvenile sandbar sharks between the summer nursery seasons from 2001 to 2015. The CPUE was standardized using a two-step delta-lognormal approach originally proposed by Lo et al (1992) that models the proportion of positive catch with a binomial error

distribution separately from the positive catch, which is modeled using a lognormal distribution. All three juvenile sandbar shark time series showed a fairly stable trend in relative abundance from 2001 to 2005 with only a brief decrease in abundance in 2002, which may be attributed to a large storm (associated with a hurricane offshore) that passed through the Bay that year. This stable trend was followed by a decreasing trend from 2005 to 2008, followed by an increase in relative abundance in 2009 and a subsequent decrease and then increase in the trend. Overall this trend shows high annual variability.

NMFS Northeast Longline (SEDAR21-DW-28) S7 NMFS NE

This document detailed sandbar and dusky shark catch from the Northeast Fisheries Science Center (NEFSC) coastal shark bottom longline survey, conducted by the Apex Predators Program, Narragansett Laboratory, Narragansett, RI from 1996-2015. Data from this survey were used to look at the trends in relative abundance of sandbar and dusky sharks in the waters off the east coast of the United States. Catch per unit effort (CPUE) by set in number of sharks/(hooks*soak time) were examined for each year of the bottom longline survey, 1996, 1998, 2001, 2004, 2007, 2009, 2012, and 2015. The CPUE was standardized using a two-step delta lognormal approach originally proposed by Lo *et al.* (1992) that models the proportion of positive catch with a binomial error distribution separately from the positive catch, which was modeled using a lognormal distribution. Sandbar sharks showed a declining trend from 1998 to 2004 followed by an increase in relative abundance through 2015. Sandbar sharks showed an increasing trend in relative abundance post 2004, particularly in 2007-2015.

Southeast Pelagic Longline Observer Program (SEDAR21-DW-08) S8 PLLOP

Updated indices of abundance were developed for sandbar sharks (*Carcharhinus plumbeus*) from the US pelagic longline observer program (1992-2015). Indices were calculated using a two-step delta-lognormal approach that treats the proportion of positive sets and the CPUE of positive catches separately. Standardized indices with 95% confidence intervals are reported. The trends from the observer index decreased from 1992 to 2003, after which it showed an upward trend. Fishing regulations such as time-area closures or bait restrictions were taken into account in the index standardization.

SC COASTSPAN / SCDNR Red drum Longline (SEDAR21-DW-30) S9 COASTSPAN SE LL and *S10 SCDNR Red Drum*

This document detailed shark catches from the South Carolina Department of Natural Resources (SCDNR), Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) survey and the SCDNR adult red drum survey, both conducted in South Carolina's estuarine and nearshore waters from 1998-2009. Catch per unit effort (CPUE) in number of sharks per hook hour were used to examine sandbar shark relative abundance for all SCDNR time series. The SCDNR red drum time series had to be analyzed in two separate time segments (1998-2006 and 2007-2009) due to a change in gear and sampling design. The CPUE for all time series was standardized using a two-step delta-lognormal approach originally proposed by Lo *et al.* (1992) that models the proportion of positive catch with a binomial error distribution separately from the positive catch, which is modeled using a lognormal distribution. Sandbar sharks from the SCDNR COASTSPAN survey showed a fairly stable trend in relative abundance from 1998 to 2003, followed by a slight increasing trend during the mid-2000s. Sandbar sharks from the 1998-2006 SCDNR red drum survey showed a drop in abundance from 1999 to 2000 followed by a more stable trend in the 2000s. Sandbar sharks from the 2007-2009 SCDNR red drum survey also showed a relatively stable trend during the three year time frame this survey has been in existence.

SEAMAP LL ATL survey (SC/GA combined, with recent red drum series for SC)
S11_SEAMAP_LL_SE

For the SEAMAP LL ATL survey only fish 80 cm FL and greater were included in the time series. The CPUE = sandbar catch (80 cm FL +) per 100 hook hours standardized using a delta-lognormal model with stepwise forward incorporation of the following factors: year (2007-2015), month (May-September), area (Winyah Bay, Charlestown Harbor, St Helena Sound, Port Royal Sound, southern Georgia, northern Florida), salinity (<25, 25-29, 30-34, 35+ ppt), temperature (<20, 20-25, 25+ degC), depth (<10 m, 10+ m), and set (sequential set number in a given day of sampling). Analyses were conducted using SAS. Final models were ppos= year + area + month + salinity and log pos cpue = year + area. A declining trend is seen until 2012 and then the trend is positive for the remainder of the time series.

2.3 TABLES

Table 2.1 Age specific life history inputs to the model: natural mortality at age (M), and proportion mature at age. All these quantities are treated as constants in the SEDAR 54 assessment.

Age	Natural mortality (M)	Proportion mature
0	0.1604	0.00
1	0.1604	0.00
2	0.1604	0.00
3	0.1604	0.00
4	0.1604	0.00
5	0.1604	0.00
6	0.1578	0.01
7	0.1168	0.02
8	0.1168	0.03
9	0.1168	0.06
10	0.1168	0.12
11	0.1168	0.21
12	0.1168	0.33
13	0.1168	0.49
14	0.1168	0.65
15	0.1168	0.78
16	0.1168	0.88
17	0.1168	0.93
18	0.1168	0.96
19	0.1168	0.98
20	0.1168	0.99
21	0.1168	0.99
22	0.1168	1.00
23	0.1168	1.00
24	0.1168	1.00
25	0.1168	1.00
26	0.1168	1.00
27	0.1168	1.00
28	0.1168	1.00
29	0.1168	1.00
30	0.1168	1.00
31	0.1168	1.00

Table 2.2 Life history inputs to the model. All these quantities are treated as constants in the SEDAR 54 assessment.

Quantity	VALUE
Sex ratio:	1:1
Reproductive frequency:	2.5 yr
Pupping month:	June
Length vs litter size relation:	pups = 0.0324*FL + 4.2447
L_{inf}	183.3 cm FL (F), 175.5cm (M)
k	0.124(F), 0.143(M)
t_0	-3.098(F), -2.388(M)
Weight vs Fork length relation:	$W=0.000010885L^{3.0124}$
SR function	Beverton Holt
SR steepness	0.3

Table 2.3 Catch statistics for use in the SEDAR 54 assessment SS3 model. Catch for F1, F2 and F3 is in metric tons (mt) and catch for F4 is in 1000s of animals. See Table 2.4 for definition of F1, F2, F3, and F4.

Year	F1 Commercial GOM (MT)	F2 Commercial South Atlantic (MT)	F3 Recreational and Mexican (MT)	F4 Menhaden Discards (1000's)
1960	0.8	0.3	0.0	0.5
1961	1.5	0.7	0.0	0.5
1962	2.3	1.0	0.0	0.5
1963	3.1	1.3	0.0	0.5
1964	3.9	1.7	0.1	0.5
1965	4.6	2.0	0.1	0.5
1966	5.4	2.3	0.1	0.5
1967	6.2	2.6	0.1	0.5
1968	7.0	3.0	0.1	0.5
1969	7.7	3.3	0.1	0.5
1970	8.5	3.6	0.1	0.5
1971	9.3	4.0	0.1	0.5
1972	10.1	4.3	0.1	0.5
1973	10.8	4.6	0.1	0.5
1974	11.6	5.0	0.2	0.5
1975	12.4	5.3	0.2	0.5
1976	17.6	7.5	0.8	0.5
1977	24.9	10.7	3.4	0.5
1978	35.4	15.1	15.3	0.5
1979	50.2	21.5	68.7	0.5
1980	71.2	30.5	308.1	0.5
1981	101.1	43.2	1380.6	0.7
1982	101.1	43.2	1078.8	0.7
1983	109.2	46.7	1861.8	0.7
1984	149.1	63.8	1203.4	0.7
1985	138.5	59.3	972.1	0.6
1986	411.3	150.5	1281.2	0.6
1987	1177.4	431.8	719.6	0.7
1988	1701.6	1009.8	1090.8	0.6
1989	2280.2	1215.1	769.5	0.7
1990	1902.5	760.7	1052.7	0.7
1991	1933.7	169.3	843.0	0.5
1992	1511.5	676.6	880.0	0.4
1993	983.2	582.5	806.1	0.5
1994	2021.8	936.1	747.5	0.5
1995	1103.4	795.7	866.9	0.5
1996	619.5	644.5	1051.0	0.4
1997	413.7	395.8	790.7	0.5
1998	485.1	456.9	716.4	0.4

1999	370.3	720.8	703.5	0.5
2000	436.0	533.7	282.3	0.4
2001	606.4	509.5	327.3	0.4
2002	738.6	771.2	202.9	0.4
2003	606.7	552.9	176.5	0.4
2004	448.2	501.4	172.2	0.4
2005	398.2	543.8	167.4	0.4
2006	571.6	518.0	175.0	0.4
2007	169.8	303.5	182.0	0.4
2008	20.7	46.1	130.1	0.4
2009	84.4	40.0	116.2	0.4
2010	56.0	26.5	127.9	0.4
2011	70.8	33.5	79.5	0.4
2012	35.0	16.6	101.2	0.3
2013	26.4	26.9	99.6	0.3
2014	24.0	51.9	90.1	0.3
2015	33.6	71.0	91.6	0.3

Table 2.4. Names and time frame of the fishery and CPUE series used in the SEDAR 54 assessment.

Number	Type	Name	Short Name	Time Period
1	Fishery	Commercial Gulf of Mexico Longline	F1_COM_GOM	1960-2015
2	Fishery	Commercial South Atlantic Longline	F2_COM_SA	1960-2015
3	Fishery	Recreational and Mexican catches	F3_RecMEX	1960-2015
4	Fishery	Menhaden Discards	F4_MEN_DSC	1960-2015
5	CPUE	Large Pelagic Survey	S1_LPS	1986-2015
6	CPUE	Bottom Longline Observer Program 1	S2_BLLOP_1	1994-2007
7	CPUE	Bottom Longline Observer Program 2	S3_BLLOP_2	2008-2015
8	CPUE	Virginia Longline Survey	S4_VA_LL	1975, 1977, 1980,1981, 1990-1993, 1995-2015
9	CPUE	NMFS Southeast Bottom Longline	S5_NMFS_LLSE	1995-1997, 1999-2015
10	CPUE	Coastspan NE LL Survey	S6_CST_NE_LL	2001-2015
11	CPUE	NMFS Longline Northeast Survey	S7_NMFS_NE	1996, 1998, 2001, 2004,2007, 2009, 2012, 2015
12	CPUE	Pelagic longline observer program	S8_PLLOP	1992-2015
13	CPUE	Coastspan SE LL Survey	S9_COASTSPAN_SE_LL	2000-2015
14	CPUE	South Carolina DNR red drum observer program	S10_SCDNR_RedDr	1998-2006
15	CPUE	SEAMAP Longline SE Survey	S11_SEAMAP_LL_SE	2007-2015

Table 2.5 Indices of abundance used in the SEDAR 54 assessment.

YEAR	S1 LPS	S2 BLLOP 1	S3 BLLOP 2	S4 VA_LL	S5 NMFS LLSE	S6 CST NELL	S7 NMFS NE	S8 PLLOP	S9 COASTSPAN SE LL	S10 SCDNR RedDr	S11 SEAMAP LL SE
1960											
1961											
1962											
1963											
1964											
1965											
1966											
1967											
1968											
1969											
1970											
1971											
1972											
1973											
1974											
1975				2.362							
1976											
1977				1.629							
1978											
1979											
1980				2.106							
1981				2.406							
1982											
1983											
1984											
1985											
1986	1.183										
1987	0.363										
1988	1.184										
1989	1.352										
1990	0.471			0.299							

1991	0.762			0.408							
1992	0.584			0.149				0.593			
1993	0.261			0.755				0.483			
1994	0.175	223.74						0.192			
1995	0.138	188.64		0.606	0.215			0.304			
1996	0.164	178.42		0.626	0.110		0.0005	0.071			
1997	0.198	284.33		0.619	0.199			0.281			
1998	0.051	298.58		0.935			0.0032	0.113		0.140	
1999	0.081	168.69		0.854	0.090			0.300		0.595	
2000	0.085	103.26		0.767	0.137			0.112	0.308	0.058	
2001	0.370	360.60		0.883	0.205	3.529	0.0016	0.085	0.683	0.350	
2002	0.145	189.97		0.422	0.151	1.232		0.007	1.269	0.231	
2003	0.066	308.88		0.425	0.170	3.414		0.006	2.027	0.154	
2004	0.030	223.06		0.519	0.131	3.312	0.0015	0.110	5.876	0.338	
2005	0.156	226.42		0.298	0.049	3.524		0.032	4.275	0.155	
2006	0.046	299.50		0.795	0.083	1.815		0.161	5.078	0.279	
2007	0.104	388.02		0.251	0.214	1.864	0.0075	0.094	4.656		1.681
2008	0.135		536	0.834	0.162	0.581		0.109	4.894		1.205
2009	0.201		1371	1.188	0.409	4.620	0.0121	0.138	2.512		0.862
2010	0.106		1158	1.110	0.478	2.084		0.075	2.522		0.740
2011	0.086		729	0.624	0.371	3.351		0.097	2.864		0.346
2012	0.070		1381	1.146	0.636	0.862	0.0165	0.081	2.542		0.289
2013	0.275		910	0.959	0.443	2.400		0.128	3.015		0.301
2014	0.461		936	0.749	0.480	5.697		0.079	3.604		0.417
2015	0.232		1584	0.469	0.704	3.485	0.0270	0.126	1.177		0.589

Table 2.6 Estimated CVs for the indices of abundance used in the SEDAR 54 assessment.

YEAR	S1 LPS	S2 BLLOP 1	S3 BLLOP 2	S4 VA_LL	S5 NMFS LLSE	S6 CST NELL	S7 NMFS NE	S8 PLLOP	S9 COASTSPAN SE LL	S10 SCDNR RedDr	S11 SEAMAP LL SE
1960	-	-	-	-	-	-	-	-	-	-	-
1961	-	-	-	-	-	-	-	-	-	-	-
1962	-	-	-	-	-	-	-	-	-	-	-
1963	-	-	-	-	-	-	-	-	-	-	-
1964	-	-	-	-	-	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-
1970	-	-	-	-	-	-	-	-	-	-	-
1971	-	-	-	-	-	-	-	-	-	-	-
1972	-	-	-	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-	-	-	-
1975	-	-	-	0.382	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-	-	-	-
1977	-	-	-	0.586	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	0.239	-	-	-	-	-	-	-
1981	-	-	-	0.230	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-
1986	0.155	-	-	-	-	-	-	-	-	-	-
1987	0.218	-	-	-	-	-	-	-	-	-	-
1988	0.199	-	-	-	-	-	-	-	-	-	-
1989	0.133	-	-	-	-	-	-	-	-	-	-

1990	0.184	-	-	0.404	-	-	-	-	-	-	-
1991	0.180	-	-	0.449	-	-	-	-	-	-	-
1992	0.193	-	-	0.570	-	-	-	0.403	-	-	-
1993	0.564	-	-	0.414	-	-	-	0.287	-	-	-
1994	0.485	0.31	-	1	-	-	-	0.379	-	-	-
1995	0.579	0.33	-	0.302	0.248	-	-	0.362	-	-	-
1996	0.591	0.31	-	0.328	0.379	-	0.3531	0.978	-	-	-
1997	0.483	0.33	-	0.311	0.237	-	1.0000	0.435	-	-	-
1998	1.001	0.35	-	0.305	-	-	0.2759	0.783	0.6990429	0.464	-
1999	0.841	0.49	-	0.404	0.362	-	1.0000	0.498	0.6398977	0.353	-
2000	0.870	0.52	-	0.302	0.261	-	1.0000	0.535	0.627	0.549	-
2001	0.650	0.39	-	0.299	0.207	0.229	0.2720	0.595	0.586	0.468	-
2002	0.778	0.33	-	0.411	0.179	0.414	1.0000	2.480	0.561	0.402	-
2003	0.592	0.29	-	0.416	0.209	0.249	1.0000	2.488	0.345	0.365	-
2004	0.666	0.33	-	0.357	0.220	0.272	0.3262	0.442	0.207	0.293	-
2005	0.467	0.35	-	0.410	0.516	0.256	1.0000	0.642	0.218	0.423	-
2006	0.788	0.33	-	0.276	0.331	0.309	1.0000	0.552	0.175	0.261	-
2007	0.443	0.37	-	0.452	0.303	0.288	0.3341	0.489	0.200	1.000	0.233
2008	0.447	-	0.21	0.290	0.275	0.493	1.0000	0.360	0.202	1.000	0.147
2009	0.388	-	0.14	0.355	0.160	0.188	0.1865	0.385	0.247	1.000	0.219
2010	0.401	-	0.13	0.308	0.167	0.331	1.0000	0.493	0.191	1.000	0.214
2011	0.509	-	0.13	0.516	0.141	0.304	1.0000	0.439	0.182	1.000	0.304
2012	0.690	-	0.18	0.256	0.139	0.415	0.2258	0.394	0.172	1.000	0.285
2013	0.343	-	0.17	0.312	0.167	0.305	1.0000	0.35	0.269	1.000	0.270
2014	0.340	-	0.17	0.262	0.185	0.193	1.0000	0.488	0.197	1.000	0.226
2015	0.360	-	0.14	0.319	0.133	0.250	0.1809	0.401	0.226	1.000	0.222

2.4 FIGURES

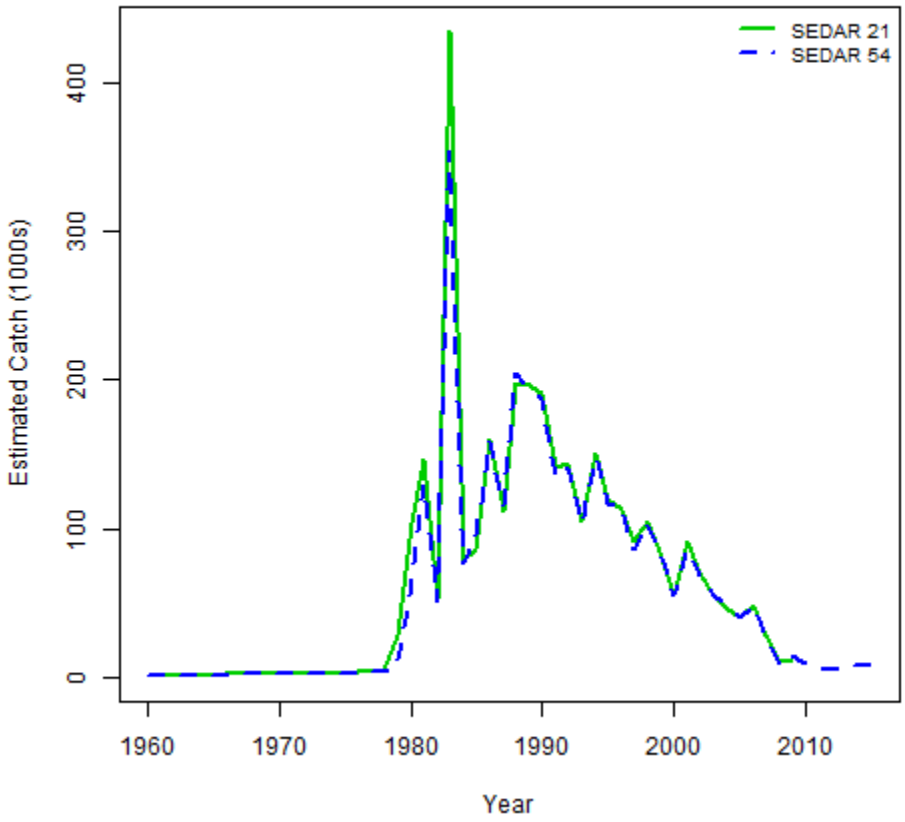


Figure 2.1 Catches of sandbar sharks (numbers) used in the SEDAR 21 (green line) and SEDAR 54 (blue line) assessments.

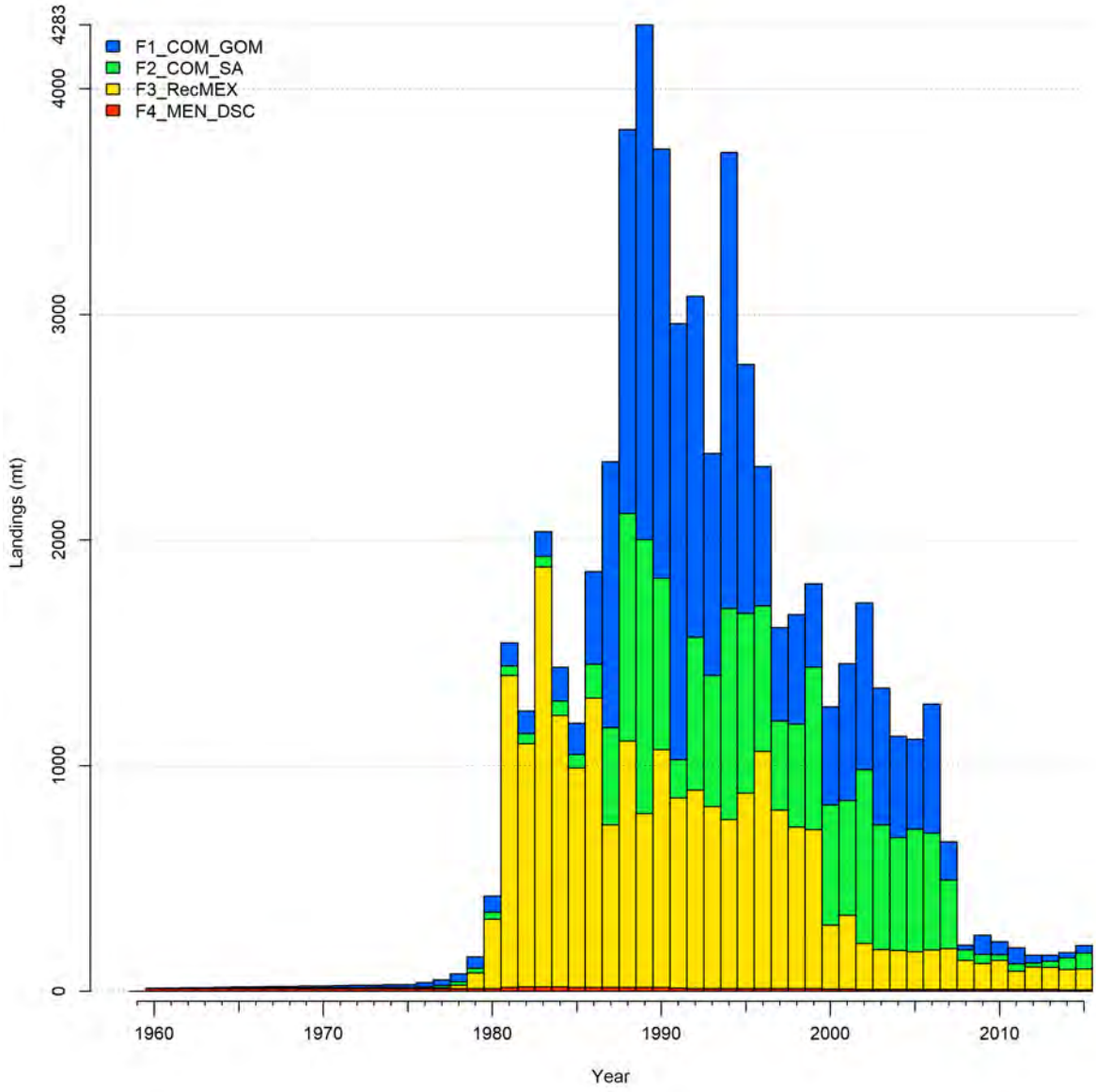


Figure 2.2. Catch of sandbar shark by fleet in metric tons (mt) used in the SEDAR 54 analysis.

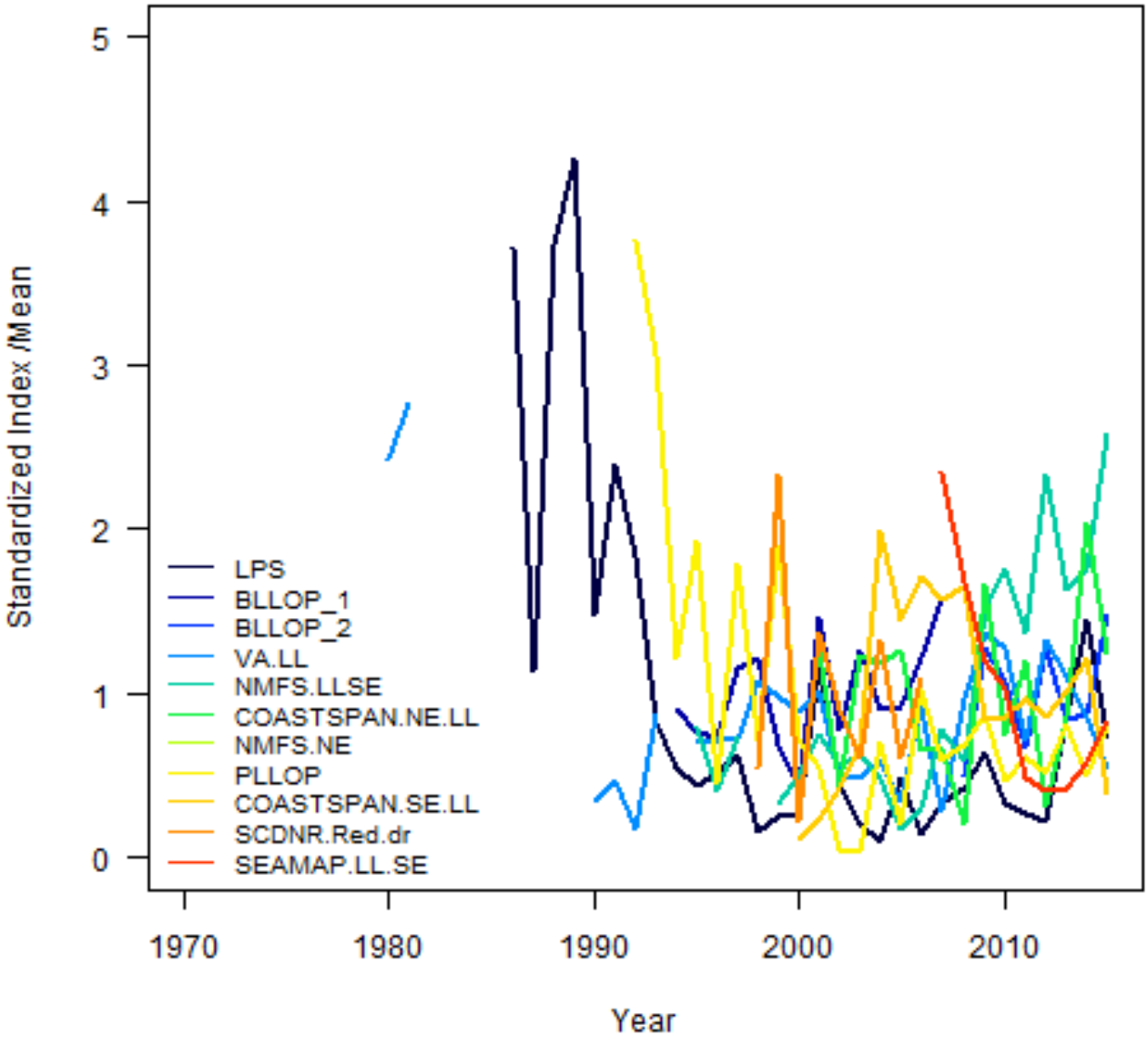


Figure 2.3 Indices of relative abundance used for the SEDAR 54 assessment.

3 STOCK ASSESMENT MODEL AND RESULTS

The analytical approach used for this assessment was a length-based age-structured statistical model (Stock Synthesis; Methot and Wetzel 2013; Wetzel and Punt 2011a, 2011b). The stock assessment

methods and results were formatted following those in recent SEDAR assessments implemented with Stock Synthesis (e.g., SEDAR 39 Atlantic smooth dogfish).

3.1 REPLICATION ANALYSIS

The analysis conducted for SEDAR 21 used a state-space age structured production model (SSASPM, Porch 2003, ICCAT 2005). The initial model for SEDAR 54 (this analysis) parameterized SS3 to recreate as closely as possible the assessment results from SEDAR 21 prior to undertaking an updated assessment using SS3. SS3 can be used to create an age structured production model (ASPM) by fixing (not estimating) the selectivity at length or age and eliminating the model's functionality to fit deviations in the stock recruitment relationship.

3.1.1. Replication Analysis Model Configuration

As with the previous assessment this analysis assumes one unified stock (Figure 3.1.1, Atlantic and Gulf of Mexico), and covers the temporal framework from 1960 to 2009, with the stock status in 1960 assumed to be close to virgin stock size. The data included in this analysis consisted of catch (Table 3.1.1) and indices of abundance (Table 3.1.2; Figure 3.1.1).

Parameterization of the model included parameters for fecundity, proportion mature and natural mortality at age (M) (Table 3.1.3 and 3.1.4). The growth curve, length-weight relationship, and other biological parameters were kept the same, with the exception that the growth parameters were entered as sex-specific parameters (Table 3.1.4) and the relationship between pup production and maternal age was expressed as a function of length, as recommended in working paper (SEDAR21-DW-26 2011). These differences are shown in bold face in Table 3.1.4.

Selectivities for the fishery and index of abundance data in the previous analysis were a mix of logistic and double logistic models (Table 3.1.5). This analysis used the same logistic selectivities but reparametrized the double logistic models as double normal as this is the preferred alternative in SS3 (Table 3.1.5). The differences in the selectivity functional form of the previous analysis (SEDAR 21) and this analysis are presented in Table 3.1.5 and Figures 3.1.2 and 3.1.3.

3.1.2 Replication Analysis Results

The list of derived parameters in the SS model is presented in Table 3.1.6 along with values from the base case run from SEDAR 21. Note that there exist differences in relevant metrics as this analysis is conducted in biomass and the SEDAR 21 analysis was conducted in numbers; similar outputs have been shaded in grey. The replication analysis model was able to capture the general trend for indices in all surveys, and overall biomass trends and stock status conclusions are the same (Figure 3.1.4., Table 3.1.6). The results in Table 3.1.6 and Figures 3.1.4 and 3.1.5 show the management quantities, total biomass trends and ratio of the estimated biomass trends (SEDAR21/SEDAR 54). This analysis includes the majority of the assumptions in the previous analysis, to the extent that the modeling frameworks allowed. The SEDAR 21 analysis down weighted the historical catch and the 1983 recreational catch; the replication analysis did not, and instead fit the catch exactly.

As noted above, the replication analysis was conducted in biomass as opposed to the SEDAR 21 analysis which was conducted in numbers, and as such not all of the management quantities are comparable. The replication analysis estimated that F_{2009}/F_{MSY} was 0.51, indicating that the stock was not experiencing overfishing, while the SEDAR 21 assessment resulted in a similar estimate of 0.62, also indicating that the stock was not experiencing overfishing. The SSF_{2009}/SSF_{MSY} from this study was 0.70, whereas the SEDAR 21 analysis reported SSF_{2009}/SSF_{MSY} of 0.66. As in the previous SEDAR 21 assessment, spawning output in the stock-recruitment relationship was modelled as spawning stock fecundity (SSF), and calculated here as the sum of female numbers at age (in 1,000s) multiplied by annual female pup production at age (male and female pups, assuming a 1:1 ratio of male to female pups) at the beginning of each calendar year. For the purposes of this assessment, SSF and Spawning Stock Biomass (SSB) are referred to interchangeably in some figures and tables. They both show that the stock was overfished. Figures 3.1.6 and 3.1.7 show a relatively good fit (compared to SEDAR 21) of the model to all of the indices.

3.1.1 Continuity analysis

Stepwise progression of updating the model to the current case proceeded by updating the catch data, the indices of abundance and certain biological parameters. These continuity runs precede the finer scale model fitting that leads to the base case analysis, and are presented here in

aggregate. Details of the continuity runs presented are listed in Table 3.1.7 and shown in Figure 3.1.8. Briefly, the first run was to update the catch to the new estimated catch series, then to extend the catch series up to 2015 (Update Catch Run, Continuity Run #1, respectively); these two runs estimate the same total biomass for the years 1960-2009. The next continuity run (Continuity Run #2) was to update the longevity from 27 to 31 years, and Continuity Run #3 included updates to the life history data according to the values in Table 2.2). The stepwise continuity analysis showed similar trends across the individual runs. The final step to updating the model included the addition of length composition and the new indices of abundance (Figure 2.3). The base case model fit to all the data is presented in the next section (3.2); changes to the CPUE series with respect to SEDAR 21 are shown in Figure 3.1.9 through Figure 3.1.11.

3.2 BASE CASE MODEL AND SENSITIVITY ANALYSES METHODS AND RESULTS

3.2.1 Overview

The assessment model was implemented in Stock Synthesis version 3.24f (SS3 Methot 2013). A newer version of the model is available (version 3.3) but due to time constraints and the overall similarity of the model versions for the features implemented in this assessment, the SS3 model was not updated to version 3.3. SS3 (v. 3.24f) was implemented here as a length-based age-structured stock assessment model (Methot and Wetzel 2013; e.g., Wetzel and Punt 2011a, 2011b). SS3 utilizes an integrated modeling approach (Maunder and Punt 2013) to take advantage of the many data sources available for the stock of sandbar shark (*Carcharhinus plumbeus*). An advantage of the integrated modeling approach is that the development of statistical methods that combine several sources of information into a single analysis allows for consistency in assumptions and permits the uncertainty associated with each data source to be propagated to final model outputs (Maunder and Punt 2013).

3.2.2 Data Sources

The catches, indices of abundance, length compositions, and biological inputs used in the SEDAR 54 stock synthesis assessment are described next.

Catches

For the purposes of this assessment the fisheries catching sandbar sharks in the Atlantic and Gulf of Mexico were separated into four fleets, F1-F4 (Table 3.2.1) as in SEDAR 21. A full description of the derivation of these estimates is given in the SEDAR 21 DW Report and SEDAR21-DW-09. Total catch (landed catch, bycatch and dead discards) by year and fishery are explained in section 2.2.2 and shown in Table 2.3 and Figure 2.2; it is assumed that prior to the start of the catch time series the stock was experiencing minimal, if any bycatch and hence was at or near virgin biomass. Further information on the catch estimates can be found in section 2.

Relative Abundance Indices

These data are described in section 2.2.3, shown in Figures 3.1.9 -3.1.11, and their spatial extent is shown in Figures 2.3 and 3.2.1. The indices of abundance were used in the model as shown in Table 3.2.1. The CVs for these indices were re-scaled according to the Francis (2011) approach, which fits a smooth line to the CPUE series, then estimates the CV that would be necessary to fit the data points at least as well as an independently fit smooth line, and then rescales the input CVs so that the mean of the input CVs is equal to the estimated CV.

Timeframe, Biological Inputs and Assumptions

The model was iterated from 1960-2015 using an annual time-step. The life history inputs used in the assessment are presented in Tables 2.1 and 2.2. These include age and growth, as well as several parameters associated with reproduction, including sex ratio, reproductive frequency, fecundity, maturity at age, and month of pupping, and natural mortality. Stock synthesis uses these life history characteristics as constants (inputs), which are reported for the base case in the Appendix 1 Control File. The maturity and mortality schedules for the base case of this assessment are reported in Table 2.1. Changes from the previous assessment (SEDAR 21) include steepness set to 0.3 (0.29 previously), new natural mortality schedules, and growth parameters. As in the previous SEDAR 21 assessment, spawning output in the stock-recruitment relationship was modelled as spawning stock fecundity (SSF), and calculated here as the sum of female numbers at age (in 1,000s) multiplied by annual female pup production at age (male and female pups, assuming a 1:1 ratio of male to female pups) at the beginning of each calendar year.

Size Composition Data

Length-frequency information from animals caught in scientific observer programs, recreational fishery surveys, and various fishery-independent surveys was available for this analysis (Figure 3.2.2). Length-composition data collected by observers were available for the commercial fisheries (F1 and F2), length data for F3 (recreational and Mexican fisheries) were available from the MRFSS/MRIP, Headboat, and Texas Parks and Wildlife Department surveys and no length data was available for F4 (bycatch in the menhaden fishery). Most of the CPUE series, with the exception of the BLLOP, PLLOP, and LPS series, were based on fishery independent surveys and some length data was available for all of the surveys. In general, the length data exhibits high interannual variability, and is limited for all of the survey CPUE series. An annual effective sample size equal to the number of sets was assumed for each group of length composition. The annual sample size was then weighted by the Francis (2011) likelihood weighting method. The number of samples, number of sets, and weights given to each of the length composition data series is in Table 3.2.2.

3.2.3 Software

The analysis was undertaken with Stock synthesis SS V3.234F, 64 bit version (Methot 2000, 2009, executable available from http://nft.nefsc.noaa.gov/SS3.html), running on Microsoft Windows 10. Typical function minimization of the full model (without running additional MCMC analysis) on a 3.0 GHz personal computer required about 10 minutes. Additional simplifications and aggregations could probably reduce the minimization time further, without significant loss to the stock status inferences.

3.2.4 General Assessment Approach

This was a standard assessment and as such used the ‘base case’ model configuration from the previous assessment, which included all CPUE series. Note that the overall suite of indices of abundance changed from the previous assessment, though the Assessment Panel agreed to use all submitted indices of abundance for the base case model run. Sensitivities to the base case model were carried out by dropping one of two groups of CPUE series and their associated length composition data from the analysis. The grouping of the CPUE series was chosen in part by using a hierarchical cluster analysis to identify separate groupings of similar indices of

abundance (SEDAR54_TEMP1). Hierarchical cluster analysis identified two groupings of time-series. The first group was characterized by time-series which were highly correlated with each other and which had some highly negative correlations with time-series not included in the group. The second group was characterized by time-series which were less highly correlated with each other or were slightly negatively correlated with each other. Because CPUEs with conflicting information were identified, it may be reasonable to assume that the indices reflect alternative hypotheses about states of nature and to run scenarios for single or sets of indices identified that represent a common hypothesis as alternative sates of nature. Cross-correlations identified strong autocorrelation in some CPUE indices over 2 to 3 years, which could indicate a year-class effect. Cross-correlations also identified strong cross correlation of lagged values of some CPUE indices (at lags between 2 to 10 years) with the current values of other CPUE indices, which could indicate that some CPUE indices represent younger age-classes than others. However, the specific lagged relationships with high correlation were not consistent among the series. Further information can be found in section 3.2.7 and SEDAR54_TEMP1.

Model Assumptions

The most important model assumptions are described in the following sections. Standard population dynamics and statistical terms are described verbally, while equations can be found in Methot (2000, 2010). Attachment 1 contains all the template specification files for the base case model, with the exception of the data file which is voluminous and provided separately. The template file includes additional information on secondary elements of model formulation which may be omitted in the description below.

Growth

The standard assumptions made concerning age and growth in the Stock Synthesis model are (i) the lengths-at-age are assumed to be normally distributed for each age-class; (ii) the mean lengths-at-age are assumed to follow a von Bertalanffy growth curve. For any specific model, it is necessary to assume the number of significant age-classes in the exploited population, with the last age-class being defined as a “plus group”, i.e. all fish of the designated age and older. For the results presented here, 31 yearly age-classes have been assumed, as age 31 approximates the age at the theoretical maximum length of an average fish.

Population and Fishery Dynamics

The model partitions the population into 31 yearly age-classes in one region (Figure 3.2.1). The last age-class comprises a "plus group" in which mortality and other characteristics are assumed to be constant. The population is "monitored" in the model at yearly time steps, extending through a time window of 1960-2015. The main population dynamics processes are as follows: In this model "recruitment" is the appearance of age-class 0 fish (i.e. fish averaging approximately 45 cm fork length (FL) in the population). The results presented in this report were derived using one recruitment episode per year, which is assumed to occur at the start of each year. Annual recruitment deviates from the recruitment relationship were estimated, but constrained to reflect the limited scope for compensation given the estimates of fecundity. Deviations from the stock recruitment relationship (SRR) were estimated in two parts; first, the early recruitment deviates for the 10 years prior to the model period that contains the bulk of the length composition information (1970-1980) and second, the main recruitment deviates that covered the model period (1981 - 2015).

Initial Population State

In the previous model it was assumed that the sandbar shark population was at an unfished state of equilibrium at the start of the model (1960). The same assumption is made for SEDAR 54 based on the historical nature of the longline fishery in the Gulf of Mexico and western Atlantic. The population age structure and overall size in the first year is determined as a function of the estimate of the first year recruitment (R1) and the initial equilibrium catch (set to 0.1 mt from the F4 Menhaden Fishery).

Selectivity Curves

Selectivity is fishery and index specific and was assumed to be time-invariant. A double normal functional form was assumed for the fishery selectivity curves F1 and F3, and logistic with asymptotic selectivity used for F2 and F4. Initially the model was fit with a double normal selectivity for F2; however, this was changed to include an asymptotic selectivity function to avoid situations where a cryptic biomass of large fish is estimated in the model. Selectivities for the CPUE series were all double normal with the exception of S9, which was fit with a cubic

spline (Table 3.2.1). An offset on the peak and scale was estimated for sex-specific differences in selectivity where data was available by sex. The selectivity function was fixed at 100% for fishery F4 (menhaden discards) under the assumption that all fish encountered were caught (as done in SEDAR 21). The selectivity was fixed (not estimated) for the CPUE series S2 and S3 as these CPUE series share the length compositions with the fisheries F1 and F2, so as to not use the same data in the estimation phase more than once.

Parameter Estimation and Uncertainty

Model parameters were estimated by maximizing the log-likelihoods of the data plus the log of the probability density functions of the priors, and the normalized sum of the recruitment deviates estimated in the model. For the catch and the CPUE series we assumed lognormal likelihood functions while a multinomial distribution was assumed for the size data. The maximization was performed by an efficient optimization using exact numerical derivatives with respect to the model parameters (Fournier et al. 2012). Estimation was conducted in a series of phases, the first of which used arbitrary starting values for most parameters. The Hessian matrix computed at the mode of the posterior distribution was used to obtain estimates of the covariance matrix. This was used in combination with the Delta method to compute approximate confidence intervals for parameters of interest. For the base case model and two alternative states of nature (see section 3.2.7) Markov Chain Monte Carlo (MCMC) estimates were calculated for all parameters. MCMC analysis was conducted with one chain, 500,000 iterations thinned every 1000 with a 100 iteration burn in. This MCMC analysis was also used for projections to carry the uncertainty in the parameter estimates forward to the projection period.

Benchmark and Reference Point Methods

Benchmarks included estimates of absolute population levels and fishing mortality for the terminal year, 2015 (F_{2015}, SSF_{2015}, B_{2015}). These values are reported against reference points relative to MSY levels, and depletion estimates (relative to virgin levels). In addition, trajectories for F_{YEAR}/F_{MSY} and SSF_{YEAR}/SSF_{MSY} were plotted and phase plots provided. Stock status, including MSST (Minimum Stock Size Threshold) were also included in the benchmark reporting. Because M<0.5, MSST is computed as $(1-M)*SSF_{MSY}$ (Restrepo et al. 1998). The

value of M used (0.126) was the arithmetic mean of the age-specific values of M used for the baseline run (Table 2.1).

Other Model Considerations

With the exception of re-weighting the length composition annual sample size by the Francis (2011) likelihood weighting method and estimating the minimum average CV associated with the indices of abundance no data was changed or weighted in this assessment.

Projections

Projections were carried out using the forecast module internal to SS3 via MCMC analysis and as such used the uncertainty associated with the parameter estimates calculated internally to SS3. Recruitment variability was not included in the projections, but given the reproductive biology of this species variability in recruitment is expected to be low. Based on the observation that the influence of the high and low productivity scenarios had minimal effect on stock status in comparison to the CPUE groupings (see section 3.2.7) projections were only carried out for the base case productivity assumptions. Projections were carried out using the forecast module internal to Stock Synthesis using the MLE estimates over a grid of TAC and also via MCMC analysis to incorporate the uncertainty associated with the parameter estimates calculated internally to Stock Synthesis. The forecast routine internal to Stock Synthesis calculates fishing intensity levels that would satisfy fishery management. Much like other integrated stock assessment platforms (e.g. MULTIFAN-CL), stock synthesis is basically a simulation of a stock's age-structured population dynamics. Methot and Wetzel (2013) note that "this enables SS to utilize a selected fishing mortality approach (e.g. harvest policy) to extend into a forecast of the future age-structured stock abundance and yield that would occur while fishing according to that harvest policy (Maunder et al., 2006)". The forecast routine is implemented in Stock Synthesis after the variance estimate phase so that the aspects of parameter uncertainty calculated using the inverse Hessian method in the maximum likelihood estimation are propagated into the variance of the derived quantities (i.e. forecasts of stock abundance under a chosen TAC). The forecast routine is implemented much same way during the MCMC analysis phase so that the equilibrium and forecast results become part of the output for each selected set of parameters. For further technical details see Methot and Wetzel (2013). Projections were carried out using the MLE estimates over a range of values to determine the levels of TAC that

would result in the SSF/SSFMSY=1 by the rebuilding year with a given probability (see the TOR) given the stock status (see the next section). The corresponding TAC value associated was then forecast using MCMC. MCMC analysis was not carried out over a range of values because of the prohibitive time constraint of running the MCMC analysis (>2 days).

3.2.5 Base Case Model Results

Model Fits to Abundance Indices

The model appeared to have trouble reconciling the conflicting trends and oscillations of some of the indices of abundance (Figure 3.2.3). As a result, some of the indices were poorly fit, particularly the model did not fit well the increasing trend at the end of the S5_NMFS_LLSE (2010-2015) or the increase in the last three data points of S7 NMFS LLNE, which were from 2009, 2012, and 2015. Other series that had decreasing and then increasing trends (S11 SEAMAP LL SE, S1 LPS) were well fit in the middle period but not the later years. The model fit the later years of the S9 COASTSPAN SE index well with the exception of 2015. The model fit the S3 BLLOP 2 and S4 VA LL time series adequately given the decrease in the beginning and the later increase in the time series. The longest running series (S1 LPS and S4 VA LL) show a decrease from the early and mid- 1980s through the remainder of the time series, which were fit well. Several of the indices (S3 BLLOP 2, S9 Coastspan SE LL SE, S6 NMFS Coastspan age-1+, and S10 SCDNR historic red drum) showed no clear trend and three indices (S5 NMFS LL SE, S7 NMFS NE LL, and S11 SEAMAP LLSE) showed a generally increasing trend. The model interpreted those trends by predicting a stabilization and slight increase of abundance in the most recent years. It is worth noting also that the increasing trend in relative abundance of several of the indices in recent years conflicted with other trends in the indices of abundance. The catch data indicates relatively stable catch in the recent years (approximate average of 190 mt over 2008-2015) which corresponds with management controls and a rebuilding stock. In general, the poor fit to some of the indices is caused in part by high interannual variability that does not seem to be compatible with the life history of the species, suggesting that the statistical standardization of the indices done externally to the model may not have included all factors that help explain relative abundance.

Parameter Estimates and Associated Measures of Uncertainty

A list of estimated model parameters is presented in Table 3.2.3 (main parameters) and Table 3.2.4 (estimated recruitment deviations). The table includes predicted parameter values with their associated standard deviation (Parm_StDevs based on the asymptotic standard errors from the Hessian at the converged solution), initial parameter values, minimum and maximum allowed values, and prior density functions assigned to parameters where applicable. Parameters designated as constant were estimated as such; parameters that were held fixed (not estimated) are not included in this table.

Annual Abundance at Age

Predicted annual stock abundance at age is presented in Figure 3.2.4. The first seven age classes made up the majority of the population (>50%) in any given year and mean age by year varied very little.

Annual Estimates of Total Biomass, Spawning Output and Recruitment

Annual estimates of total biomass, spawning output and recruits are presented in Table 3.2.5 and Figure 3.2.5. All trajectories show little depletion from 1960 to the early 1980s, corresponding to very low catches, effort and estimated F in the historic period, and a marked decline until 2007, followed by stabilization until 2010 and an increase until the end of the model. Decreasing biomass and abundance over the period between 1983-2009 correspond to increased catches over that period compared with the 1960s and 1970s, and possibly declining trends in the early years of some indices, whereas the stabilization in the last few years of data likely corresponds to reduced catches and increasing CPUE rates for some of the CPUE series in those years.

Model Fits to Length Compositions

The fits to the aggregated length composition data are shown in Figure 3.2.6. In general the length data are characterized by low sample sizes and high inter-annual variability. This figure shows that most fleets fully select for immature animals (length at 50% maturity is 153 cm FL for females, 142 cm FL for males), and that F3 is almost exclusively on animals less than 100 cm, which corresponds to approximately 3.5 years old. The fit to the F1 length composition is quite good, the data associated with this fishery are among the most uniform in the model and are uni-modal. In comparison, the fits to the F2 length composition are poorer, the distribution is

wider and the largest ages in the sample are not well fit. With respect to the length composition for the survey data (S1-S11), the majority of the samples had broad distributions with one or more large spikes that made fitting the entire length composition difficult. The fits to the length composition in general capture the appropriate size classes and reflect the observed sex ratio in the length composition data.

Fishing Mortality

Estimated total and fleet-specific instantaneous fishing mortality rates are presented in Table 3.2.6 and Figure 3.2.7. Fishing mortality was very low in 1960-1981 in accordance with very low catches and effort during that period. In the late 1970s fishing mortality increased with the advent of the Recreational and Mexican fishery (F3). Starting in the mid-1980s overall fishing mortality began to increase sharply, with large fluctuations due in part to the changes in the F3 rate and the start of the commercial fisheries. The contribution of the menhaden fishery fleet to total F was insignificant. During 1981 to 2007 the total annual fishing mortality rate was above F_{MSY}, but has been below F_{MSY} from 2008 to the present, with the exception of 2010 (Table 3.2.6 and Figure 3.2.8).

Stock-recruitment Parameters

The predicted virgin recruitment (R0; number of age 0 pups) was 533,000 animals (Table 3.2.5) and the number of estimated pups declined from the mid-1980s through 2009, after which estimated recruitment slowly increased (Figure 3.2.9). The corresponding estimated stock recruitment relationship and annual deviations are also shown in Figure 3.2.9.

3.2.6 Retrospective and MCMC Analyses Conducted for the Base Case

A retrospective analysis was carried out for the base case model by sequentially dropping a year of data from the model, for up to five years, and refitting the model. Results of the retrospective analysis are presented in Figure 3.2.10. Two model output quantities were examined in the analysis: 1) spawning stock depletion (relative to virgin stock size), and 2) estimated virgin biomass on the natural log scale. The depletion trajectories for all retrospective runs are very similar, overlapping the base run, which indicates that the estimated stock status is robust to removing the last year of data for up to five years. The retrospective analysis had a negligible effect on the estimate of R0 on the log scale, which is the global scaling parameter, indicating

that the estimates of absolute population scale obtained for the base case model are robust to the sequential deletion of the last 5 years of data.

Stock status uncertainty was evaluated with MCMC analysis for the base case model. Figure 3.2.11 shows the estimated values from SS3 (the maximum likelihood estimate (MLE)) along with the 50th quantile and distribution of the MCMC analysis. The MLE estimates of SSF_{2015}/SSF_{MSY} and F_{2015}/F_{MSY} were 0.599 and 0.750, respectively, while the 50th quantiles of the MCMC analysis differ slightly at 0.634 and 0.7, respectively, for the same quantities, indicating a slight negative bias in SSF_{2015}/SSF_{MSY} and a slight positive bias in F_{2015}/F_{MSY} relative to the median MCMC output. The negative bias in SSF_{2015}/SSF_{MSY} appears to result from a skewed distribution of the MCMC output for that management quantity. The reasons for the positive bias in F_{2015}/F_{MSY} are not obvious.

3.2.7 Model Sensitivity Runs Representing Alternative State of Nature Scenarios

Model uncertainty was evaluated in this assessment with a set of sensitivity runs representing plausible alternative states of nature to the base case model, as recommended in part by the SEDAR 21 CIE reviewers (Table 3.2.7). Three groupings of the CPUE series (base plus two others) and three groupings of productivity assumptions (as recommended by the SEDAR 21 CIE reviewers) were used in a fully interacted grid providing nine individual model runs. The groupings of the CPUE series were determined mostly through a hierarchical cluster analysis (SEDAR54_TEMP1 and Appendix 2) and to a lesser extent by expert opinion. The first group of CPUEs that the hierarchical cluster analysis identified (named “POS_1” CPUE group) was: S3_BLLOP_2, S4_VA_LL, S5_NMFS_LLSE, S7_NMFS_NE, and the CPUE series S2_BLLOP1 was added to this group because the Assessment Panel felt that it helped extend the available time series to the period where the majority of the fishing effort occurred (see Appendix 2). The second sensitivity grouping of CPUE series (named “NEG” CPUE group because they were negatively correlated with the first group) included all the indices that were not included in the first group, which were S1_LPS, S6_CST_NE_LL, S8_PLLOP, S9_COASTSPAN_SE_LL, S10_SCDNR_RedDr, and S11_SEAMAP_LL_SE. In addition to the three CPUE groupings (BASE, POS_1 and NEG) three levels of overall productivity were assumed based on variability reported in the literature for this species. These levels of

productivity were: low, medium, and high, with medium being the base case parameterization. Further details are in Table 3.2.7. The effect of changing the productivity from the base case parameterization to the high and low values on the estimates of overall depletion and virgin stock size was fairly minimal (Figure 3.2.12). The result of changing the CPUE series by far outweighed the changes to the productivity assumptions (Figure 3.2.12). Estimates of stock depletion were lower (more depleted) for the NEG grouping of the CPUE series than the base case grouping and higher (less depleted) for the POS_1 grouping than the base case. The uncertainty with respect to initial stock size and overall depletion was highest with the POS CPUE grouping and lowest with the NEG CPUE grouping (Figure 3.2.12).

Reference points for the base case and each sensitivity run representing an alternative state of nature are provided in Table 3.2.8 and Figure 3.2.13. MCMC reference point uncertainty for the base case and sensitivity runs representing two alternative states of nature scenarios evaluated for CPUE (POS_1, NEG) with the base case productivity scenario as defined in the main text are provided in Table 3.2.9 and Figure 3.2.14.

3.2.8 Profile Likelihoods

An investigation of model structure uncertainty was undertaken via the use of profile likelihood on the global scaling parameter (R0) (Lee et al 2014). The negative log likelihood of a specific parameter or data component should, in theory decline to an obvious minimum. In situations where this does not happen, at least from one side, there may be insufficient information within the data to estimate other parameters. Virgin recruitment (R0) is an ideal scaling parameter because it is proportional to the unfished biomass. Profiles were run with the natural log of virgin recruitment, ln(R0), parameter fixed at various values above and below the model estimated value; the corresponding likelihood profile quantified how much loss of fit was contributed by each data source.

Profile likelihoods for the base case and sensitivity runs representing two alternative states of nature scenarios evaluated for CPUE (POS_1, NEG) with the base case productivity scenario as defined in the main text are provided in Figures 3.2.15 – 3.2.23. Two data components were profiled for each alternative model run, the length composition data and CPUE likelihood data. Component-specific likelihoods for the base case are provided in Figures 3.2.15, 3.2.16 and

3.2.17 for the CPUE length composition, the fishery length composition, and the CPUE, respectively. Component-specific likelihoods for the POS_1 CPUE scenario with the base case productivity are provided in Figures 3.2.18, 3.2.19, and 3.2.20. Component-specific likelihoods for the NEG CPUE scenario with the base case productivity are provided in Figures 3.2.21, 3.2.22, and 3.2.23.

Examples of evidence for informative data components are a "U" or "V" shape in the likelihood profile such as is apparent in the profile likelihoods for S4 and S9 CPUE length composition (Figure 3.2.15). Examples of evidence for non-informative data are a flat or highly variable likelihood profile, such as is apparent in the profile likelihoods for S10 and S11 CPUE length composition (Figure 3.2.15).

In general the likelihood profiles showed that the individual data components were not equally informative about the scale of the population. The length composition likelihood profiles for the base case CPUE indices (Figure 3.2.15) showed that the information from S3, S4 and S9 was being overwhelmed by the data from the other surveys. The length composition likelihood profiles for the base case fisheries data (Figure 3.3.16) were internally consistent but did not have a local minimum and supported larger values of ln (R_0) than length likelihood profiles for the base case CPUE indices. The CPUE likelihood pertaining to the base case (Figure 3.2.18) was fairly informative overall but included series that were in conflict with other series in the grouping (i.e. S8 and S11 show a contrasting profile to S6 and S9). These results indicate that R_0 in the base case configuration is mostly informed by S3, and to an extent by S4, for which the length and CPUE components are in agreement, and that the overall likelihood profile of the base case is informative about the scale.

The likelihood profiles based on the POS_1 CPUE grouping (Figures 3.2.18 – 3.2.20) show that the information in the length composition data from S3 and S4 is less influential than the length composition data in S2 and S5 combined with the length composition data in the fishery, because the total likelihood reflects length composition data in S2 and in the fishery more closely than the other CPUE's profiles. The profile likelihoods for the CPUE data from the model with the POS_1 CPUE grouping are in better agreement with the overall likelihood, but the relatively flat right hand side of the likelihoods indicates that there is not much information about the scale of

the population in the CPUE data. The likelihood profiles based on the negatively correlated CPUE groupings (Figures 3.2.21 and 3.2.23) showed that S8 was influential in the length composition as well as in the CPUE data.

3.2.9 Reference Points

Reference points for the proposed base configuration and alternative scenarios are presented in Table 3.2.8. The base case model estimated an overfished stock but that overfishing was no longer occurring (Table 3.2.8; Figures 3.2.13 and 3.2.8). The base model estimated that the stock had been overfished since 1997 (SSF = 660, Table 3.2.5; SSF_{MSY} = 662 Table 3.2.8) but that overfishing no longer occurred as of 2008, with the exception of 2010 where F_{2010}/F_{MSY}=1.015 (Table 3.2.6 and Figures 3.28).

Probabilities obtained through MCMC analysis of the base case indicated that there was a 99 % probability that the stock in 2015 was overfished ($P(SSB_{2015}<SSB_{MSY})$=0.99) and a 97% probability that there was no overfishing in 2015 ($P(F_{2015}<F_{MSY})$=0.97) (Figure 3.2.11).

All sensitivity runs using the base case CPUE selections indicated that the stock was overfished but that over fishing was not occurring; all sensitivity runs from the POS_1 group estimated that the stock was not overfished and that overfishing was not occurring; and all sensitivity runs from the NEG CPUE grouping indicated that the stock was overfished and that overfishing was occurring (Table 3.2.8 and Figure 3.2.13). Similar results were obtained from MCMC analysis for the base case model configuration and for the two alternative states of nature scenarios evaluated for CPUE (POS_1, NEG) with the base case productivity scenario, except that the wide ranges of uncertainty among scenarios overlapped for the MCMC analyses (Table 3.2.9 and Figure 3.2.14).

3.2.10 Projection Results

Projections were carried out using the forecast module internal to SS3 via the maximum likelihood estimates (MLE) and also via MCMC analysis. The MLE projections use uncertainty associated with the MLE parameter estimates calculated internally to SS3 using the inverse Hessian method in the maximum likelihood estimation, which is then propagated into the

variance of derived quantities, such as the fishing mortality intensity that would produce MSY, and forecasts of stock abundance and future yield for a given TAC. Recruitment variability (deviations from the spawner recruit relationship) was estimated in the main time period of the model but not included in the projections. Given the reproductive biology of this species variability in recruitment is expected to be low. Based on the observation that the influence of the high and low productivity scenarios had minimal effect on stock status in comparison to the CPUE groupings (Table 3.2.8, Figure 3.2.13) projections were only carried out for the base case productivity assumptions. This resulted in three projection scenarios: 1) the base case model configuration, 2) the alternative state of nature scenario evaluated for the POS_1 CPUE grouping with the base case productivity scenario (as defined in Table 3.2.8), and 3) the alternative state of nature scenario evaluated for the NEG CPUE grouping with the base case productivity scenario (as defined in Table 3.2.7). All projections were carried out using TAC on whole weight. To be consistent with previous analyses conversion of the whole weight TAC to dressed weight used 1.39 as the conversion factor (i.e. whole weight = 1.39*dressed weight).

Under the base case, the stock was estimated to be overfished, but not experiencing overfishing (F_{2015}/F_{MSY} <1). Therefore, as per the TORs, because there is no new or unexpected information about the status of the stock, no new rebuilding schedule was warranted, and projections were implemented consistent with the current rebuilding plan (started in 2005, projected to end in 2070) at a fixed level of removals (TAC on whole weight) allowing rebuilding of the stock by 2070 with 50% and 70% probability. Constant TAC strategies that would allow stock rebuilding by 2070 with a 50% and 70% probability, respectively, were 208 and 148 mt (whole weight) based on projections using the MLE (Figure 3.2.24 and 3.2.25). Projections based on the MCMC analysis associated with a 50% probability of rebuilding in the year 2070 resulted in estimates of the 50th quantile of the SSF_{2070}/SSF_{MSY}=1.04, indicating that the MCMC analysis was slightly more optimistic than the MLE based projections, which projected the SSB_{2070}/SSB_{MSY}=1 under the same catch. Projections based on the TAC associated with a 70% probability of rebuilding in the year 2070 were 148 MT (Figure 3.2.25); the corresponding projections based on MCMC indicated that this TAC would have a 50^{th} quantile of $SSF_{YR\_Rebuild}/SSF_{MSY}$ = 1.18 (Table 3.2.10).

Under the scenario using the NEG CPUE grouping the stock was estimated to be overfished and experiencing overfishing. Therefore, as per the TORs, because this is a new status for the stock, a new rebuilding schedule had to be calculated. The stock was projected at F = 0 to determine the year when the stock can be declared recovered with a 70% probability (SSF/SSFMSY > 1, Year $F=0_{70\%}$), which was 2093. Because that year is greater than 10 years in the future, then management action should be implemented to rebuild the stock within the estimated rebuilding time + 1 generation time (Restrepo et al. 1998). The estimate of generation time, defined as the mean age of parents of offspring produced by a cohort over its lifetime (μ1; Caswell 2001), is approximately 18 years. Therefore the target rebuilding year would be 2111, and the model was projected with a fixed TAC strategy that would attain rebuilding by the designated year with 50% and 70% probability. These TACs were 71 mt and 53 mt (whole weight), respectively. It was assumed that any modification to a TAC will impact each fishery by the same proportion. The MCMC analysis (Figures 3.2.26 and 3.2.27) resulted in estimates of SSF/SSF_{MSY} = 1.07 and 1.16 for the 50% and 70% TAC levels, respectively. The estimates of SSF/SSF_{MSY} from the MCMC analysis are larger than the estimates from the MLE-based projections; this is due to the MCMC analysis incorporating the uncertainty in the parameter estimates into the projections.

Under the POS_1 CPUE grouping the stock was estimated to be neither overfished nor experiencing overfishing. Consequently, under the POS_1 CPUE grouping, a projection model (TOR 4D), analogous to a P* approach associated with a 70% probability of overfishing not occurring (P* = 0.3), was implemented that projected with constant TAC so that the probability of overfishing was less than or equal to 30% in the current rebuilding year, 2070. The estimated TAC that would result in no more than a 30% chance of overfishing by 2070 was 677 mt (whole weight) based on the MLE estimates. MCMC analysis with this level of TAC led to estimates of stock status in 2070 at SSF/SSFMSY = 1.4 with a 70% probability (Figure 3.2.28).

The inclusion of parameter uncertainty in the projections via the MCMC analysis indicated, across all CPUE groupings and TAC levels, that the $SSF_{YR\_Rebuild} / SSF_{MSY} > 1$. This is also evident in the comparison of the stock status for 2015 (Figure 3.2.11). This is because the distribution of the MCMC results, when taking into account all of the parameter uncertainty, for $SSF_{YR\_Rebuild} / SSF_{MSY}$ has a slightly non-normal distribution that is wider on the higher values than the MLE

estimate. This indicates that when taking into account parameter uncertainty higher TAC values may reasonably be expected to reach SSF / SSF_{MSY} = 1 in the rebuilding year.

3.3 ASSESSMENT RESEARCH RECOMMENDATIONS

We list below research recommendations that are more feasible and would allow substantial improvement of future stock assessment of this stock:

- Determine what is missing in terms of experimental design or/and data analysis to arrive at incontrovertible (to the extent that it may be scientifically possible) conclusions on the reproductive periodicity of the stock
- Continue work on reconstruction of historical catches, especially catches outside of the US EEZ
- Investigate the length composition of the F3 Recreational and Mexican fisheries more in depth as this fishery is estimated to have a large impact on the stock mainly due to selecting age-0 fish.
- Research to estimate the degree of connectivity between the portions of the stock within the US and outside of the US EEZ.
- Study the distribution and movements of the stock relative to sampling coverage. It is possible that none of the indices alone track stock-wide abundance trends.

3.4 DISCUSSION

Although most shark species can likely be considered data poor when compared to most teleost stocks, information for sandbar sharks is relatively abundant mainly because—together with blacktip sharks—they have been the main target of commercial fisheries in the eastern U.S. seaboard since their inception. As a result, relatively good records of commercial landings exist, and biological and fishery information is available mainly from the directed bottom longline shark fishery observer program. Unlike other large coastal shark species, sandbar sharks are somewhat easy to identify, mostly by their high first dorsal fin in combination with the interdorsal ridge and placement of the pectoral fin compared with the origin of the dorsal fin.

Although these physical features should help distinguishing this species anecdotal evidence indicates that sandbar sharks are often confused with other species (i.e. dusky sharks).

Multiple indices that theoretically track relative abundance, many of them fishery independent, are also available. However, the majority of those fishery-independent indices started after 1995, and thus did not cover the main period of exploitation of this stock in the western North Atlantic Ocean. An issue of concern regarding the indices of relative abundance, is that many show interannual variability that does not seem to be compatible with the life history of the species, suggesting that the standardization procedure did not include all factors to help track relative abundance or that the spatial scope of sampling is too limited to allow for precise inference about stock-wide trends. The poor fit to some of the indices is thus likely the result of the model attempting to reconcile different signals provided by different indices and fitting a more central tendency ("compromise fit").

The uncertainty associated with biological parameters (reproduction and natural mortality) affected the estimation of stock status to some extent but was less influential than the groupings of CPUE series. Recent work has led to similar estimates with respect to age, growth, reproduction and the associated life history characteristics. As such the range of variation investigated was not as wide as in the past but reflected nevertheless the best available estimates. Changes to the biology and life history inputs were minor with respect the last assessment. Changes were that: the maximum age is now 31 (from 27); steepness is now 0.30 (from 0.29); the theoretical maximum length has changed a few centimeters; and the natural mortality at age has been updated to new values. These changes may affect the potential productivity/resiliency of the stock in different ways but the overall characteristics of shark with low fecundity, long gestation period, and late age at maturity have remained.

In general, the results of the assessment were robust to structural assumptions regarding the productivity of the stock. The sensitivity runs that used alternative groupings of the CPUE indices showed a more productive and less impacted stock that was not overfished nor undergoing overfishing based on the POS_1 CPUE grouping. The sensitivity runs that included the NEG CPUE grouping showed a less productive, more impacted stock that was overfished and experiencing overfishing.

The uncertainty associated with the sensitivity runs that included the POS_1 CPUE groupings was much greater than the uncertainty associated with the Base or NEG CPUE groupings (Figure 3.2.12). The POS_1 CPUE groupings included most, but not all, of the CPUE series that were increasing in the final years, (note S11 SEAMAP SE), and does not include the CPUEs which index some of the smallest animals in the stock (the northeast and southeast Coastspan indices), and as such may not be representative of the entire stock. Alternatively, as the model tracks spawning stock fecundity (SSF), the other indices (e.g. NE BLL, SE BLL) that track the older portion of the population may be more indicative of the stock trend. In comparison the NEG CPUE grouping does not contain the indices from the main commercial fisheries (bottom longline), the longest running CPUE index (VA longline), or the index with the most complete geographic coverage (NMFS longline SE) and as such may be non-representative with respect to the exploited biomass.

There is no CPUE trend available for fishery F3, the recreational and Mexican fisheries, that has contributed to the majority of the estimated fishing mortality throughout the model and is the predominant source of fishing mortality since 2008; consequently the model is missing information on the abundance of the stock that has been exploited by the largest fishery in the last seven years of the model.

Despite the differences in life history inputs noted above, changes in some of the indices of abundance, and use of length compositions, estimated stock status in the base run did not change substantially between the 2011 (SEDAR 21) and the current assessment. This is in part because the species biology constrains the model to the plausible population dynamics for the species. In conjunction with the parameterization of the species biology the two assessments (SEDAR 21 and 54) share quite similar catch and CPUE trends, both of which are influential to the model fit. The current base run results confirm that the combination of life-history parameters and the vulnerability of sandbar sharks to the various gears long before they are mature suggest a population that cannot support a large level of exploitation and help explain the degree of depletion estimated by the model. However, the strict limitation on catches in recent years has ended overfishing.

Stock status under the base case model configuration estimated that the stock in 2015 was overfished and overfishing was not occurring (SSF_{2015}/SSF_{MSY} = 0.6, F_{2015}/F_{MSY} = 0.75, Table 3.2.8). This result was robust to the MCMC analysis, with a 97% probability of the stock being in that quadrant of the Kobe plot (Table 3.2.9). The results from the MCMC analysis based on the other CPUE groupings estimated the stock was either overfished and experiencing overfishing (NEG CPUE group; 99.8% probability) or that the stock was neither overfished nor experiencing overfishing (POS_1 CPUE group; 99% probability). Based on the MCMC analysis, the distribution of estimates for SSF_{2015}/SSF_{MSY} and F_{2015}/F_{MSY} is smallest for the base case (Figure 3.2.14). The uncertainty associated with the POS_1 sensitivity analysis shows that SSF_{2015}/SSF_{MSY} ranges from less than 1 (overfished) to greater than 2.5 (near virgin conditions). The results of the MCMC analysis with the POS_1 CPUE grouping show low levels (<0.6) of F_{2015}/F_{MSY}. In contrast, the MCMC analysis based on NEG CPUE grouping shows high variability in the F_{2015}/F_{MSY} estimates (from <1 to >3) and low variability in SSF_{2015}/SSF_{MSY} estimates (Figure 3.2.14).

The retrospective analysis found no systematic pattern of over- or under-estimation of abundance, relative abundance, or fishing mortality for the base case, which is as close as possible to the previous benchmark assessment base case configuration. The base model configuration, parameter values and input data are based on the best available information, and stock status results based on the base case run should thus be considered the most credible.

Projections at alternative fixed harvest levels were used to provide an approach for evaluating total allowable catch (TAC) along the main axis of structural uncertainty investigated, the groupings of CPUE series. Among the multiple projection scenarios evaluated, were fixed levels of TAC that resulted in a 50% and 70% chance of rebuilding by the rebuilding year for the base case configuration and the NEG CPUE grouping, and TAC values obtained analogously to a P* approach used here to determine the removals associated with a 70% probability of overfishing not occurring (P* = 0.3) for the POS_1 CPUE grouping. As a pragmatic approach we used the MLE projections to determine the TAC levels associated with the probabilities (50% and/or 70%) of rebuilding by the rebuilding year. The MCMC analysis was then based on these determined TACs; MCMC analysis was not run over a large number of TACs due to the length of time (> 2days) required for each MCMC run.

The MLE projections indicated that at the 70% probability level the TACs required for stock rebuilding by 2070 would be 148 mt, 53 mt, and 677 mt for Base, NEG, and POS_1 CPUE groupings, respectively. The MCMC analysis indicated, across all CPUE groupings and TAC levels, that the $SSF_{YR\_Rebuild}$ / SSF_{MSY} >1; the median values from the 70% probability TAC levels were 1.18, 1.6 and 1.4 for the for Base, NEG and POS_1 CPUE groupings, respectively, based on 500 bootstrap replicates sampled from 500,000 runs. This indicates that when taking into account MCMC uncertainty, higher TAC values may reasonably be expected to reach SSF / SSFMSY = 1 in the rebuilding year. This is expected given that the TAC providing a 70% chance of $SSF_{YR\_Rebuild}$ / SSF_{MSY} >1 is calculated such that 30th quantile would be approximately 1 (i.e. 70% of the runs >1). Figure 3.2.11 indicates that the shape of the MCMC distribution for SSF_{2015} / SSF_{MSY} is not symmetric. Because the estimated SSF / SSF_{MSY} distribution from the MCMC analysis is slightly skewed to values greater than 1 the MCMC estimated $SSF_{YR\_Rebuild}$ / SSF_{MSY} are larger than 1, and as a result both the 50% and 70% projection results differ from those obtained with the MLE and asymptotic variance obtained from the Hessian. These results are useful because they help to characterize uncertainty in the assessment. For example, in the future it may be important to determine why the discrepancy exists. However, this is beyond the scope of the current assessment. Comparison of the MLE estimates and the 50th quantile of the MCMC results (Table 3.2.11) shows agreement for the majority of the parameters, indicating that the MLE estimates are appropriate. However some estimates from the MCMC analysis show deviation from the MLE estimates (note the selectivity parameters for S10, SCDNR) indicating some discrepancies in the two modes of parameter estimation.

This is the second HMS shark assessment conducted within the SEDAR process to utilize the Stock Synthesis modeling framework (the first was SEDAR 39 Atlantic Smooth Dogfish). Previous HMS shark assessments conducted within the SEDAR process used a State Space Age Structured Production Model (SSASPM). It is important when transitioning between modeling platforms to identify the potential impacts of differences in modeling approaches on assessment outcomes. Consequently, an attempt was made in this assessment to implement many of the features previously implemented in HMS shark assessments conducted with SSASPM in order to identify and evaluate the potential impacts of differences in modeling approaches on assessment

outcomes. However, two differences were identified between this assessment and previous assessments for HMS sharks conducted with SSASPM:

1. This assessment included length data from age-0 sharks. Previous assessments for HMS sharks conducted with SSASPM excluded age-0 sharks from the assessment.

2. This assessment estimated selectivity internally to the model. Previous assessments for HMS sharks conducted with SSASPM estimated selectivity externally of the stock assessment model.

The reason why the population is still recovering and the projected TAC is lower than the projected TAC from SEDAR 21 (the previous assessment) is likely due in part to these differences. The current assessment has different, slightly higher mortality levels on ages 0-6, which account for approximately 60% of the unfished population, and make up a bulk of the catches. Furthermore, the previous assessment did not include 0 age fish, and the fishing mortality in the recent years (2007-2015) is from the fishery that catches ages 0s. These factors result in an overall estimate of MSY that is lower.

The use of Stock Synthesis as a modeling platform is due to the recommendations of the CIE Reviewers from SEDAR 21, which did not specifically recommend Stock Synthesis but did recommend the following:

- Estimating the fishery and index selectivities within the assessment model.
- Development of a two sex model for more direct estimation of the spawning stock
- Fitting the model to either length or age data. In addition to being necessary in order to estimate selectivities, these data can be informative about changes in age-specific abundance.
- Exploration of models that do not require an assumption that the population is at virgin levels at some point in time.

By modeling the stock with Stock Synthesis the first 3 recommendations were fulfilled, while the last recommendation was initially addressed but ultimately the model was started at a time when

the stock was assumed to be close to virgin levels. This was due to the relative confidence in the stock being at approximately unfished levels in 1960, and the uncertainty associated with estimating initial depletion. One last consideration is that for a highly migratory species that ranges from the western north Atlantic to the Gulf of Mexico, Caribbean and Brazil this assessment has included data from only a portion of that range. Although this may be appropriate given that tagging results indicated a high amount of movement between the eastern US coast and the Gulf of Mexico there is little to no information concerning the degree of connectedness throughout the species southern range.

4 REFERENCES

Andrews, A. H., Natanson, L.J., Kerr, L.A., Burgess, G.H., and G.M. Cailliet. 2011. Bomb radiocarbon and tag-recapture dating of sandbar shark (*Carcharhinus plumbeus*). Fish. Bull. 109(4), 454-465.

Baremore, I., and Hale, L. 2012. Reproduction of the Sandbar Shark in the Western North Atlantic Ocean and Gulf of Mexico. Marine and Coastal Fisheries 4(1), 560-572.

Cadrin, S.X., Vaughn, D.S. 1997.. Retrospective analysis of virtual population estimates for Atlantic menhaden stock assessment. Fish. Bull. 95(3), 445-455.

Fournier D A, Skaug HJ, Ancheta J, Ianelli J, Magnusson A, Maunder MN, Nielsen A, Sibert J. 2012. AD Model Builder: using automatic differentiation for statistical inference of highly parameterized complex nonlinear models. Optim. Methods Softw. 27:233-249.

Francis RICC. 2011. Data weighting in statistical fisheries stock assessment models. Canadian Journal of Fisheries and Aquatic Sciences, 2011, 68(6): 1124-1138

Francis RICC .2014. Replacing the multinomial in stock assessment models: A first step. Fisheries Research, 151, (2014), 70-84.

Hale, L., and Baremore, I. 2013. Age and growth of the sandbar shark from the Northern Gulf of Mexico and the Western North Atlantic Ocean. Gulf of Mexico Science 1-2, 28-39.

ICCAT (International Commission for the Conservation of Atlantic Tunas). 2005. Report of the 2004 Inter-sessional meeting of the ICCAT Subcommittee on by-catches: shark stock assessment. Col. Vol. Sci. Pap. ICCAT 58:799-890.

Lee, H.-H., Piner, K.R., Methot R.D., Maunder, M.N. 2014. Use of likelihood profiling over a global scaling parameter to structure the population dynamics model: An example using blue marlin in the Pacific Ocean. Fish. Res.

Maunder, M. N. and A. E. Punt. 2013. A review of integrated analysis in fisheries stock assessment. Fisheries Research 142:61–74.

Maunder, M.N., Harley, S.J., Hampton, J., 2006. Including parameter uncertainty in forward projections of computationally intensive statistical population dynamic models. ICES J. Mar. Sci. 63, 969–979.

Methot, R. D. 2000. Technical description of the stock synthesis assessment program. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-43: 46.

Methot, R. 2010. User manual for Stock Synthesis: model version 3.10b. Feb 26, 2010. NOAA Fisheries Service, Seattle, WA.

Methot R. D., Wetzel C. R. 2013. Stock synthesis: a biological and statistical framework for fish stock assessment and fishery management, Fisheries Research, vol. 142 (pg. 86-99)

Porch, C.E. 2003a. A preliminary assessment of Atlantic white marlin (Tetrapturus albidus) using a state-space implementation of an age-structured model. SCRS/02/68 23pp.

Restrepo, V. R., G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall, R. D. Methot, J. E. Powers, B. L. Taylor, P.R. Wade, and J. F. Witzig. 1998. Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memo. NMFS-F/SPO-31, 54p. National Technical information Center, 5825 Port Royal Road, Springfield, VA 22161.

SEDAR 21, 2011. SEDAR 21 Stock Assessment Report, HMS Sandbar Shark. SEDAR 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405. (http://sedarweb.org/sedar-21-final-stock-assessment-report-hms-sandbar-shark, accessed January 2017).

SEDAR21-DW-09. Updated catches of sandbar, dusky and blacknose sharks. E. Cortés and I.E. Baremore SEDAR 21 Data Workshop Report (http://sedarweb.org)

SEDAR 39, 2015. SEDAR 39 Stock Assessment Report, HMS Atlantic Smooth dogfish Shark. SEDAR 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405. (http://sedarweb.org/).

SEDAR 54_TEMP1, 2017. Example Implementation of a Hierarchical Cluster Analysis and Cross-correlations of Selected CPUE Indices for the SEDAR 54 Assessment.

Wetzel, C. R., and A. E. Punt. 2011a. Model performance for the determination of appropriate harvest levels in the case of data-poor stocks. Fisheries Research 110:342–355.

Wetzel, C. R., and A. E. Punt. 2011b. Performance of a fisheries catch-at-age model (Stock Synthesis) in data-limited situations. Marine and Freshwater Research 62: 927–936.

5 TABLES

5.1 TABLES FROM SECTION 3.1

Table 3.1.1. Catches of sandbar shark by fleet in numbers used in the replication analysis. Catches are separated into four fisheries: commercial landings + unreported commercial catches in the GOM, commercial landings + unreported commercial catches in the ATL, recreational + Mexican catches, and menhaden fishery bycatch.

Year	Com+Un (GOM)	Com + Un (SA)	REC+MEX	Menhaden disc
1960	59	25	65	504
1961	119	51	129	504
1962	178	76	194	504
1963	237	102	259	504
1964	297	127	323	504
1965	356	152	388	504
1966	415	178	453	504
1967	475	203	517	504
1968	534	228	582	504
1969	593	254	647	504
1970	653	279	711	504
1971	712	305	776	504
1972	771	330	841	504
1973	831	355	905	504
1974	890	381	970	504
1975	949	406	1035	504
1976	969	414	1036	504
1977	1033	442	1079	504
1978	1236	529	2310	504
1979	1807	773	25366	504
1980	3018	1291	97983	504
1981	4650	1990	138933	696
1982	4650	1990	45401	713
1983	5024	2149	426979	705
1984	6861	2936	68135	705
1985	6373	2727	75593	635
1986	18908	6918	134151	626
1987	54132	19851	37438	653
1988	78241	46440	72789	635
1989	104839	55874	34532	670
1990	87469	34971	68479	653
1991	88900	7781	44428	505
1992	69488	31105	43450	444
1993	45201	26777	32922	452
1994	86311	39963	23411	486
1995	49038	35360	35206	445
1996	32126	33419	46817	444
1997	21190	20275	49315	452
1998	32264	30391	41846	435
1999	18087	35212	27329	479

2000	16781	20544	17794	409
2001	26185	21998	42127	383
2002	27572	28788	13062	374
2003	23663	21567	9252	365
2004	18472	20667	7395	374
2005	14109	19265	6126	374
2006	22096	20022	5059	374
2007	6068	10845	10638	374
2008	668	1485	7324	374
2009	2705	1281	7026	374

Table 3.1.2. Standardized indices of relative abundance used in the replication analysis. All indices are scaled (divided by their respective mean). For details on the indices of abundance and the definition of the acronyms please see the Section 2 and Table 2.4.

YEAR	LPS	BLLOP	VA-LL	NMFS LLSE	NMFS Coast age 1+	NMFS-NE	PLLOP	GA-Coastspan	SC-Coastspan	SCDNR-Red dr	PCGN
1975	-	-	1.826	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-	-	-	-
1977	-	-	1.636	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	2.293	-	-	-	-	-	-	-	-
1981	-	-	2.397	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-
1986	3.480	-	-	-	-	-	-	-	-	-	-
1987	1.024	-	-	-	-	-	-	-	-	-	-
1988	3.193	-	-	-	-	-	-	-	-	-	-
1989	3.780	-	-	-	-	-	-	-	-	-	-
1990	1.243	-	0.396	-	-	-	-	-	-	-	-
1991	2.078	-	0.558	-	-	-	-	-	-	-	-
1992	1.624	-	0.232	-	-	-	3.326	-	-	-	-
1993	0.828	-	0.749	-	-	-	2.633	-	-	-	-
1994	0.509	0.617	-	-	-	-	1.863	-	-	-	-
1995	0.440	0.658	0.885	1.855	-	-	1.500	-	-	-	-
1996	0.541	0.568	0.882	0.972	-	0.138	1.223	-	-	-	0.965
1997	0.623	0.912	0.818	1.466	-	-1	1.239	-	-	-	0.551
1998	0.170	1.003	1.335	-	-	0.835	0.876	-	0.702	0.548	1.394
1999	0.245	0.741	1.054	0.462	-	-	1.117	-	0.613	2.329	-
2000	0.294	0.438	1.000	1.084	-	-	0.408	0.156	0.105	0.226	-
2001	1.220	1.262	1.103	1.019	1.343	0.412	0.481	-	0.055	1.369	0.842
2002	0.418	0.524	0.596	0.798	0.465	-	0.033	-	0.222	0.903	0.812
2003	0.192	0.746	0.508	0.979	1.267	-	0.029	0.856	0.310	0.604	0.659
2004	0.111	0.582	0.682	0.767	1.261	0.319	0.554	0.963	1.748	1.322	1.611

2005	0.473	0.763	0.435	0.349	1.308	-	0.196	0.299	1.064	0.606	1.243
2006	0.150	1.073	1.079	0.446	0.677	-	0.880	1.105	1.778	1.094	-
2007	0.333	1.421	0.311	0.970	0.707	1.408	0.554	1.785	2.024	-	0.425
2008	0.395	1.064	0.958	0.839	0.219	-	0.538	1.554	2.007	-	2.022
2009	0.636	3.627	1.268	1.995	1.754	2.888	0.550	1.283	1.373	-	0.474

Table 3.1.3. Life history inputs used in the SEDAR 21 analysis and the SEDAR 54 replication analysis. All these quantities are treated as constants in the model, note that this table differs from Table 2.1 in the number of ages assumed and age specific values.

Age	Proportion mature female	Natural Mortality M
1	0.00035	0.15431
2	0.00068	0.15431
3	0.00131	0.15431
4	0.00253	0.15431
5	0.00487	0.15431
6	0.00935	0.15431
7	0.01788	0.15431
8	0.03393	0.15323
9	0.06346	0.14812
10	0.11562	0.13116
11	0.20141	0.13116
12	0.32730	0.13116
13	0.48418	0.13116
14	0.64424	0.13116
15	0.77746	0.13099
16	0.87079	0.12942
17	0.92858	0.12806
18	0.96166	0.12688
19	0.97975	0.12586
20	0.98940	0.12497
21	0.99448	0.12419
22	0.99713	0.12351
23	0.99851	0.12291
24	0.99923	0.12239
25	0.99960	0.12193
26	0.99979	0.12153
27	0.99989	0.12117

Table 3.1.4. Summary of biological inputs used in SEDAR 21 and the SEDAR 54 replication analysis. Changes or updates are in bold font.

Quantity	SEDAR 21	SEDAR 54 Replication
Sex ratio:	1:1	1:1
Reproductive frequency:	2.5 yr	2.5 yr
Pupping month:	June	June
Age or Length vs litter size relation:	pups = 0.2591*age + 3.9897	**pups = 0.0324*FL + 4.2447**
L_{inf}	181.15 cm FL	**181.15 cm FL (F), 172.97cm (M)**
k	0.12	**0.12(F), 0.15(M)**
t_0	-2.33	**-3.09(F), -2.33(M)**
Weight vs fork length relation:	$W=0.000010885L^{3.0124}$	$W=0.000010885L^{3.0124}$
SR function	Beverton Holt	Beverton Holt
SR steepness	0.29	0.29

Table 3.1.5. Summary of selectivity inputs used in SEDAR 21 and the SEDAR 54 replication analysis.

Series	Selectivity	a_{50}	b	c_{50}	d	max(sel)
CATCH SERIES						
Commercial + unreported GOM	Logistic	6	2			
Commercial + unreported ATL	Logistic	8	1			
Recreational + Mexican	Double logistic	0.02	0.2	0.5	2.5	0.45
Menhaden discards	Logistic	-120	0.2			
CPUE SERIES						
BLLOP	Logistic	6	1			
VIMS	Logistic	0.02	0.24	8	2	0.96
LPS	Double logistic	5	2	12.5	2.5	0.71
PLLOP	Double logistic	8.53	0.59	23.97	2.01	1.00
NELL	Logistic	7.67	2.04			
NMFS Coastspan age-1+	Logistic	0.02	0.5			
GA Coastspan	Logistic	0.02	0.5			
SC Coastspan	Logistic	0.02	0.5			
SC Historic Red Drum	Logistic	2.5	0.4			
PC Gillnet	Double logistic	0.02	0.2	5	1.2	0.96
NMFS SE BLL	Logistic	6	1			

Changes for SEDAR 54 Replication Analysis

	Selectivity	PEAK	TOP	ASC-WIDTH	DSC-WIDTH	INIT	FINAL
Recreational + Mexican (Catch)	Double normal	-2	-4	-2	3	-9	-9
VIMS (Index)	Double normal	-1	-3	-2	4.2	-9	-9
LPS (Index)	Double normal	8	-3	3.4	3.4	-9	-9
PC Gillnet (index)	Double normal	-1	-3	-2	3	-9	-9

Table 3.1.6. Comparisons of the SEDAR 21 assessment base case and the SEDAR 54 replication analysis, greyed rows are directly comparable.

	Base (SEDAR 21)			Replication Analysis		
	Est	CV		Est	CV	Notes
SSF_{2009}/SSF_{MSY}	**0.66**	0.83	SSF_{2009}/SSF_{MSY}			
SSB_{2009}/SSB_{MSY}			SSB_{2009}/SSB_{MSY}	**0.70**		
F_{2009}/F_{MSY}	**0.62**	0.57	F_{2009}/F_{MSY}	**0.51**		
N_{2009}/N_{MSY}	0.74	---	N_{2009}/N_{MSY}			
B_{2009}/B_{MSY}			B_{2009}/B_{MSY}	0.70		
MSY (numbers)	160,643	---	MSY(biomass)	510		in MT
SPR_{MSY}	0.78	0.06	SPR_{MSY}	0.79		
F_{MSY}	0.021	---	F_{MSY}	0.03		
SSF_{MSY}	477,590	---	SSF_{MSY}			
SSB_{MSY}			SSB_{MSY}	699		
N_{MSY}	1,928,165	---	N_{MSY}			
B_{MSY}			B_{MSY}	38931		
F_{2009}	0.01	0.57	F_{2009}	0.02		
SSF_{2009}	312890	0.60	SSF_{2009}			
SSB_{2009}			SSB_{2009}	491		
N_{2009}	1,539,102	---	N_{2009}	1,776,785		
SSF_{2009}/SSF_0	0.28	0.41	SSF_{2009}/SSF_0			
SSB_{2009}/SSB_0			SSB_{2009}/SSB_0	0.32		
B_{2009}/B_0	0.34	0.33	B_{2009}/B_0	0.32		
R_0	563,490	0.20	R_0	600,821		
steepness	0.29	---	steepness	0.29		

Table 3.1.7 List of continuity runs.

Run Name	Description
SEDAR 21	Estimated Biomass from SEDAR 21
Replication	Estimated total biomass based on the SEDAR 21 inputs used in SS3.
Update Catch	Replication analysis using the catches re-estimated for SEDAR 54, 1960-2009
Cont_1	Updated Catch run plus catch from 2010-2015.
Cont_2	Updated the longevity from 27 to 31.
Cont_3	Updated life history and biological parameters to values in table 2.1 and 2.2

5.2 TABLES FROM SECTION 3.2

Table 3.2.1 Fishery and CPUE number, name, and selectivity functional form for the base case model configuration.

Number	Type	Name	Short Name	Selectivity Function
1	Fishery	Commercial Gulf of Mexico Longline	F1_COM_GOM	Double Normal
2	Fishery	Commercial South Atlantic Longline	F2_COM_SA	Logistic
3	Fishery	Recreational and Mexican catches	F3_RecMEX	Double Normal
4	Fishery	Menhaden Discards	F4_MEN_DSC	Logistic
5	CPUE	Large Pelagic Survey	S1_LPS	Double Normal
6	CPUE	Bottom Longline Observer Program 1	S2_BLLOP_1	Double Normal
7	CPUE	Bottom Longline Observer Program 2	S3_BLLOP_2	Double Normal
8	CPUE	Virginia Longline Survey	S4_VA_LL	Double Normal
9	CPUE	NMFS Longline Southeast Survey	S5_NMFS_LLSE	Double Normal
10	CPUE	Coastspan NE LL Survey	S6_CST_NE_LL	Double Normal
11	CPUE	NMFS Longline Northeast Survey	S7_NMFS_NE	Double Normal
12	CPUE	Pelagic longline observer program	S8_PLLOP	Double Normal
13	CPUE	Coastspan SE LL Survey	S9_COASTSPAN_SE_LL	Cubic Spline
14	CPUE	South Carolina DNR red drum observer program	S10_SCDNR_RedDr	Double Normal
15	CPUE	SEAMAP Longline SE Survey	S11_SEAMAP_LL_SE	Double Normal

Table 3.2.2. Details on the number of length measurement records, initial sample size used in Stock Synthesis, the sample size multiplier, and the resulting effective sample size input in the Stock Synthesis base case model configuration.

Number	Name	Number of records	Sex specific records	Initial sample size	Sample size multiplier	Effective sample size used in model
1	F1_COM_GOM	14634	Yes	1450	0.29	424
2	F2_COM_SA	31385	Yes	3263	0.03	96
3	F3_RecMEX	604	No	156	0.91	142
4	F4_MEN_DSC	NA	NA	NA	NA	NA
5	S1_LPS	236	No	114	1.14	130
6	S2_BLLOP_1	24862	Yes	3563	0.07	255
7	S3_BLLOP_2	21157	Yes	42	9.85	414
8	S4_VA_LL	6488	Yes	872	0.13	115
9	S5_NMFS_LLSE	1045	Yes	550	0.29	161
10	S6_CST_NE_LL	1084	Yes	384	1.58	607
11	S7_NMFS_NE	5122	Yes	333	0.14	48
12	S8_PLLOP	256	Yes	76	1.07	81
13	S9_COASTSPAN_SE_LL	1539	Yes	592	2.09	1238
14	S10_SCDNR_RedDr	516	Yes	203	0.16	33
15	S11_SEAMAP_LL_SE	842	Yes	515	0.43	219

Table 3.2.3. List of parameters estimated in SS3 for sandbar shark (base run). The list includes (columns from left to right) the parameter labels, the predicted parameter value, the minimum, maximum and initial value for the parameter, the parameter standard deviation, the prior type if applicable, the prior value (if applicable) and the prior standard deviation if applicable. Parameters that were held fixed (not estimated) are not included in this table.

Label	Value	Min	Max	Init	Parm_StDev	PR_type	Prior	Pr_SD
SR_LN(R0)	6.28	3	10	6.27	0.06	No_prior	NA	NA
SizeSel_1P_1_F1_COM_GOM	149.43	35	259	150.90	1.52	No_prior	NA	NA
SizeSel_1P_3_F1_COM_GOM	5.45	-15	15	5.96	0.20	No_prior	NA	NA
SizeSel_1P_4_F1_COM_GOM	5.61	-15	15	5.51	0.20	No_prior	NA	NA
SzSel_1Male_Ascend_F1_COM_GOM	0.74	-15	15	-0.05	0.20	No_prior	NA	NA
SzSel_1Male_Scale_F1_COM_GOM	0.67	-15	15	1.34	0.09	No_prior	NA	NA
SizeSel_2P_1_F2_COM_SA	93.63	1	200	94.68	6.22	No_prior	NA	NA
SizeSel_2P_2_F2_COM_SA	29.72	1	100	31.03	10.10	No_prior	NA	NA
SizeSel_3P_1_F3_RecMEX	55.06	35	259	55.03	0.64	Normal	55	1
SizeSel_3P_2_F3_RecMEX	-10.00	-15	15	-10.00	1.00	Normal	-10	1
SizeSel_5P_1_S1_LPS	155.53	35	259	155.50	11.11	No_prior	NA	NA
SizeSel_5P_3_S1_LPS	7.30	-15	15	7.31	0.50	No_prior	NA	NA
SizeSel_5P_4_S1_LPS	14.63	-15	15	14.62	9.96	No_prior	NA	NA
SizeSel_8P_1_S4_VA_LL	45.02	35	258	41.27	0.14	No_prior	NA	NA
SizeSel_8P_3_S4_VA_LL	-9.36	-15	15	-8.52	41.56	No_prior	NA	NA
SizeSel_9P_1_S5_NMFS_LLSE	161.85	35	259	156.52	6.25	No_prior	NA	NA
SizeSel_9P_3_S5_NMFS_LLSE	7.15	-15	15	6.91	0.31	No_prior	NA	NA
SizeSel_9P_4_S5_NMFS_LLSE	5.61	-15	15	5.88	0.83	No_prior	NA	NA
SzSel_9Male_Peak_S5_NMFS_LLSE	-6.15	-20	200	3.00	7.99	No_prior	NA	NA
SzSel_9Male_Ascend_S5_NMFS_LLSE	-0.66	-15	15	-0.14	0.52	No_prior	NA	NA
SzSel_9Male_Descend_S5_NMFS_LLSE	-0.80	-15	15	-0.60	1.24	No_prior	NA	NA
SzSel_9Male_Scale_S5_NMFS_LLSE	0.74	-15	15	0.67	0.18	No_prior	NA	NA
SizeSel_10P_1_S6_CST_NE_LL	57.03	35	258	70.82	0.68	No_prior	NA	NA
SizeSel_10P_3_S6_CST_NE_LL	-8.04	-15	15	6.07	69.31	No_prior	NA	NA
SizeSel_10P_4_S6_CST_NE_LL	7.58	-15	15	6.92	0.10	No_prior	NA	NA

Table 3.2.3 Continued.

Label	Value	Min	Max	Init	Parm_StDev	PR type	Prior	Pr_SD
SzSel_10Male_Peak_S6_CST_NE_LL	5.36	-20	200	4.21	1.44	No_prior	NA	NA
SzSel_10Male_Ascend_S6_CST_NE_LL	10.92	-15	15	-0.12	69.31	No_prior	NA	NA
SzSel_10Male_Descend_S6_CST_NE_LL	-0.79	-15	15	-0.60	0.16	No_prior	NA	NA
SzSel_10Male_Scale_S6_CST_NE_LL	1.08	-15	15	1.00	0.12	No_prior	NA	NA
SizeSel_11P_1_S7_NMFS_NE	132.67	35	259	129.64	10.92	No_prior	NA	NA
SizeSel_11P_3_S7_NMFS_NE	8.03	-15	15	7.90	0.54	No_prior	NA	NA
SizeSel_11P_4_S7_NMFS_NE	6.32	-15	15	6.66	0.86	No_prior	NA	NA
SzSel_11Fem_Scale_S7_NMFS_NE	2.32	-15	15	2.22	0.75	No_prior	NA	NA
SizeSel_12P_1_S8_PLLOP	147.30	35	259	146.63	5.60	No_prior	NA	NA
SizeSel_12P_3_S8_PLLOP	6.52	-15	15	6.70	0.63	No_prior	NA	NA
SzSel_12Male_Ascend_S8_PLLOP	-0.43	-15	15	-0.14	0.72	No_prior	NA	NA
SzSel_12Male_Descend_S8_PLLOP	-1.19	-15	15	-0.60	1.14	No_prior	NA	NA
SzSel_12Male_Scale_S8_PLLOP	1.45	-15	15	1.07	0.68	No_prior	NA	NA
SizeSpline_Val_1_S9_COASTSPAN_SE_LL_13	3.36	-5	5	1.24	0.36	No_prior	NA	NA
SizeSpline_Val_2_S9_COASTSPAN_SE_LL_13	2.54	-5	5.00	1.00	0.36	No_prior	NA	NA
SizeSpline_Val_3_S9_COASTSPAN_SE_LL_13	2.00	-5	5.00	-0.69	0.35	No_prior	NA	NA
SizeSpline_Val_4_S9_COASTSPAN_SE_LL_13	-1.05	-5	5.00	2.06	0.21	No_prior	NA	NA
SizeSel_14P_1_S10_SCDNR_RedDr	92.85	35	259.00	86.71	4.97	No_prior	NA	NA
SzSel_14Male_Ascend_S10_SCDNR_RedDr	1.58	-15	15.00	1.07	1.07	No_prior	NA	NA
SzSel_14Male_Descend_S10_SCDNR_RedDr	-0.31	-15	15.00	1.08	1.82	No_prior	NA	NA
SzSel_14Male_Scale_S10_SCDNR_RedDr	0.59	-15	15.00	0.79	0.31	Sym_Beta	4	50
SizeSel_15P_1_S11_SEAMAP_LL_SE	93.57	35	258.00	95.74	2.85	No_prior	NA	NA
SizeSel_15P_4_S11_SEAMAP_LL_SE	7.97	-15	15.00	8.09	0.26	No_prior	NA	NA
SzSel_15Male_Ascend_S11_SEAMAP_LL_SE	-0.37	-15	15.00	-0.12	0.42	No_prior	NA	NA
SzSel_15Male_Descend_S11_SEAMAP_LL_SE	-0.28	-15	15.00	-0.60	0.32	No_prior	NA	NA
SzSel_15Male_Scale_S11_SEAMAP_LL_SE	1.17	-15	15.00	1.16	0.21	No_prior	NA	NA

Table 3.2.4 Estimated recruitment deviations in the base case model configuration.

Label	Value	Parm_StDev	Prior	Pr_SD
Early_RecrDev_1970	-0.00862	0.179221	NA	NA
Early_RecrDev_1971	-0.01046	0.179053	NA	NA
Early_RecrDev_1972	-0.01074	0.178952	NA	NA
Early_RecrDev_1973	-0.00977	0.178864	NA	NA
Early_RecrDev_1974	-0.01185	0.178611	NA	NA
Early_RecrDev_1975	-0.00557	0.17884	NA	NA
Early_RecrDev_1976	0.00228	0.179649	NA	NA
Early_RecrDev_1977	0.011069	0.180348	NA	NA
Early_RecrDev_1978	0.03191	0.181665	NA	NA
Early_RecrDev_1979	0.042635	0.181954	NA	NA
Main_RecrDev_1980	0.034115	0.180875	NA	NA
Main_RecrDev_1981	0.035592	0.181527	NA	NA
Main_RecrDev_1982	0.042194	0.182736	NA	NA
Main_RecrDev_1983	0.055566	0.181956	NA	NA
Main_RecrDev_1984	0.033023	0.181476	NA	NA
Main_RecrDev_1985	-0.00221	0.178008	NA	NA
Main_RecrDev_1986	-0.01434	0.176295	NA	NA
Main_RecrDev_1987	-0.0342	0.175035	NA	NA
Main_RecrDev_1988	-0.05862	0.172592	NA	NA
Main_RecrDev_1989	-0.09764	0.169649	NA	NA
Main_RecrDev_1990	-0.12103	0.167203	NA	NA
Main_RecrDev_1991	-0.11763	0.166917	NA	NA
Main_RecrDev_1992	-0.11533	0.165902	NA	NA
Main_RecrDev_1993	-0.11451	0.167249	NA	NA
Main_RecrDev_1994	-0.09349	0.168192	NA	NA
Main_RecrDev_1995	-0.06212	0.168795	NA	NA
Main_RecrDev_1996	0.00675	0.172536	NA	NA
Main_RecrDev_1997	0.060591	0.174442	NA	NA
Main_RecrDev_1998	0.068298	0.17333	NA	NA
Main_RecrDev_1999	0.062987	0.1753	NA	NA
Main_RecrDev_2000	0.037741	0.172224	NA	NA
Main_RecrDev_2001	0.060012	0.165824	NA	NA
Main_RecrDev_2002	-0.00839	0.170931	NA	NA
Main_RecrDev_2003	0.094234	0.164966	NA	NA
Main_RecrDev_2004	0.137962	0.171418	NA	NA
Main_RecrDev_2005	0.512331	0.164567	NA	NA
Main_RecrDev_2006	0.300625	0.173098	NA	NA
Main_RecrDev_2007	0.108021	0.164314	NA	NA
Main_RecrDev_2008	0.025818	0.159392	NA	NA
Main_RecrDev_2009	-0.27804	0.1592	NA	NA
Main_RecrDev_2010	0.024232	0.157528	NA	NA

Table 3.2.4 Continued

Main_RecrDev_2011	-0.10821	0.162006	NA	NA
Main_RecrDev_2012	0.041292	0.156103	NA	NA
Main_RecrDev_2013	0.074059	0.157449	NA	NA
Main_RecrDev_2014	0.002395	0.153092	NA	NA
Main_RecrDev_2015	-0.17569	0.15647	NA	NA

Table 3.2.5. Estimated total biomass (in whole weight, mt), spawning stock fecundity (1000s) and recruits (1000s) in the base case model configuration

Year	Total biomass	Spawning stock fecundity	Recruits
1960	97218	1505	533
1961	97204	1505	533
1962	97190	1505	533
1963	97175	1505	533
1964	97159	1504	533
1965	97142	1504	533
1966	97125	1504	533
1967	97106	1503	533
1968	97088	1503	533
1969	97068	1503	533
1970	97038	1502	528
1971	96998	1502	527
1972	96947	1501	527
1973	96889	1501	527
1974	96822	1501	526
1975	96756	1500	529
1976	96701	1500	533
1977	96660	1499	538
1978	96646	1498	549
1979	96647	1497	555
1980	96574	1495	549
1981	96115	1492	550
1982	93890	1485	552
1983	91871	1478	558
1984	88483	1467	543
1985	85760	1455	521
1986	83357	1441	512
1987	80111	1416	497
1988	76562	1365	474
1989	71441	1284	439
1990	66026	1182	407
1991	61190	1093	388
1992	57259	1012	369
1993	53332	931	349
1994	50248	866	339
1995	45885	773	322
1996	42623	708	323
1997	39831	660	324
1998	37893	626	313
1999	35987	591	298

Table 3.2.5. Continued

2000	34015	557	277
2001	32834	527	271
2002	31531	494	241
2003	30143	456	250
2004	29277	426	246
2005	28950	401	340
2006	28728	378	262
2007	28325	355	205
2008	28436	345	184
2009	28797	344	136
2010	29025	345	184
2011	29133	350	163
2012	29251	358	193
2013	29417	370	205
2014	29579	383	196
2015	29665	397	169

Table 3.2.6. Estimated fishing mortality by fleet, with total fishing mortality and F/F_{MSY}.

Year	F1_COM_GOM	F2_COM_SA	F3_RecMEX	F4_MEN_DSC	F_Total	F/F_{MSY}
1960	0	0	0	0.0001	0	0.002
1961	0.0001	0	0	0.0001	0	0.003
1962	0.0001	0	0	0.0001	0	0.003
1963	0.0001	0	0	0.0001	0	0.004
1964	0.0002	0	0	0.0001	0	0.004
1965	0.0002	0	0	0.0001	0	0.005
1966	0.0002	0	0	0.0001	0	0.005
1967	0.0002	0	0	0.0001	0	0.006
1968	0.0003	0	0	0.0001	0	0.006
1969	0.0003	0	0	0.0001	0	0.007
1970	0.0003	0	0	0.0001	0.001	0.007
1971	0.0004	0	0	0.0001	0.001	0.008
1972	0.0004	0	0	0.0001	0.001	0.008
1973	0.0004	0.0001	0	0.0001	0.001	0.009
1974	0.0005	0.0001	0	0.0001	0.001	0.009
1975	0.0005	0.0001	0	0.0001	0.001	0.01
1976	0.0007	0.0001	0.0001	0.0001	0.001	0.014
1977	0.001	0.0001	0.0006	0.0001	0.002	0.025
1978	0.0014	0.0002	0.0026	0.0001	0.004	0.059
1979	0.002	0.0002	0.0114	0.0001	0.014	0.192
1980	0.0028	0.0003	0.0514	0.0001	0.055	0.763
1981	0.004	0.0005	0.2432	0.0002	0.248	3.459
1982	0.0041	0.0005	0.2043	0.0002	0.209	2.917
1983	0.0045	0.0006	0.3807	0.0002	0.386	5.385
1984	0.0064	0.0008	0.2639	0.0002	0.271	3.786
1985	0.0061	0.0008	0.2185	0.0002	0.226	3.148
1986	0.019	0.002	0.2966	0.0002	0.318	4.435
1987	0.0578	0.0059	0.1701	0.0002	0.234	3.267
1988	0.0901	0.0147	0.2643	0.0002	0.369	5.154
1989	0.1322	0.0191	0.1956	0.0003	0.347	4.844
1990	0.1207	0.0129	0.2846	0.0003	0.418	5.839
1991	0.1325	0.0031	0.244	0.0002	0.38	5.301
1992	0.1112	0.0132	0.2707	0.0002	0.395	5.516
1993	0.0771	0.0122	0.264	0.0002	0.353	4.932
1994	0.171	0.0211	0.2588	0.0003	0.451	6.295
1995	0.1014	0.0195	0.3203	0.0003	0.441	6.16
1996	0.0609	0.017	0.4199	0.0003	0.498	6.949
1997	0.043	0.0111	0.3328	0.0003	0.387	5.402
1998	0.0532	0.0135	0.3068	0.0003	0.374	5.215
1999	0.0431	0.0225	0.3078	0.0004	0.374	5.215
2000	0.0538	0.0175	0.123	0.0003	0.195	2.716

Table 3.2.6. Continued.

Year	F1_COM_GOM	F2_COM_SA	F3_RecMEX	F4_MEN_DSC	F_Total	F/FMSY
2001	0.0787	0.0175	0.1386	0.0003	0.235	3.279
2002	0.101	0.0277	0.0863	0.0003	0.215	3.004
2003	0.0864	0.0207	0.0745	0.0003	0.182	2.54
2004	0.065	0.0193	0.0722	0.0003	0.157	2.189
2005	0.058	0.0213	0.0646	0.0003	0.144	2.012
2006	0.0835	0.0206	0.0657	0.0003	0.17	2.372
2007	0.0245	0.012	0.0714	0.0003	0.108	1.509
2008	0.0029	0.0018	0.0549	0.0003	0.06	0.834
2009	0.0112	0.0015	0.0548	0.0003	0.068	0.946
2010	0.0071	0.001	0.0644	0.0003	0.073	1.015
2011	0.0087	0.0013	0.042	0.0003	0.052	0.73
2012	0.0042	0.0006	0.0535	0.0003	0.059	0.818
2013	0.0032	0.001	0.0513	0.0003	0.056	0.778
2014	0.0029	0.0019	0.0454	0.0002	0.05	0.704
2015	0.0041	0.0026	0.0468	0.0002	0.054	0.75

Table 3.2.7. Alternative states of nature scenarios evaluated for CPUE and productivity as defined in the main text. Bold text indicates base case.

GROUP	Scenario
	CPUE
CPUE scenario 1	**All CPUE SERIES**
CPUE scenario 2	"POS_1" CPUE group (S2_BLLOP1, S3_BLLOP_2, S4_VA_LL, S5_NMFS_LLSE, S7_NMFS_NE) 1.1.1.1.
CPUE scenario 3	"NEG" CPUE group (S1_LPS, S6_CST_NE_LL, S8_PLLOP, S9_COASTSPAN_SE_LL, S10_SCDNR_RedDr, S11_SEAMAP_LL_SE)
	Productivity
Productivity scenario 1	3 year reproductive cycle, pup survival reduced to 0.80, and natural mortality (M) for ages 1-max increased by 10%.
Productivity scenario 2	**2.5 year reproductive cycle, and pup survival as described in Section 2.**
Productivity scenario 3	2 year reproductive cycle, pup survival increased to 0.90, M for ages 1-max decreased by 10%, and constant fecundity of 9.65 pups.

Table 3.2.8. Reference points for base case model configuration and for alternative state of nature scenarios evaluated for CPUE and productivity as defined in the main text and Table 3.2.7 above. Stock status in 2015 relative to MSY based reference points is in the grey shaded rows. Bold text indicates base case model configuration.

CPUE Group	BASE	**BASE**	BASE	POS_1	POS_1	POS_1	NEG	NEG	NEG
Productivity	Low	**Medium**	High	Low	Medium	High	Low	Medium	High
Catch2015/MSY	0.45	**0.47**	0.52	0.29	0.3	0.33	0.53	0.55	0.6
MSY	437	**417**	380	668	648	588	373	356	327
B_0	91,517	**97,218**	111,766	140,037	151,134	173,539	78,004	83,028	96,403
B_{MSY}	40,150	**42,778**	49,480	61,429	66,495	76,821	34,211	36,520	42,655
SSF_0	1,082	**1,505**	2,497	1,656	2,340	3,878	922	1,286	2,154
SSF_{MSY}	475	**662**	1,106	726	1,030	1,717	405	566	953
SSF_{2015}/SSF_{MSY}	0.61	**0.6**	0.58	1.28	1.28	1.26	0.26	0.26	0.28
F_{MSY}	0.07	**0.07**	0.07	0.07	0.07	0.07	0.07	0.07	0.07
F_{2015}/F_{MSY}	0.71	**0.75**	0.85	0.24	0.24	0.27	1.92	2	2.06
SSF_{2015}	288	**397**	640	928	1317	2156	106	148	264
F_{2015}	0.05	**0.05**	0.06	0.02	0.02	0.02	0.14	0.14	0.15
Total Biomass 2015	28,261	**29,665**	32,698	84,853	91,593	102,886	10,497	11,181	13,693
MSST	415	**578**	966	634	900	1,500	354	495	833

Table 3.2.9. Estimated stock status based on MCMC analysis for the base case model configuration (Base) and two alternative states of nature scenarios evaluated for CPUE (POS_1, NEG) with the base case productivity scenario as defined in the main text and Table 3.2.8 above, and for all of the above combined (overall). Values shown are the probabilities of being in that particular quadrant of the phase (Kobe) plot: red (overfished and overfishing); orange (not overfished but overfishing); yellow (overfished but no overfishing); green (not overfished and no overfishing).

	Quadrant			
	1	2	3	4
Base	**1.8%**	**0.0%**	**97.3%**	**0.8%**
CPUE scenario				
POS_1	**0.0%**	**0.0%**	**1.0%**	**99.0%**
NEG	**99.8%**	**0.0%**	**0.2%**	**0.0%**
Overall	**33.9%**	**0.0%**	**32.9%**	**33.3%**

Table 3.2.10. Projections based on CPUE groupings and TAC levels (in whole weight) from MLE projections and MCMC analysis. For the base case (Base), projections were implemented with constant TAC allowing rebuilding of stock by 2070 with 50% and 70% probability (TOR 4A). Under the NEG CPUE grouping, projections were implemented with constant TAC allowing rebuilding of stock by 2111 with 50% and 70% probability (TOR 4B). Under the POS_1 CPUE grouping, a projection model (TOR 4D), analogous to a P* approach associated with a 70% probability of overfishing not occurring (P* = 0.3), was implemented that projected with constant TAC so that the probability of overfishing was less than or equal to 30% in the current rebuilding year, 2070.

CPUE Group	Probability of Rebuilding by Year Rebuild	Year Rebuild	TAC Based on MLE Projections	50th Quantile (of $SSF_{YR\_rebuild}/SSF_{MSY}$) based on MCMC Projections
Base	70%	2070	148	1.18
Base	50%	2070	208	1.04
NEG	70%	2111	53	1.16
NEG	50%	2111	71	1.07
POS_1	70%	2070	677	1.4

Table 3.2.11. Comparison of MLE estimates and the 50th quantile of the MCMC estimates.

Parameter	MLE Estimate	MCMC 50th Quantile
SR_LN(R0)	6.279	6.309
SizeSel_1P_1_F1_COM_GOM	149.427	149.537
SizeSel_1P_3_F1_COM_GOM	5.451	5.463
SizeSel_1P_4_F1_COM_GOM	5.608	5.614
SzSel_1Male_Ascend_F1_COM_GOM	0.744	0.730
SzSel_1Male_Scale_F1_COM_GOM	0.673	0.679
SizeSel_2P_1_F2_COM_SA	93.632	94.907
SizeSel_2P_2_F2_COM_SA	29.720	34.870
SizeSel_3P_1_F3_RecMEX	55.059	54.968
SizeSel_3P_2_F3_RecMEX	-9.999	-9.971
SizeSel_5P_1_S1_LPS	155.527	157.816
SizeSel_5P_3_S1_LPS	7.303	7.386
SizeSel_5P_4_S1_LPS	14.632	12.320
SizeSel_8P_1_S4_VA_LL	45.023	43.868
SizeSel_8P_3_S4_VA_LL	-9.361	-2.699
SizeSel_9P_1_S5_NMFS_LLSE	161.846	162.655
SizeSel_9P_3_S5_NMFS_LLSE	7.150	7.235
SizeSel_9P_4_S5_NMFS_LLSE	5.609	5.596
SzSel_9Male_Peak_S5_NMFS_LLSE	-6.152	-6.570
SzSel_9Male_Ascend_S5_NMFS_LLSE	-0.657	-0.704
SzSel_9Male_Descend_S5_NMFS_LLSE	-0.804	-0.914
SzSel_9Male_Scale_S5_NMFS_LLSE	0.735	0.766
SizeSel_10P_1_S6_CST_NE_LL	57.026	56.783
SizeSel_10P_3_S6_CST_NE_LL	-8.038	-5.558
SizeSel_10P_4_S6_CST_NE_LL	7.576	7.594
SzSel_10Male_Peak_S6_CST_NE_LL	5.360	5.797
SzSel_10Male_Ascend_S6_CST_NE_LL	10.920	8.643
SzSel_10Male_Descend_S6_CST_NE_LL	-0.793	-0.841
SzSel_10Male_Scale_S6_CST_NE_LL	1.076	1.101
SizeSel_11P_1_S7_NMFS_NE	132.668	131.879
SizeSel_11P_3_S7_NMFS_NE	8.034	8.107
SizeSel_11P_4_S7_NMFS_NE	6.324	6.627
SzSel_11Fem_Scale_S7_NMFS_NE	2.319	2.601
SizeSel_12P_1_S8_PLLOP	147.300	149.481
SizeSel_12P_3_S8_PLLOP	6.524	6.899
SzSel_12Male_Ascend_S8_PLLOP	-0.428	-0.423
SzSel_12Male_Descend_S8_PLLOP	-1.194	-1.439
SzSel_12Male_Scale_S8_PLLOP	1.446	1.739
SizeSpline_Val_1_S9_COASTSPAN_SE_LL_13	3.356	3.384
SizeSpline_Val_2_S9_COASTSPAN_SE_LL_13	2.543	2.564
SizeSpline_Val_3_S9_COASTSPAN_SE_LL_13	2.001	2.044
SizeSpline_Val_4_S9_COASTSPAN_SE_LL_13	-1.045	-1.032

SizeSel_14P_1_S10_SCDNR_RedDr	92.854	93.974
SzSel_14Male_Ascend_S10_SCDNR_RedDr	1.578	7.492
SzSel_14Male_Descend_S10_SCDNR_RedDr	-0.311	-0.022
SzSel_14Male_Scale_S10_SCDNR_RedDr	0.592	0.523
SizeSel_15P_1_S11_SEAMAP_LL_SE	93.568	93.157
SizeSel_15P_4_S11_SEAMAP_LL_SE	7.974	8.045
SzSel_15Male_Ascend_S11_SEAMAP_LL_SE	-0.369	-0.437
SzSel_15Male_Descend_S11_SEAMAP_LL_SE	-0.280	-0.308
SzSel_15Male_Scale_S11_SEAMAP_LL_SE	1.170	1.217

6 FIGURES

6.1 FIGURES FROM SECTION 3.1 Replication Analysis

Figure 3.1.1. Approximate linear coverage of specific abundance indices for sandbar sharks *(Carcharhinus plumbeus*) along the coast of the Gulf of Mexico and Atlantic Ocean. Blue lines indicate the indices of abundance used in the SEDAR 21 base case assessment, as well as in the SEDAR 54 replication analysis. Grey lines indicate indices of abundance used in the SEDAR 21 sensitivity analysis.

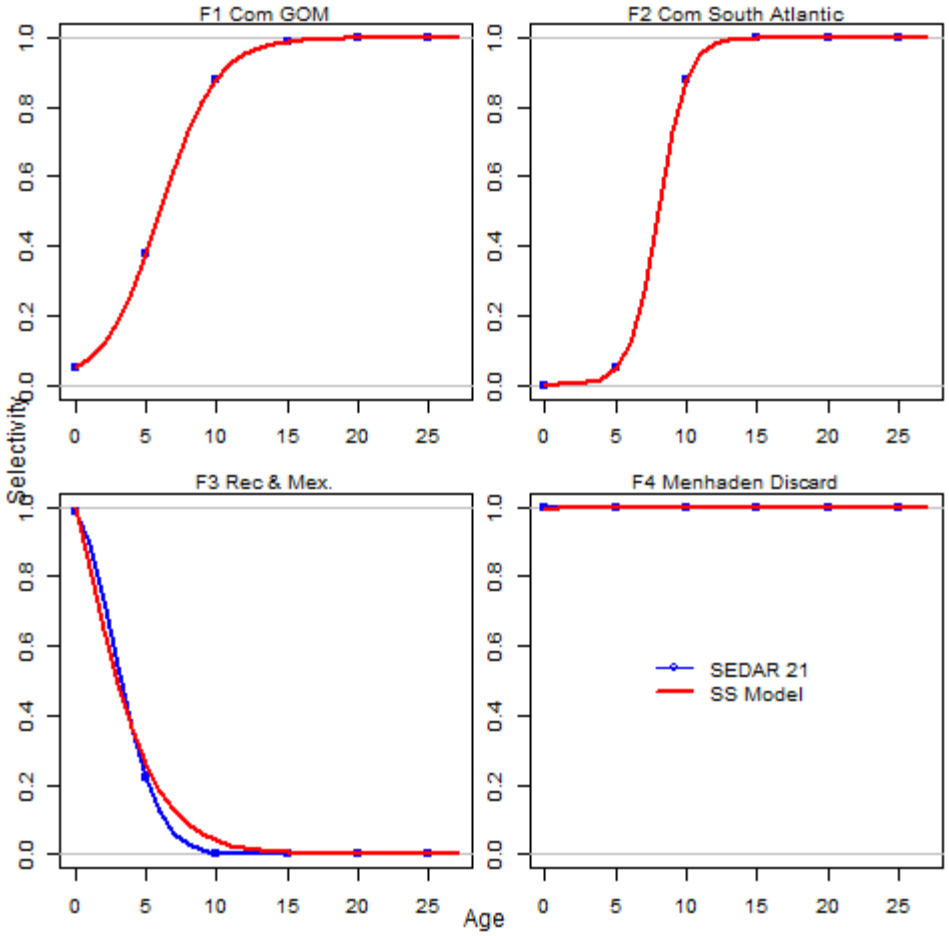


Figure 3.1.2. Selectivity of the catches showing the selectivity forms from SEDAR 21 (blue lines) and the forms used in the SEDAR 54 replication analysis (red lines).

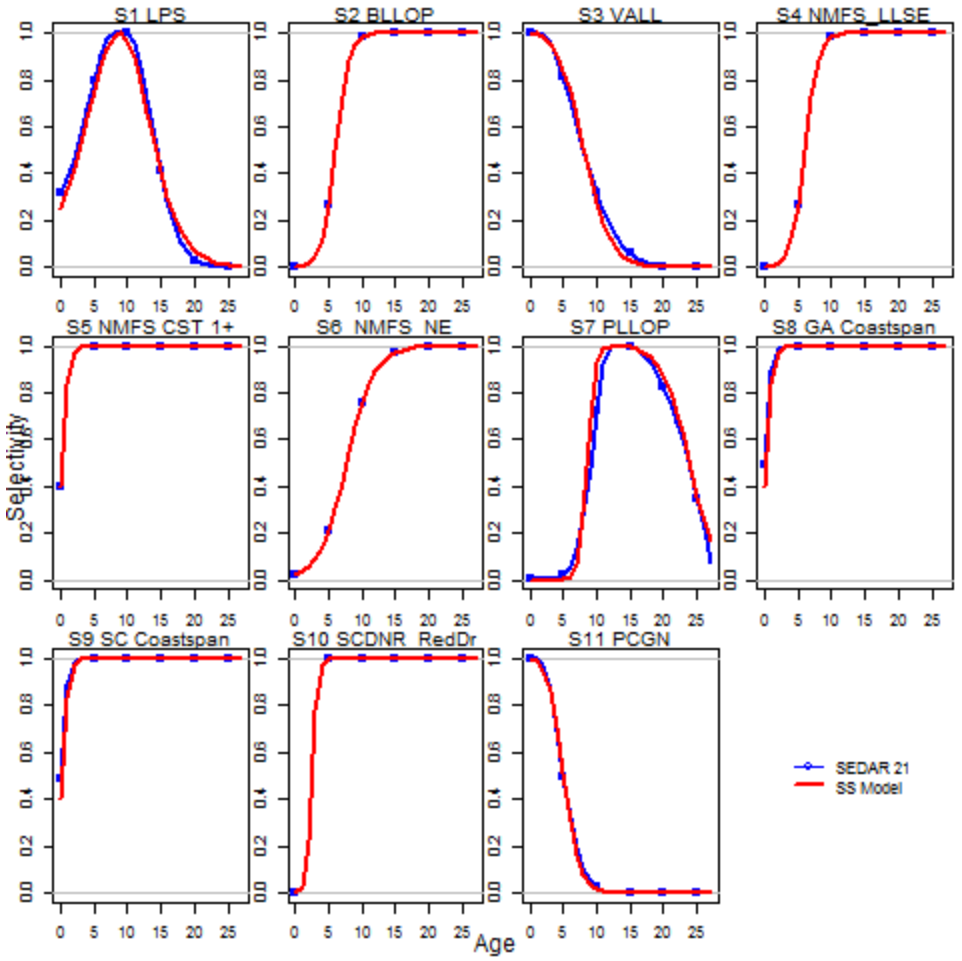


Figure 3.1.3. Selectivity of the indices of abundance showing the SEDAR 21 selectivity forms (blue lines) and the forms used in the SEDAR 54 replication analysis(red lines).

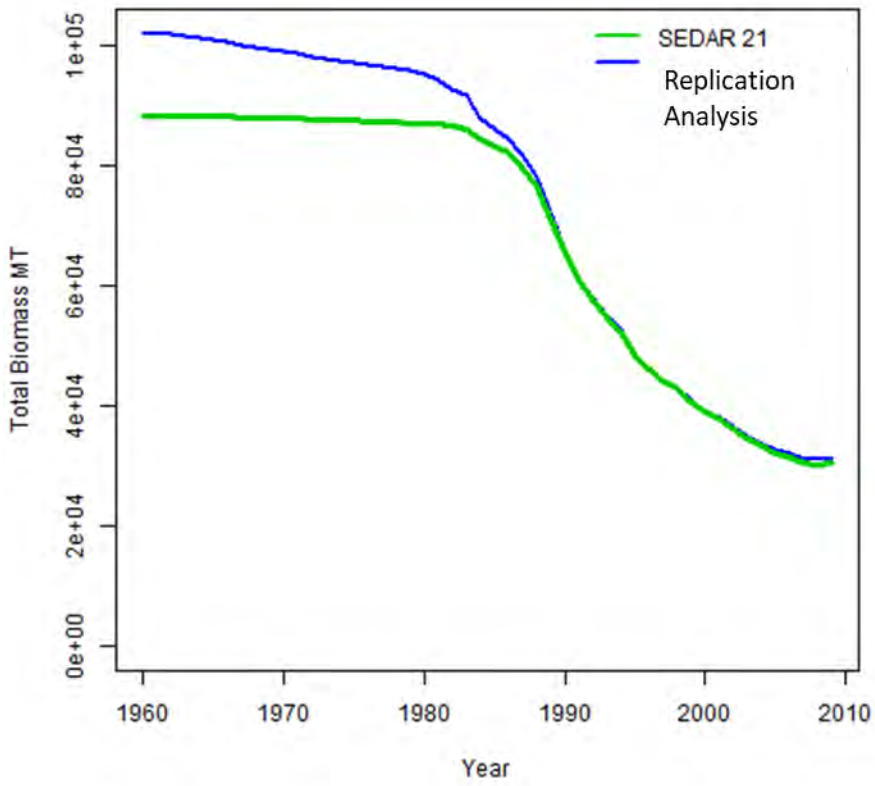


Figure 3.1.4. Comparison of biomass trends from the SEDAR 21 analysis and the SEDAR 54 replication analysis.

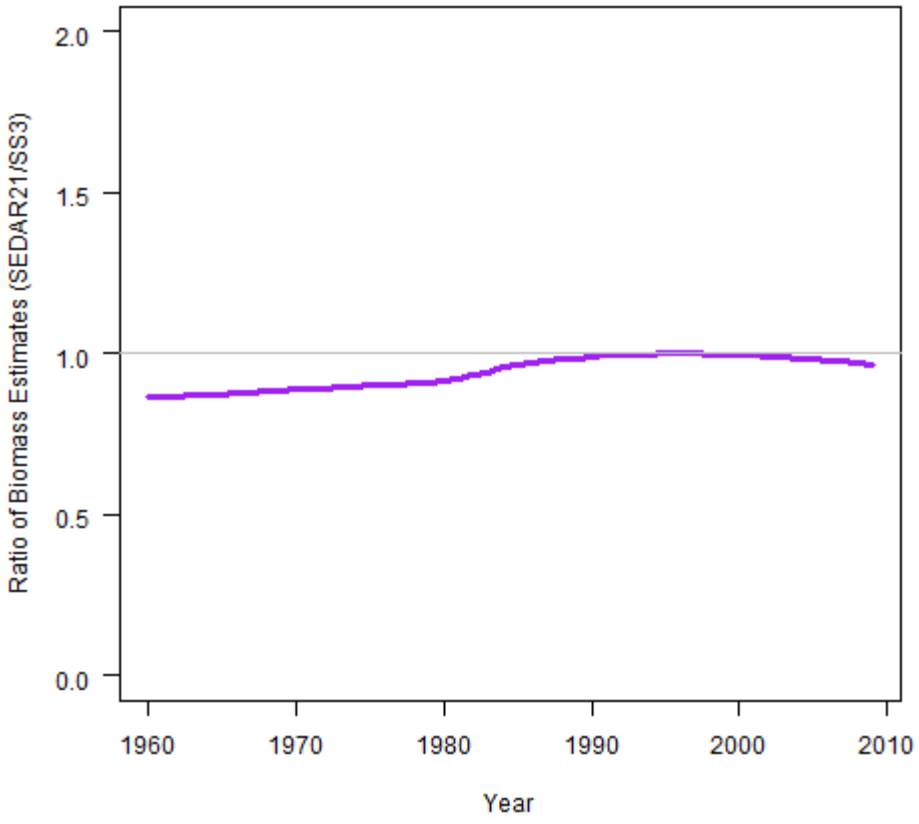


Figure 3.1.5. Ratio of total biomass estimates (SEDAR 21/ SEDAR 54 replication analysis) over the model time frame, the equivalence line is shown in grey.

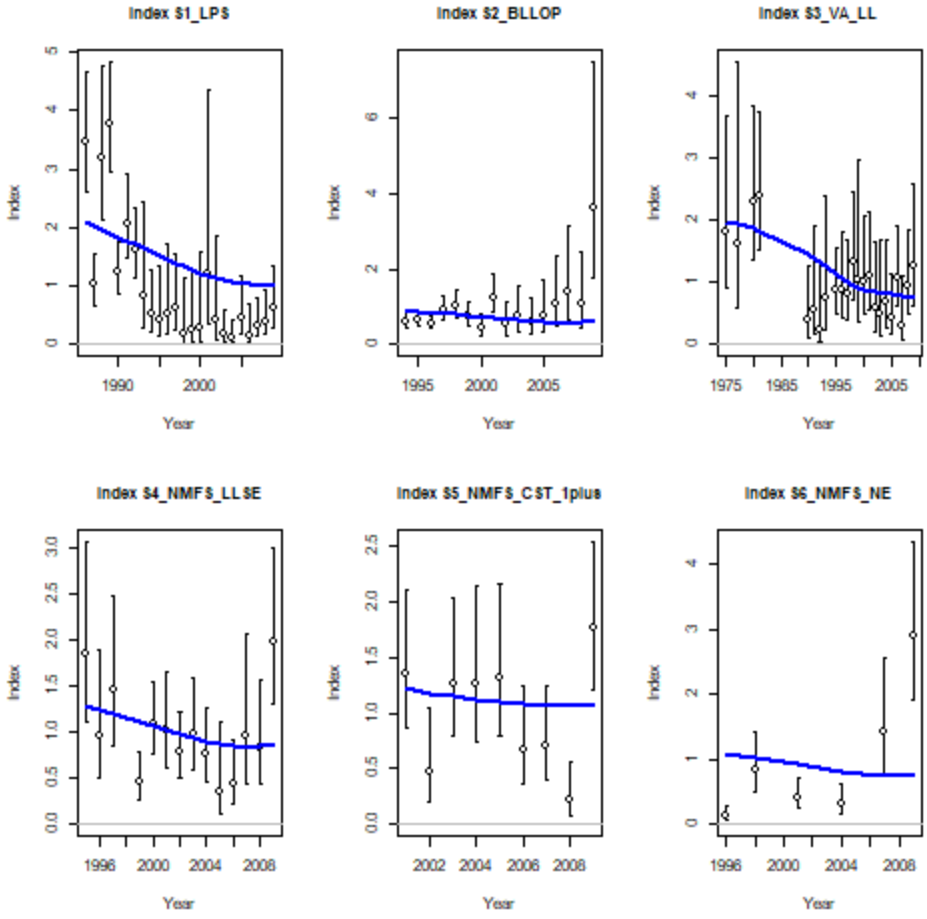


Figure 3.1.6. Model fits (blue line) to the CPUE series from the replication analysis (black circles are observed data) with associated CVs (black vertical lines). Fits for indices S1-S6 are shown.

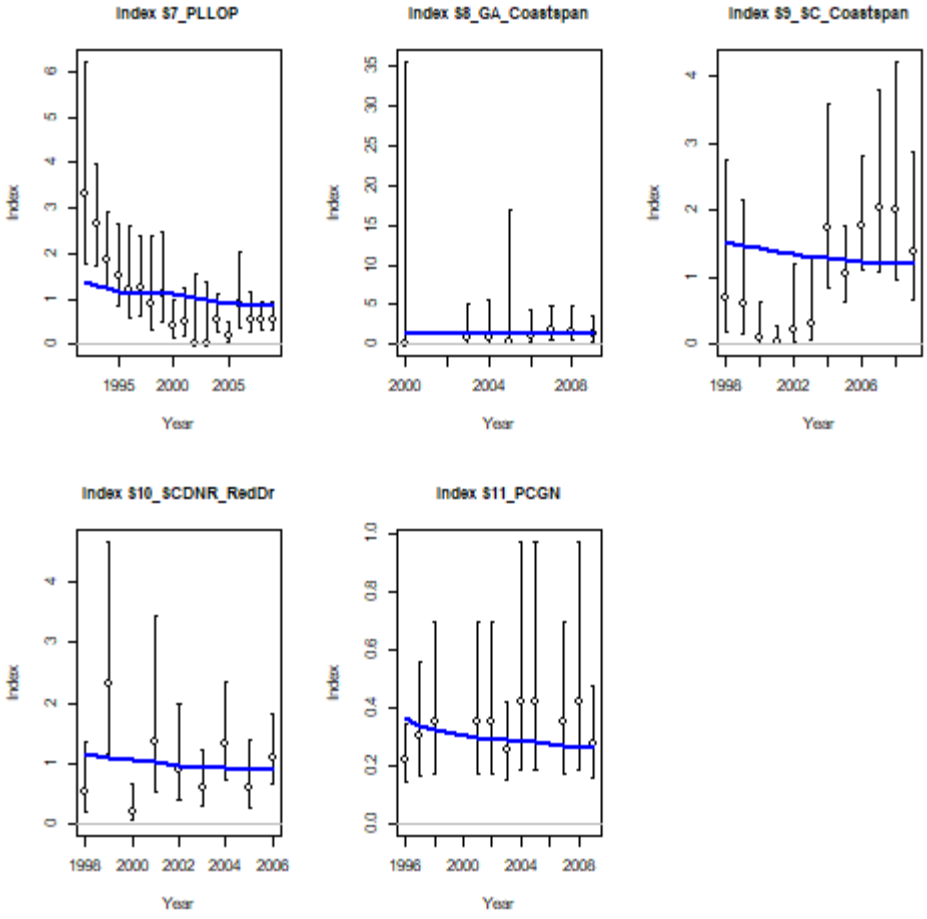


Figure 3.1.7 Model fits (blue line) to the CPUE series from the replication analysis (black circles are observed data) with associated CVs (black vertical lines). Fits for indices S7-S11 are shown.

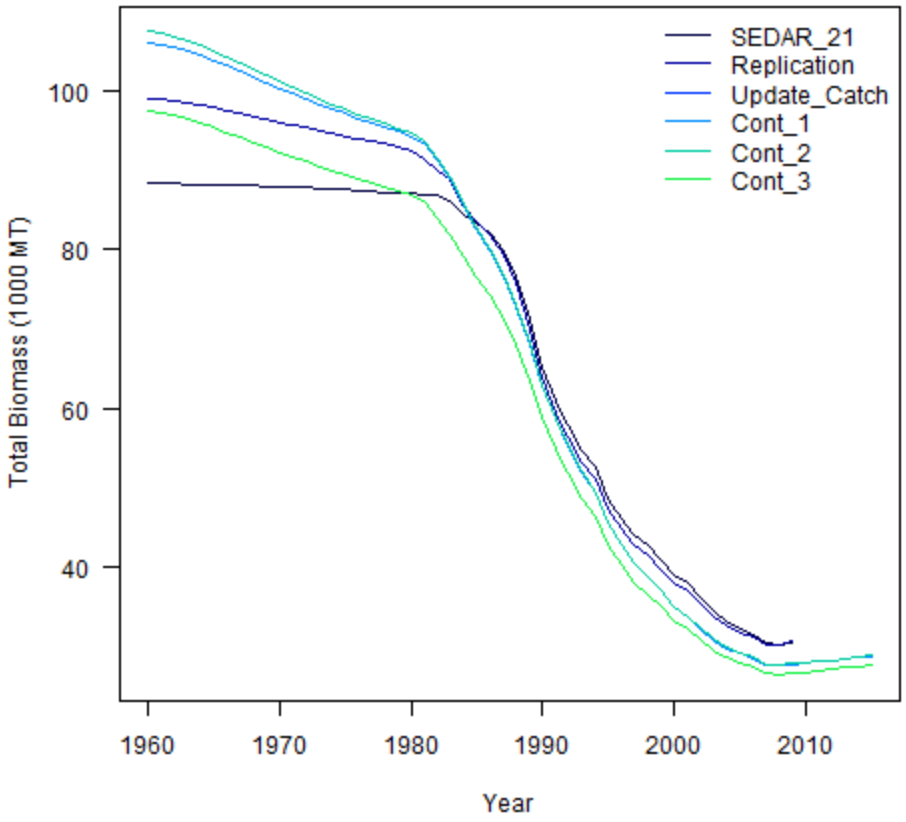


Figure 3.1.8 Estimated total biomass from the SEDAR 21 report, the replication analysis and the four continuity runs (Update_catch, Cont_1, Cont_2, and Cont_3) for the SEDAR 54 assessment. Note that continuity run #1 (Cont_1) overlays the Update_Catch run.

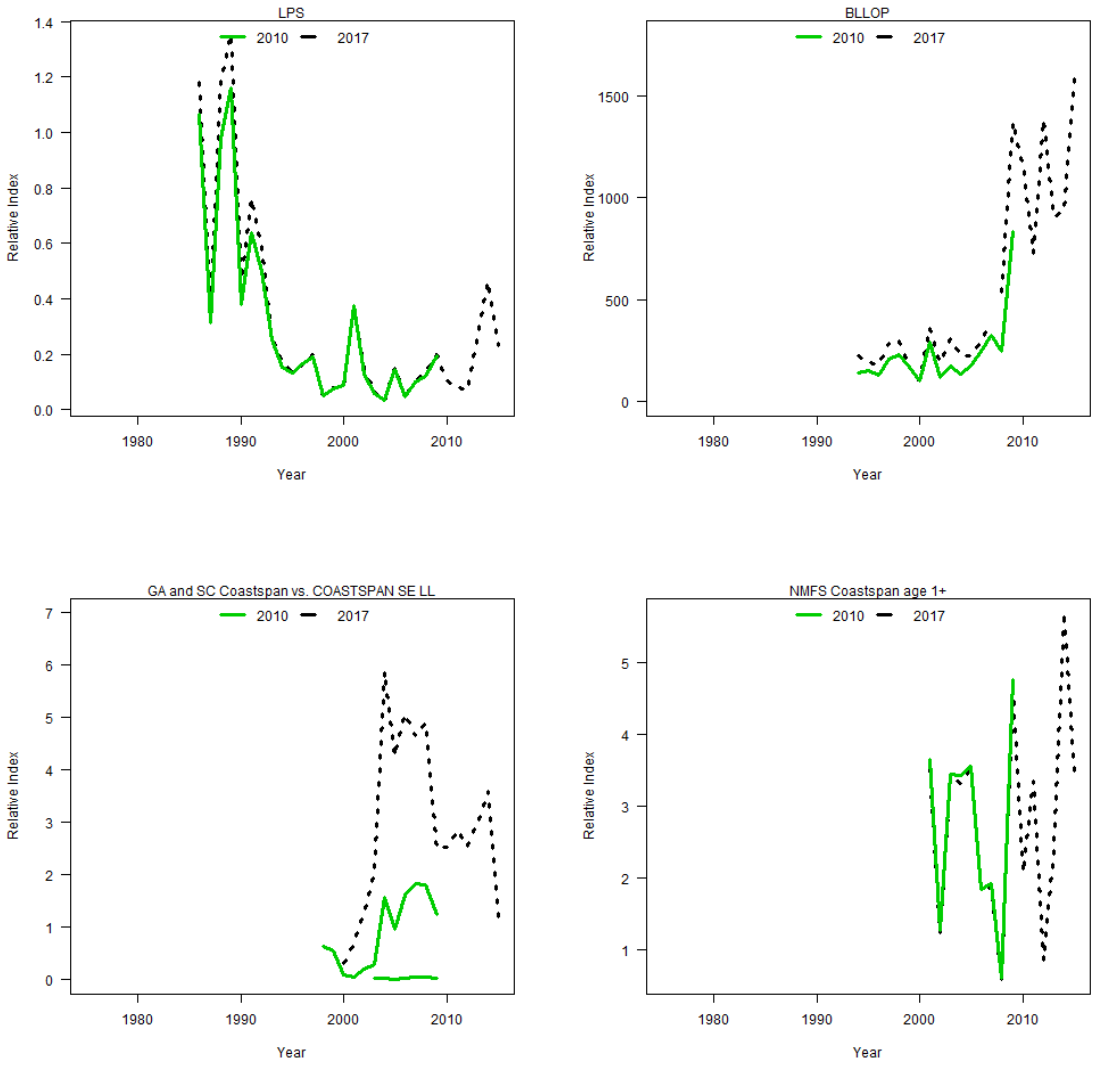


Figure 3.1.9 Comparison of CPUE series used in the SEDAR 21 and the series used in SEDAR 54 assessment; the black dotted line indicates the updated CPUE series used in SEDAR 54 for the base case. The top left panel is S1 LPS, the top right is the S2 and S3 BLLOP series, the bottom left is S9 Coastspan SE LL (compared to the GA and SC coastspan indices used in SEDAR 21), and the bottom right panel shows the S6 NMFS Coastspan 1+ survey.

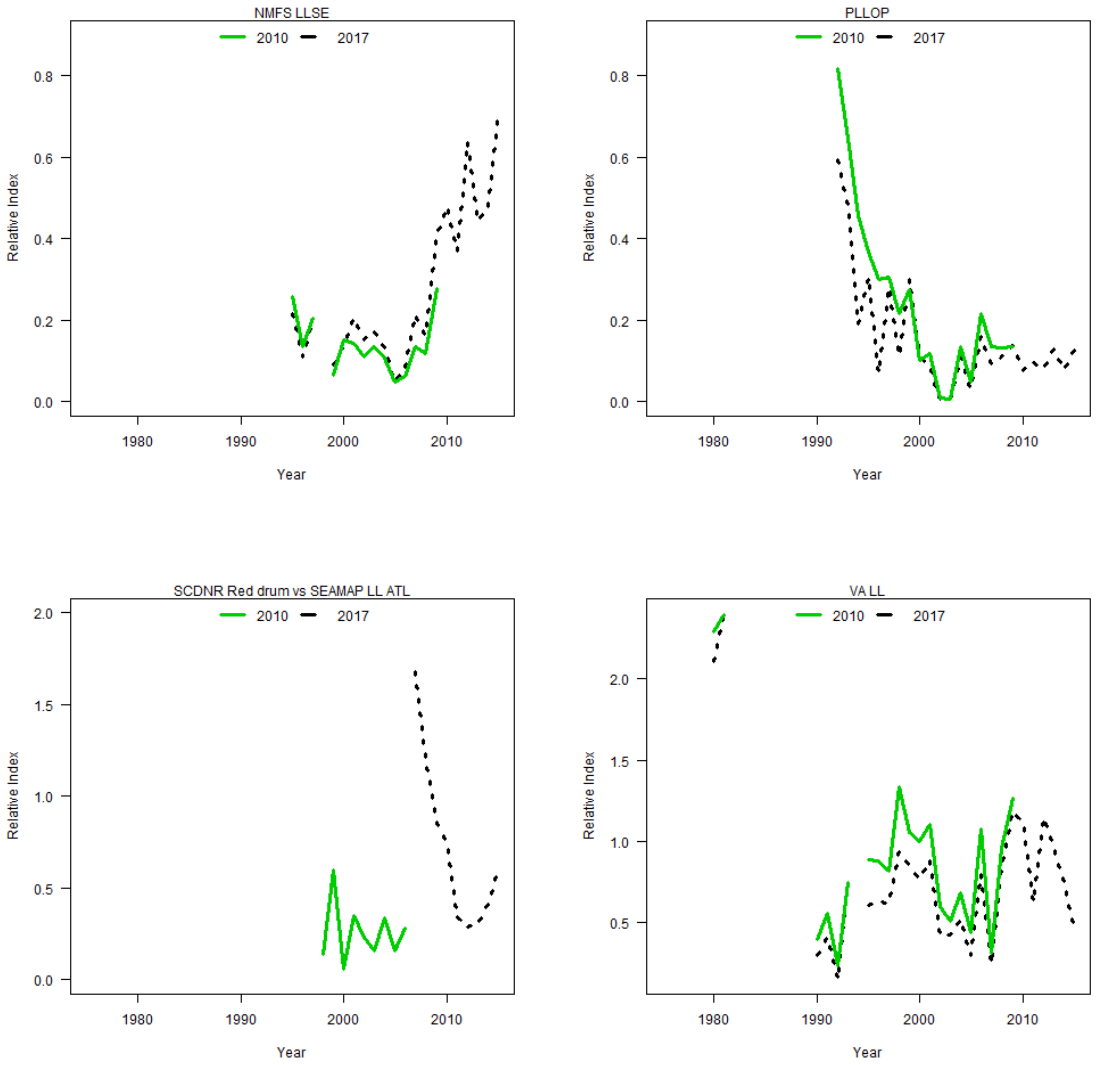


Figure 3.1.10. Comparison of CPUE series used in the SEDAR 21 and the series used in SEDAR 54 assessment; the black dotted line indicates the updated CPUE series used in SEDAR 54 for the base case. The top left panel is S5 NMFS LLSE, the top right is S8 PLLOP, the bottom left is S10 SCDNR Red drum (note that this index has not changed from SEDAR 21) and S11 SEAMAP LL SE, and the bottom right panel shows the S4 Virginia LL survey.

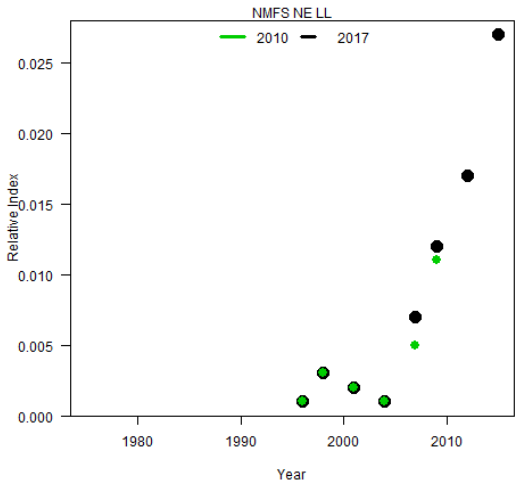


Figure 3.1.11 Comparison of CPUE series used in the SEDAR 21 and the series used in SEDAR 54 assessment; the black dotted line indicates the updated CPUE series used in SEDAR 54 for the base case. This figure shows S7 NMFS NE LL.

6.2 FIGURES FROM SECTION 3.2 BASE CASE

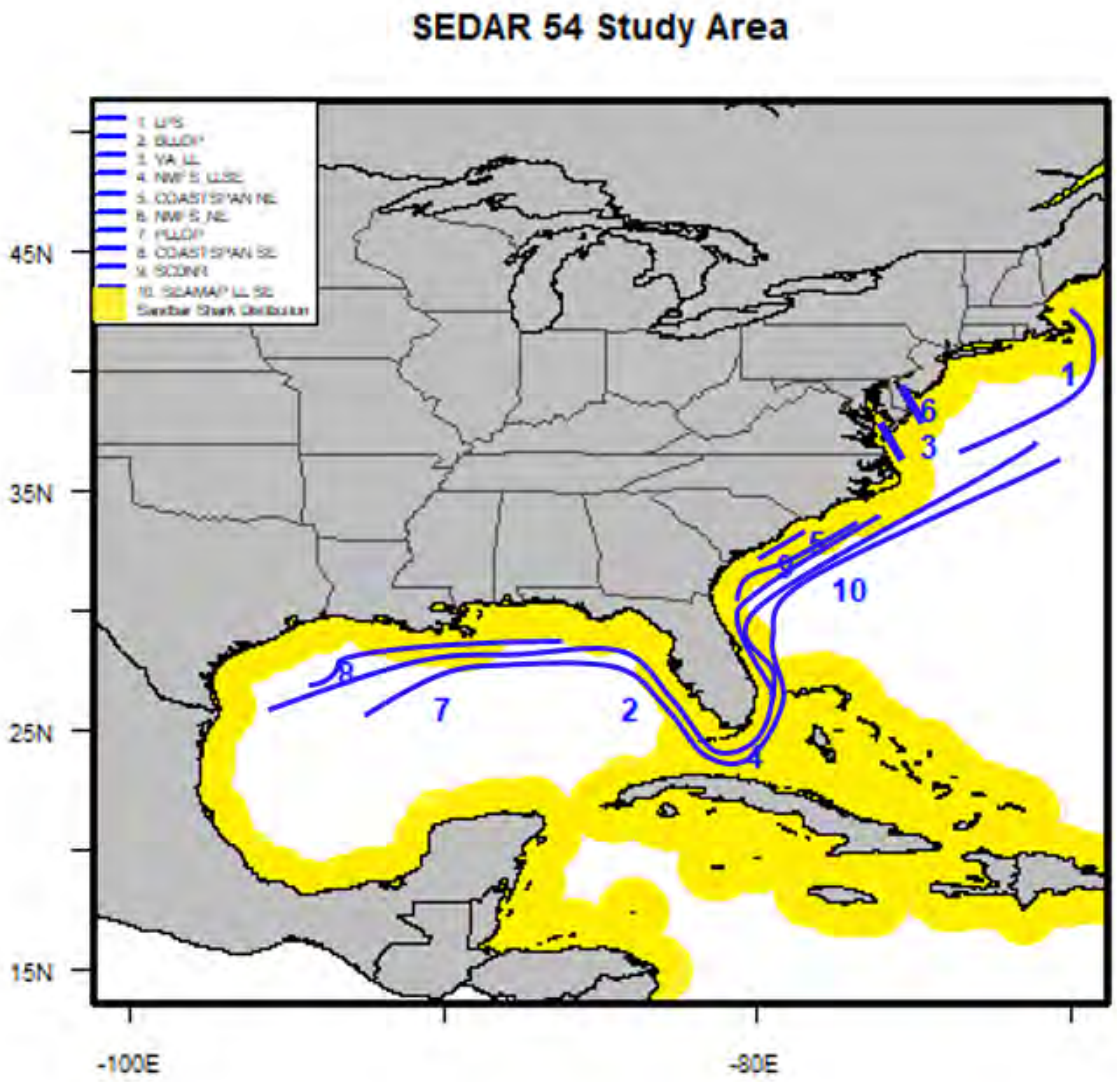


Figure 3.2.1 Spatial extent of the CPUE data used in the base case model configuration in this assessment (SEDAR 54). The blue lines represent individual CPUE series and the yellow area indicates the distribution of the sandbar shark in the western North Atlantic and Gulf of Mexico.

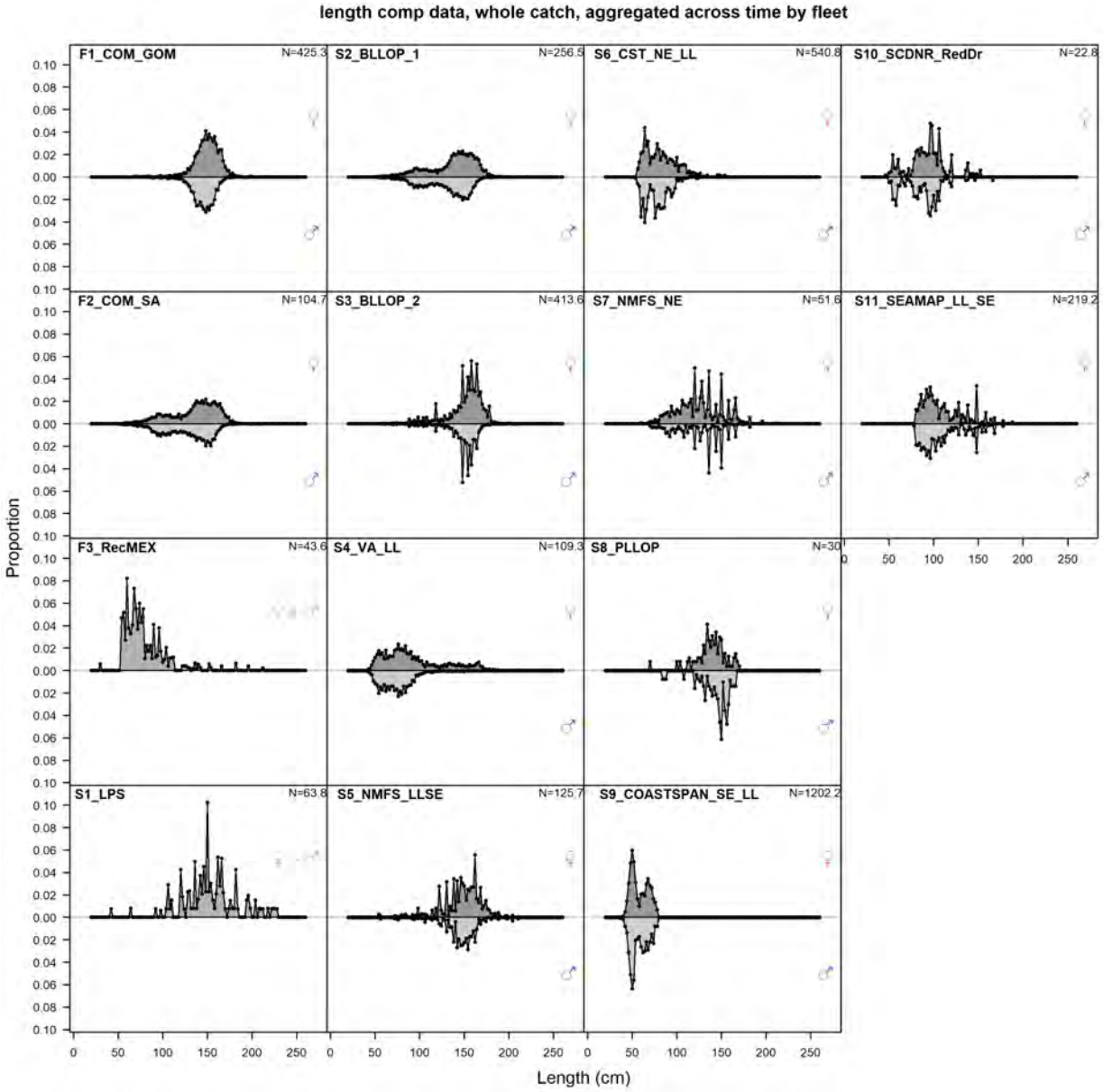


Figure 3.2.2. Available length frequency data by fishery and survey, aggregated across years, used in the base case model configuration

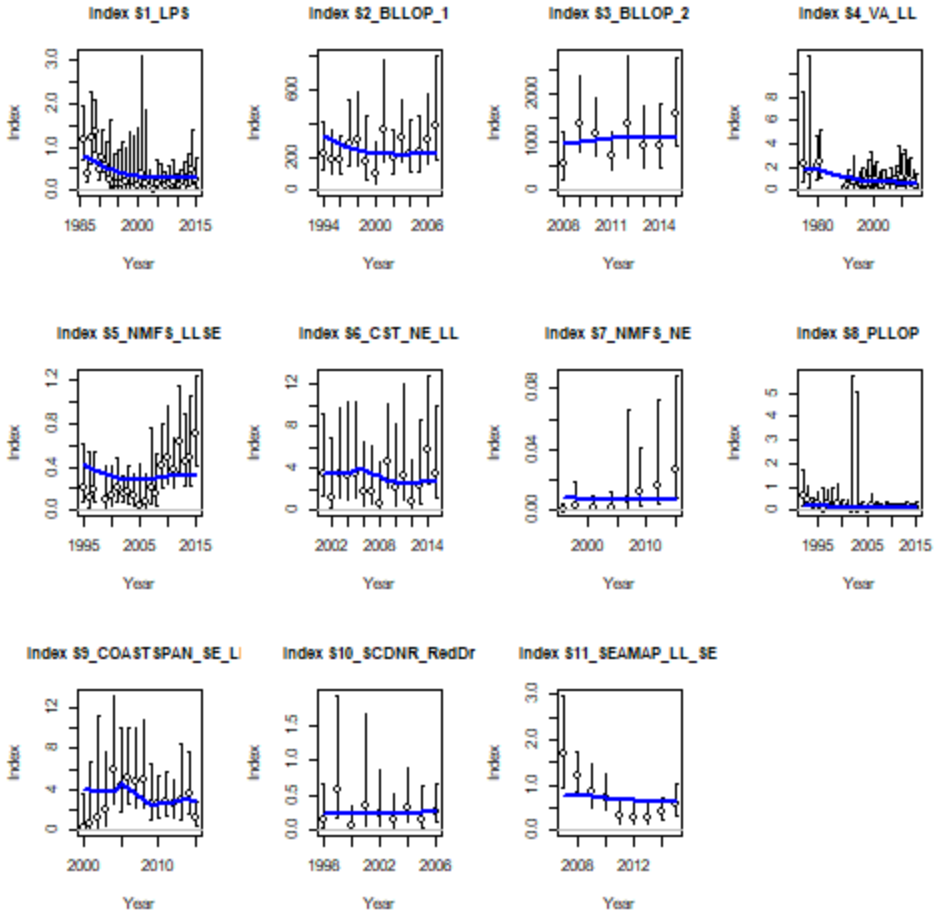


Figure 3.2.3 Fits to indices of abundance for the base case model configuration.

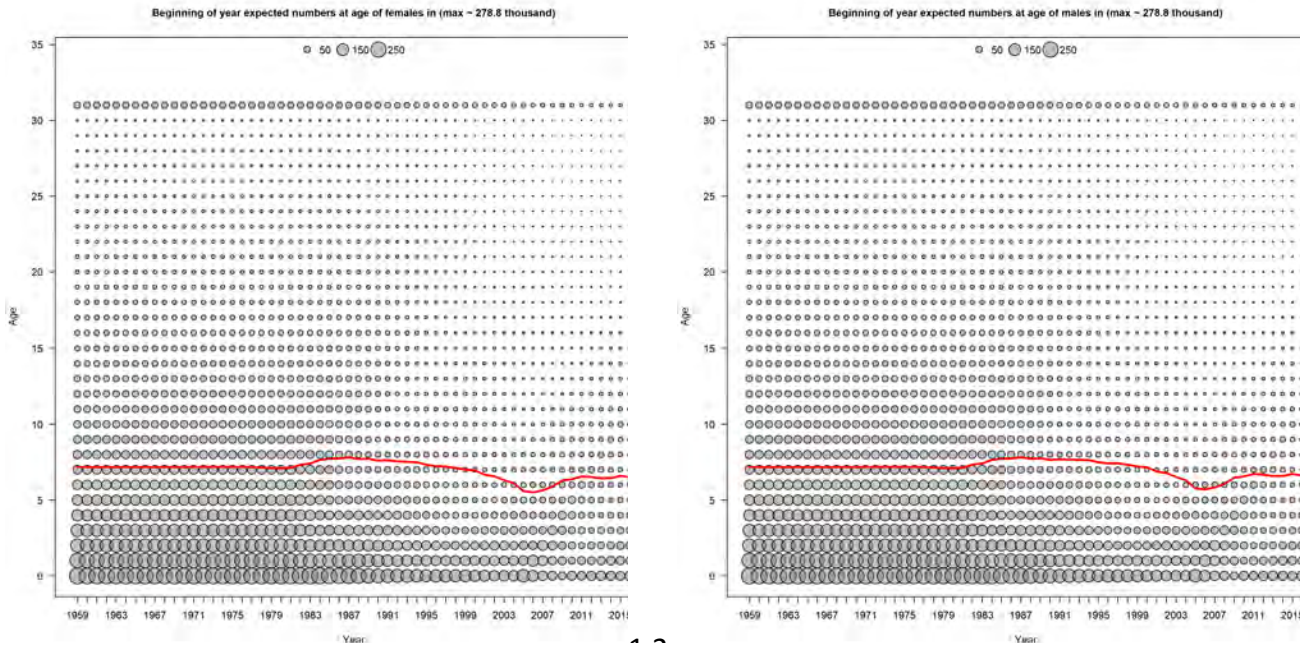


Figure 3.24 Estimated numbers at age of female (left panel) and male (right panel) by year for the base case model configuration.

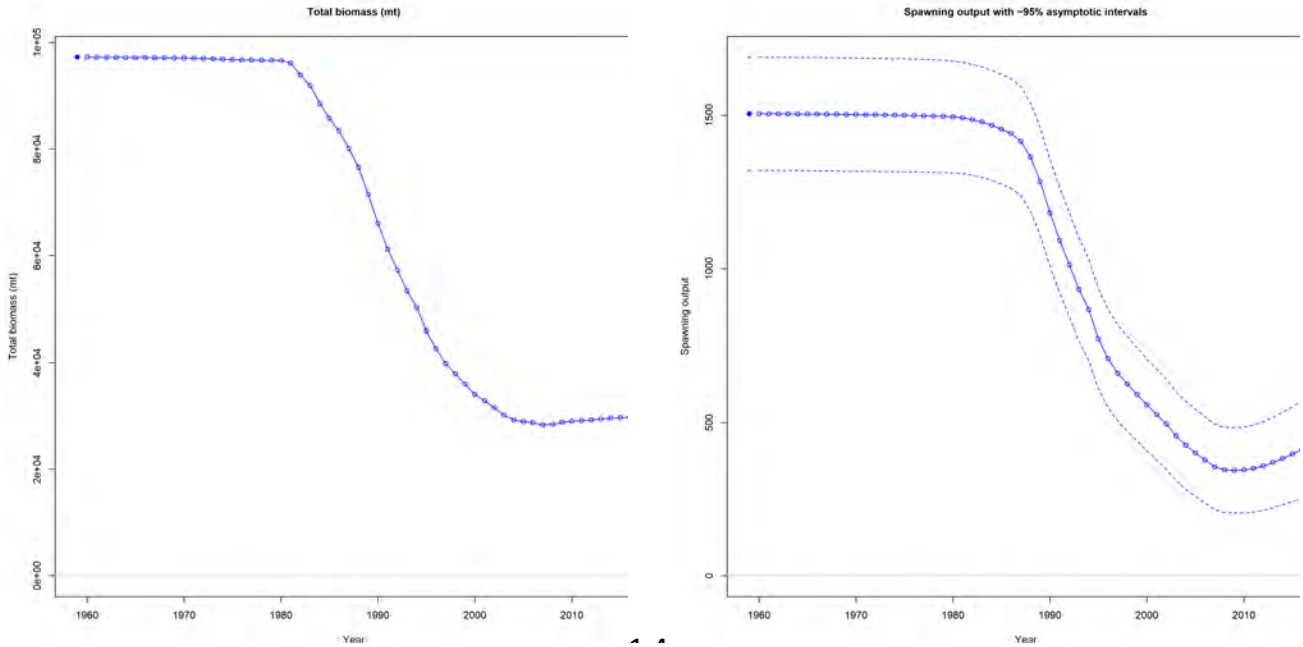


Figure 3.2.5. Estimated total biomass (left panel) and spawning output (SSF, right panel) by year for the base case model configuration.

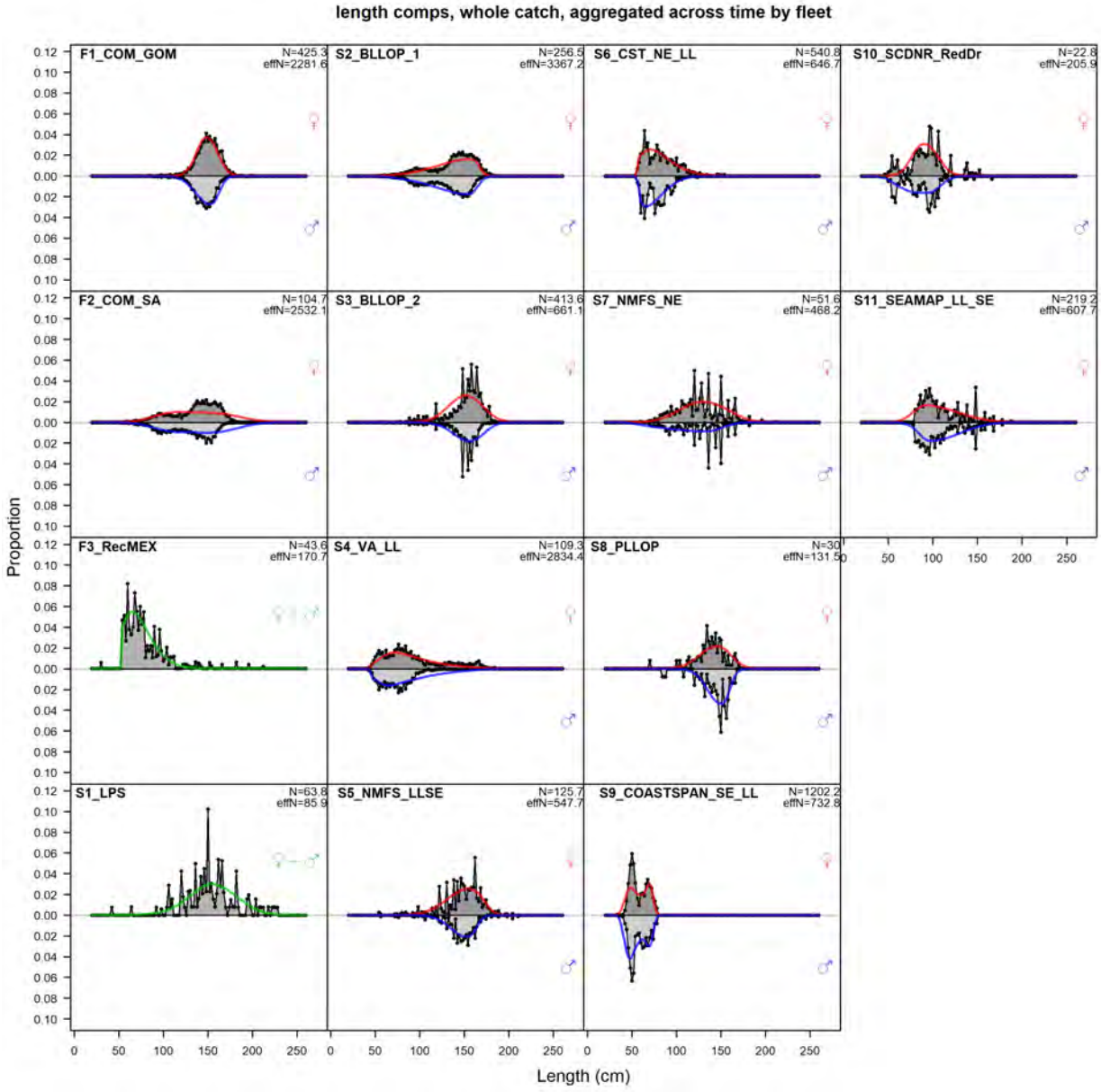


Figure 3.2.6. **.** Fits of the estimated length compositions to the length composition by fleet for the base case model configuration. Where possible the sex specific selectivity was estimated. For sex specific length compositions (all except F3 and S1) the top half of each panel shows the female length composition and estimated fit, while the bottom shows the male length compositions and corresponding fits.

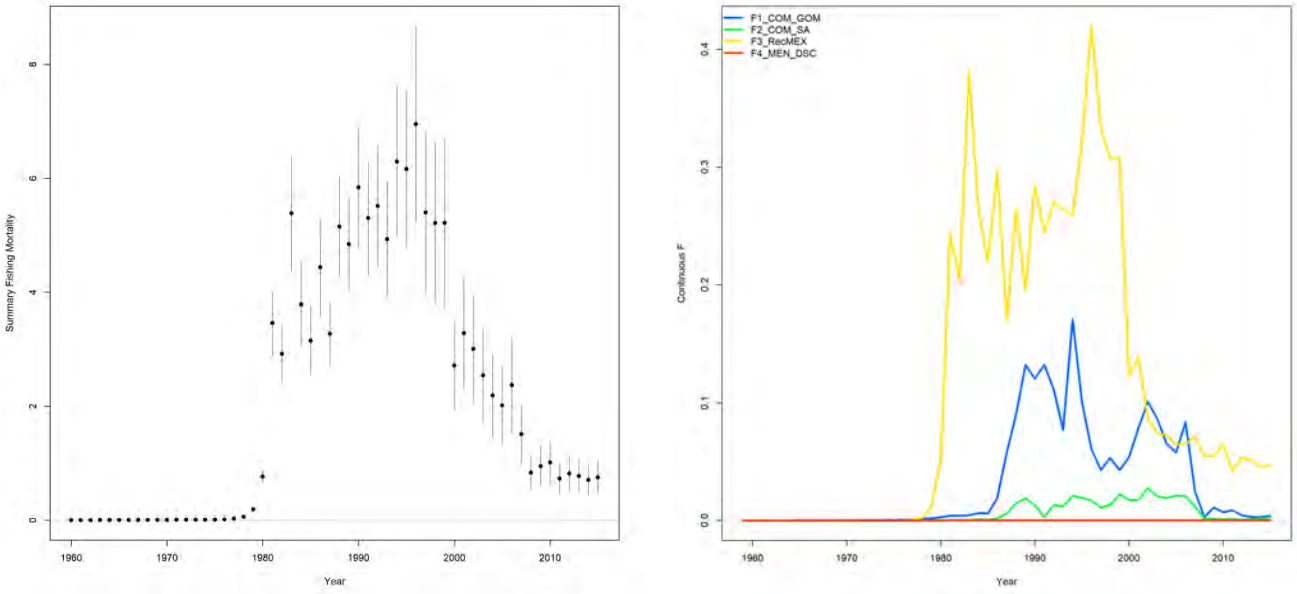


Figure 3.2.7. Estimated F/F_{MSY} (left panel) and fleet specific (right panel) fishing mortality by year for the base case model configuration.

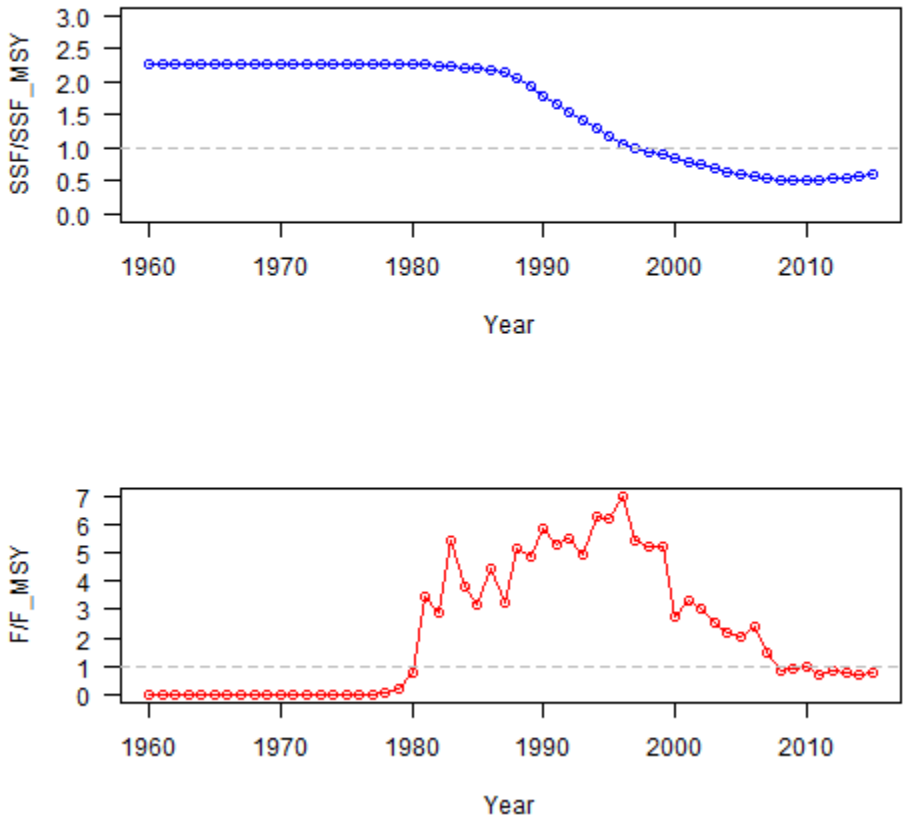


Figure 3.2.8. Time series of stock status parameters F/F_{MSY} and SSF/SSF_{MSY} for the base case configuration of the assessment model.

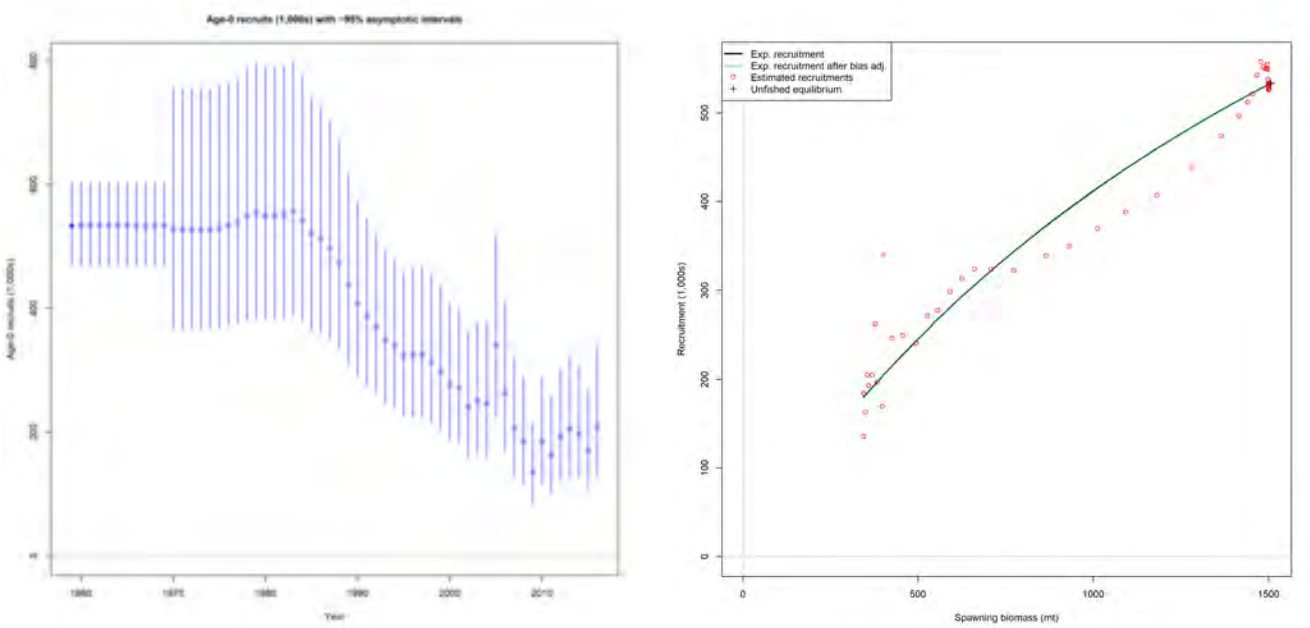


Figure 3.2.9. Estimated annual recruits (left panel) and estimated stock recruitment relationship (right panel) with annual recruitment deviates (red circles in right panel) by year for the base case model configuration.

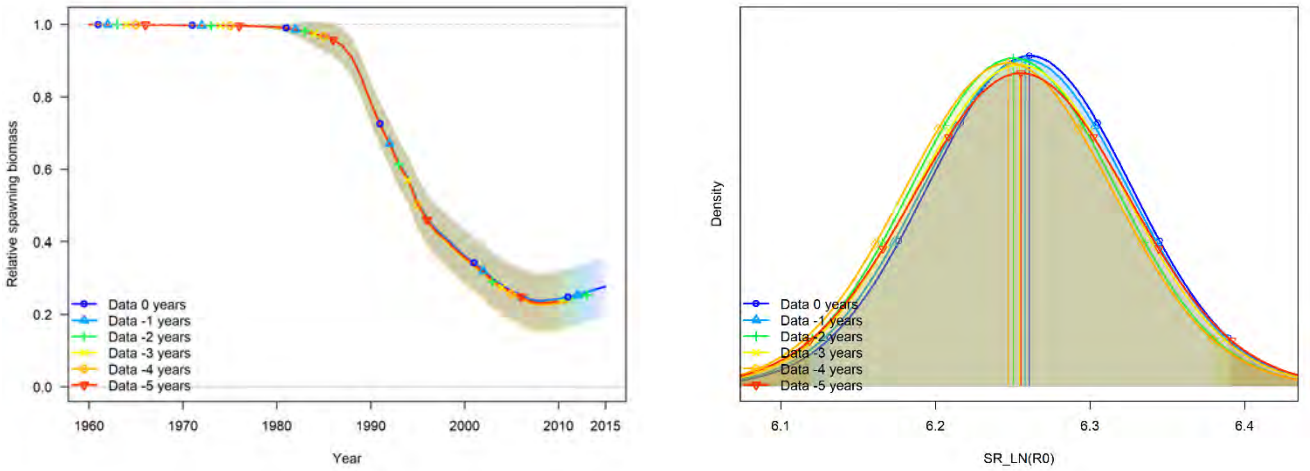
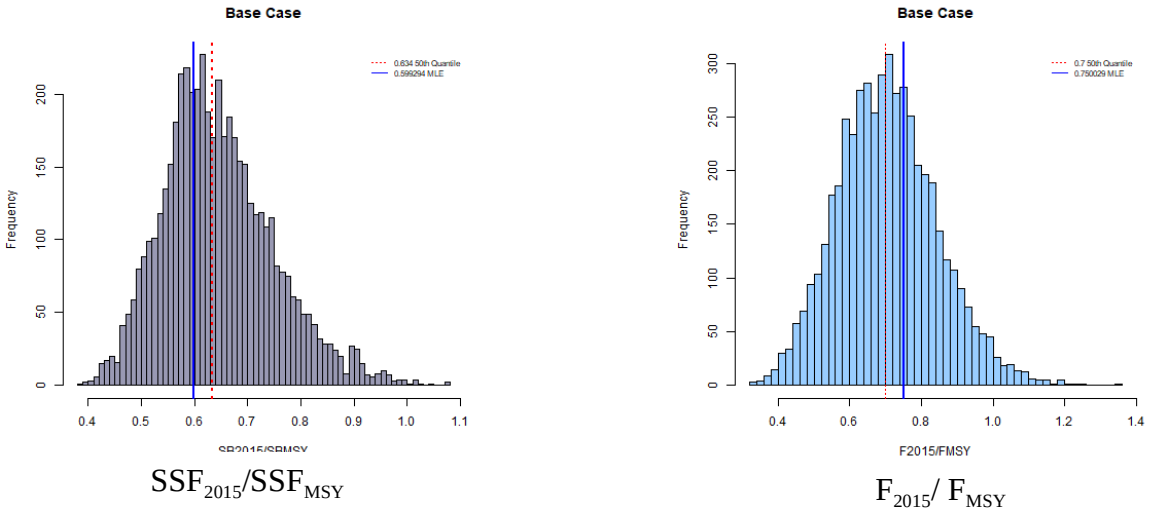


Figure 3.2.10. Estimated spawning output relative to virgin (SSF/SSF_0, left panel) by year along with 95% asymptotic uncertainty (shaded areas) and the maximum likelihood estimate (MLE, vertical lines) and asymptotic uncertainty (bell shaped curves) of the natural log of virgin recruitment size (right panel) for each of the retrospective model runs conducted for the base case model configuration.



SSF_{2015}/SSF_{MSY} F_{2015}/F_{MSY}

Figure 3.2.11. Estimated spawning output in 2015 relative to MSY (SSF_{2015}/SSF_{MSY}, left panel) and estimated total fishing mortality in 2015 relative to MSY (F_{2015}/F_{MSY}, right panel) for the base case model configuration, comparing the maximum likelihood estimate (MLE blue line in both panels) obtained from Stock Synthesis and the 50th quantile (stippled red line in both panels) obtained from MCMC analysis (histograms in both panels).

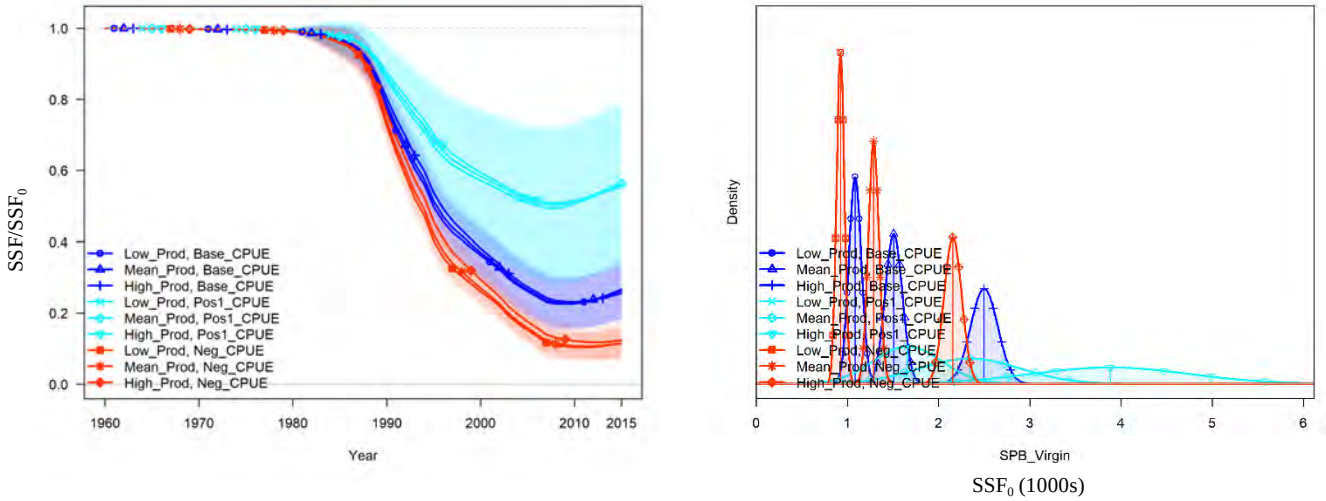


Figure 3.2.12. Estimated spawning output depletion (SFF/SSF_0, left panel) by year and asymptotic uncertainty (bell shaped curves) of estimated virgin spawning output (SSF_0, right panel) obtained for each of the nine alternative states of nature scenarios evaluated for CPUE and productivity as defined in Table 3.2.9 and in the main text. The base case is shown in dark blue with a triangle and denoted "Mean_Prod, BASE_CPUE".

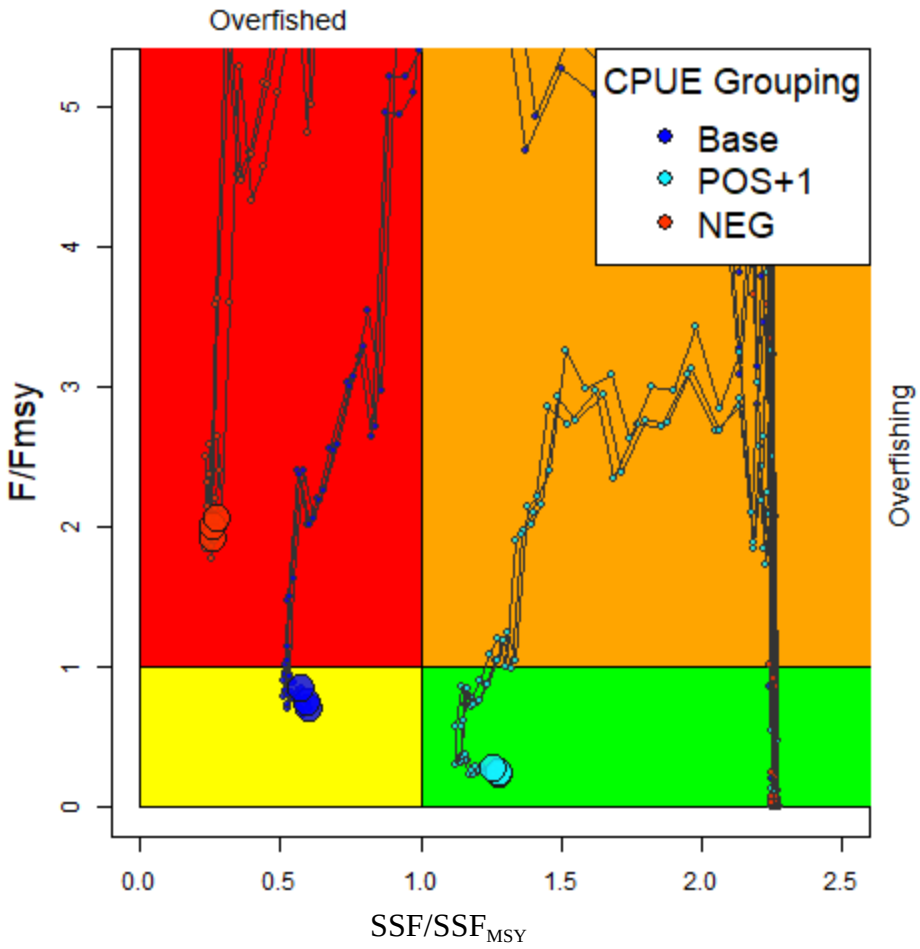


Figure 3.2.13. Time series of stock status based on estimated spawning output each year relative to MSY (SSF/SSF_{MSY}, x-axis) and estimated total fishing mortality each year relative to MSY (F/F_{MSY}, y-axis) obtained for each of the nine alternative states of nature scenarios evaluated for CPUE and productivity as defined in Table 3.2.9 and in the main text, and colored by CPUE grouping. The large circles indicate current (for 2015) conditions.

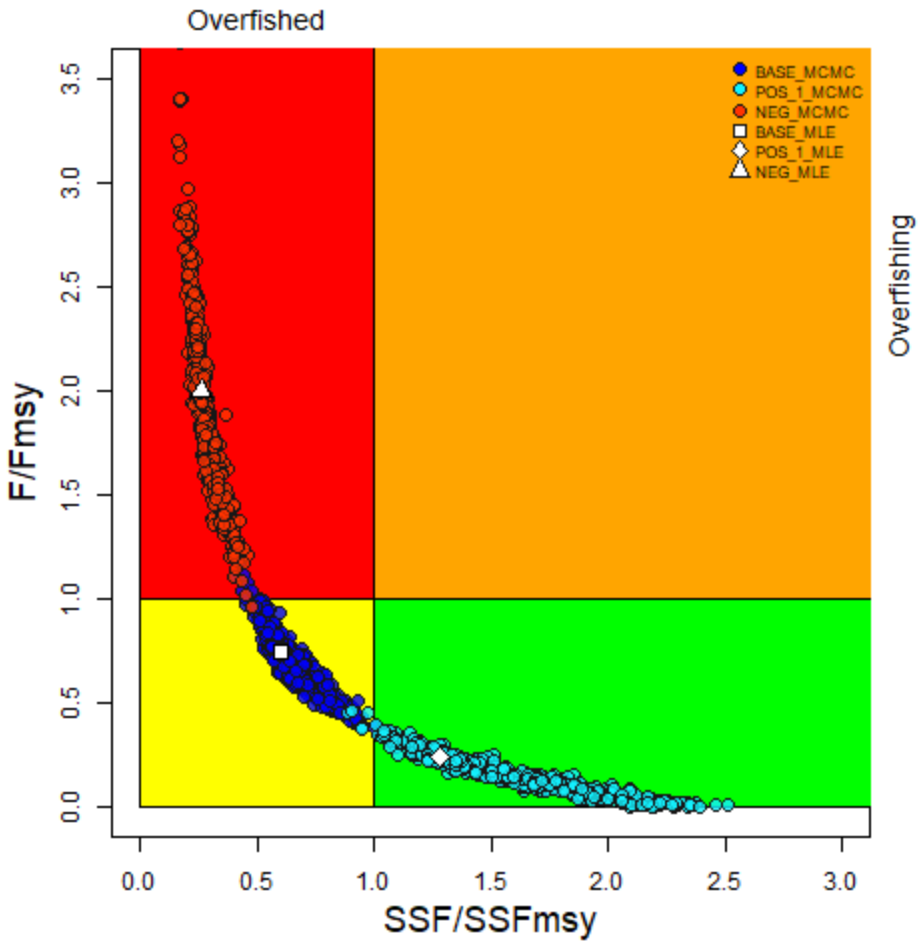


Figure 3.2.14 Estimated stock status based on MCMC analysis for the base case model configuration (Base, dark blue circles) and for two alternative states of nature scenarios evaluated for CPUE (POS_1, NEG) with the base case productivity scenario as defined in the main text and Table 3.2.9. The white square, triangle and diamond are MLE estimates.

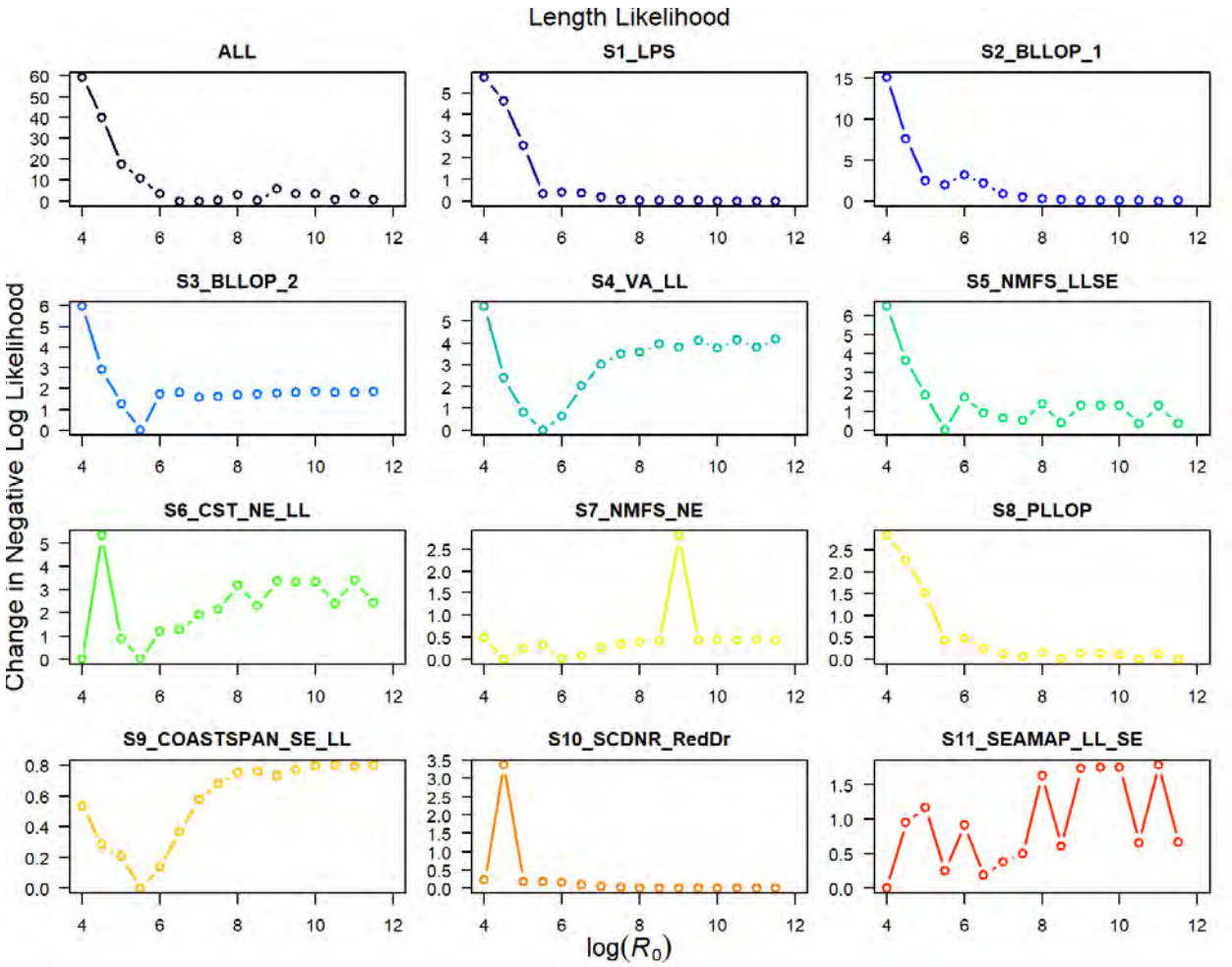


Figure 3.2.15. Profile likelihoods for the length composition associated with the CPUE data from the base case configuration as defined in Table 3.2.3 and the main text.

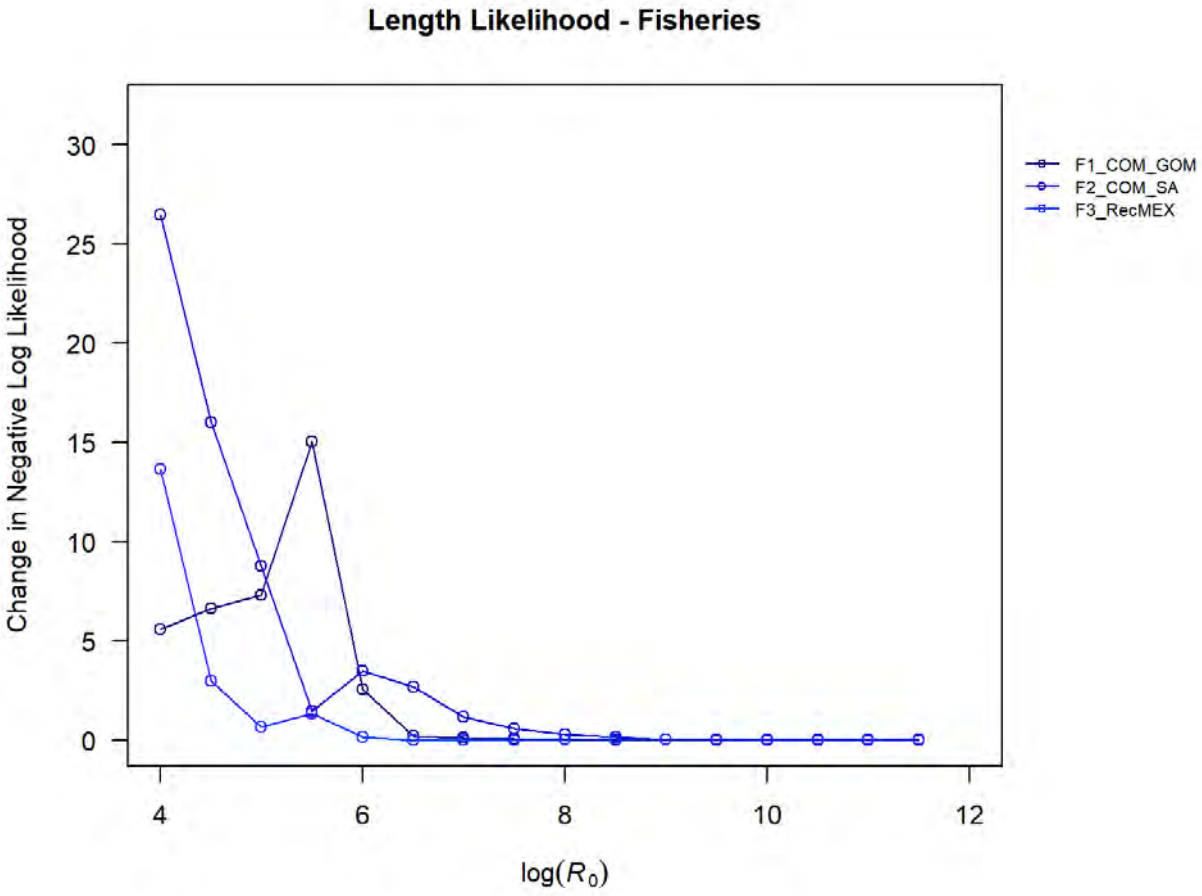


Figure 3.2.16. Profile likelihoods for the length composition data from fisheries F1-F3 for the base case configuration as defined in Table 3.2.3 and the main text.

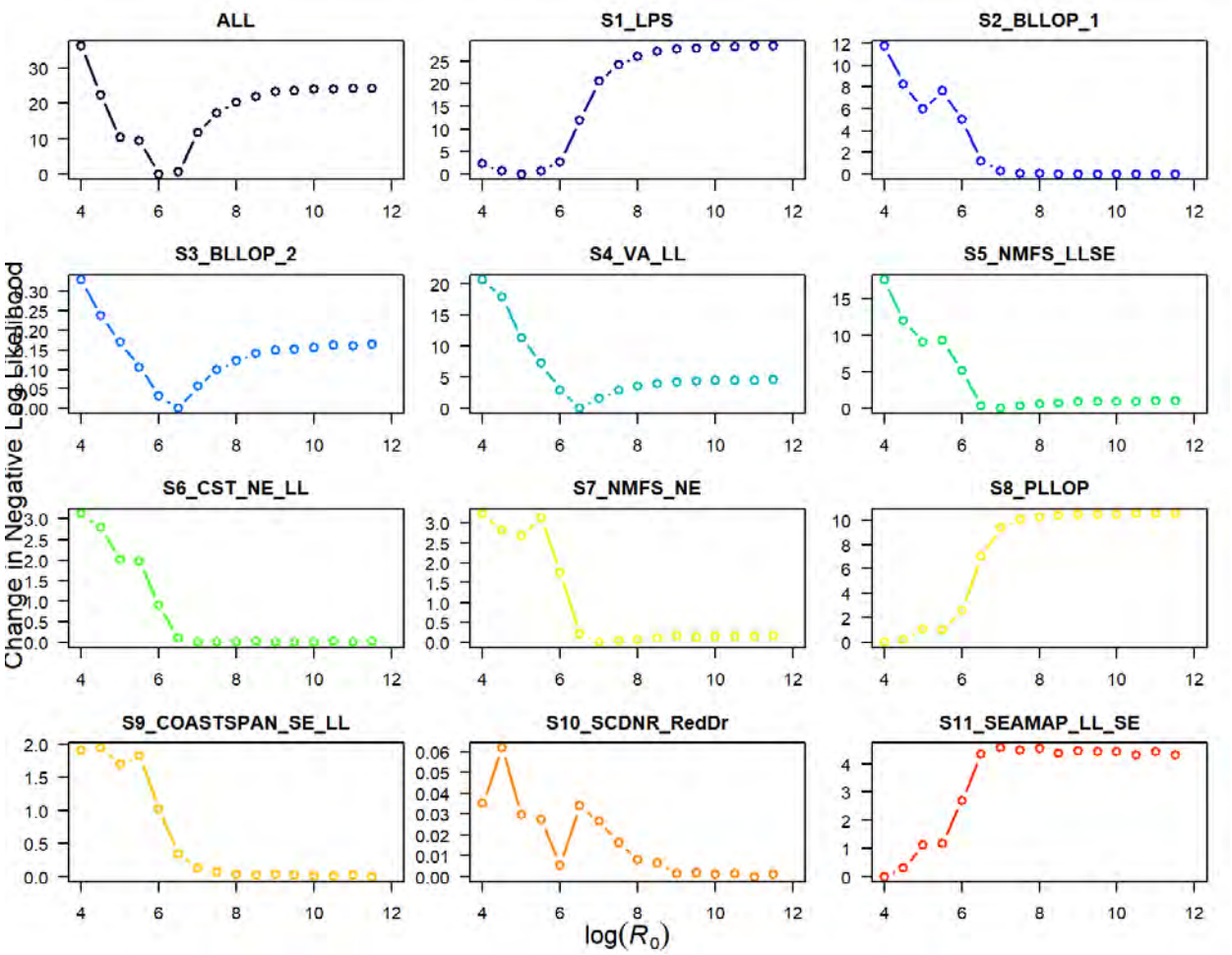


Figure 3.2.17. Profile likelihoods for the CPUE data from the base case configuration defined in table 3.2.1 and the main text above.

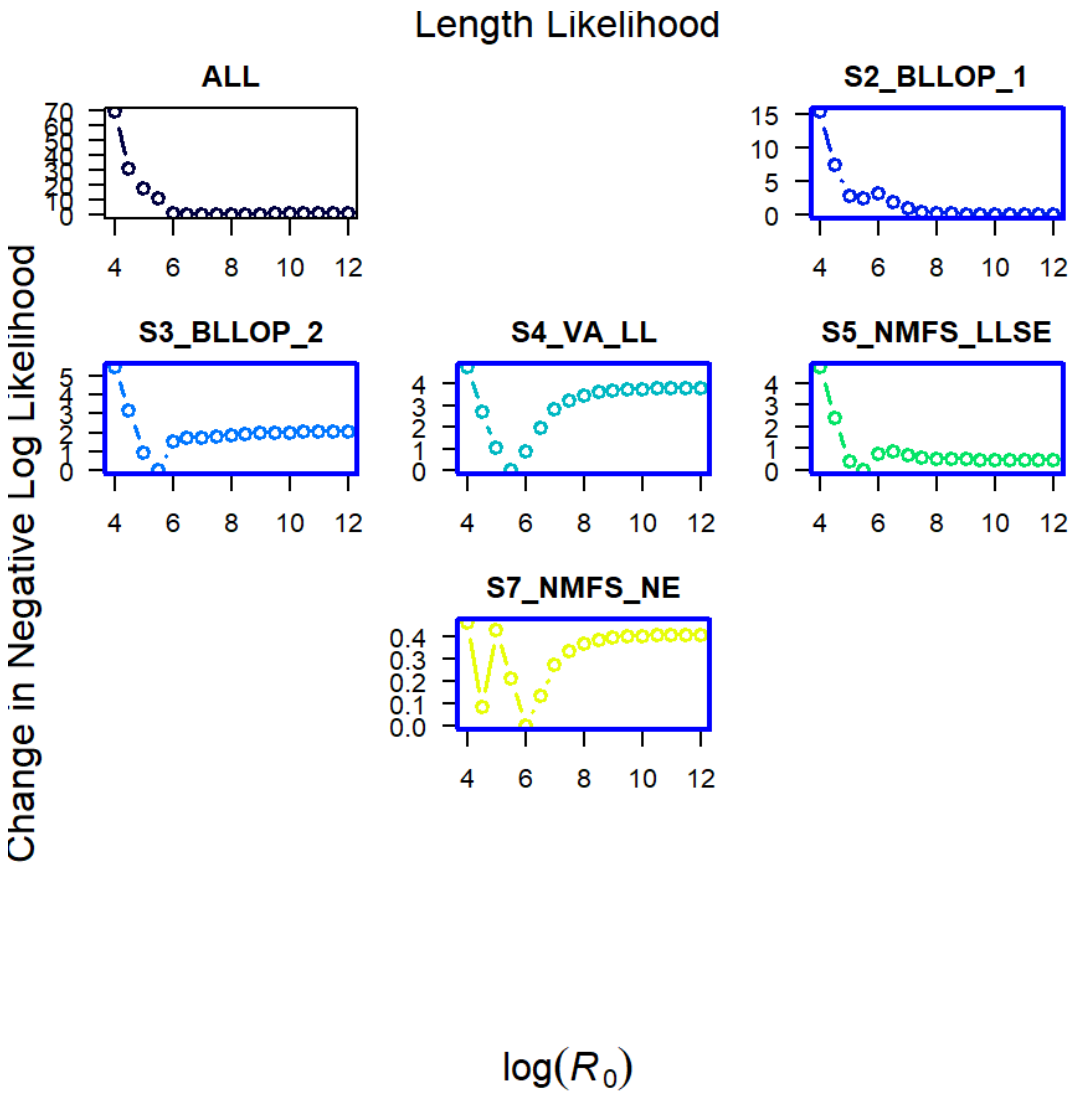


Figure 3.2.18 Profile likelihood values from the POS_1 CPUE grouping on the length composition likelihood associated with the CPUE series.

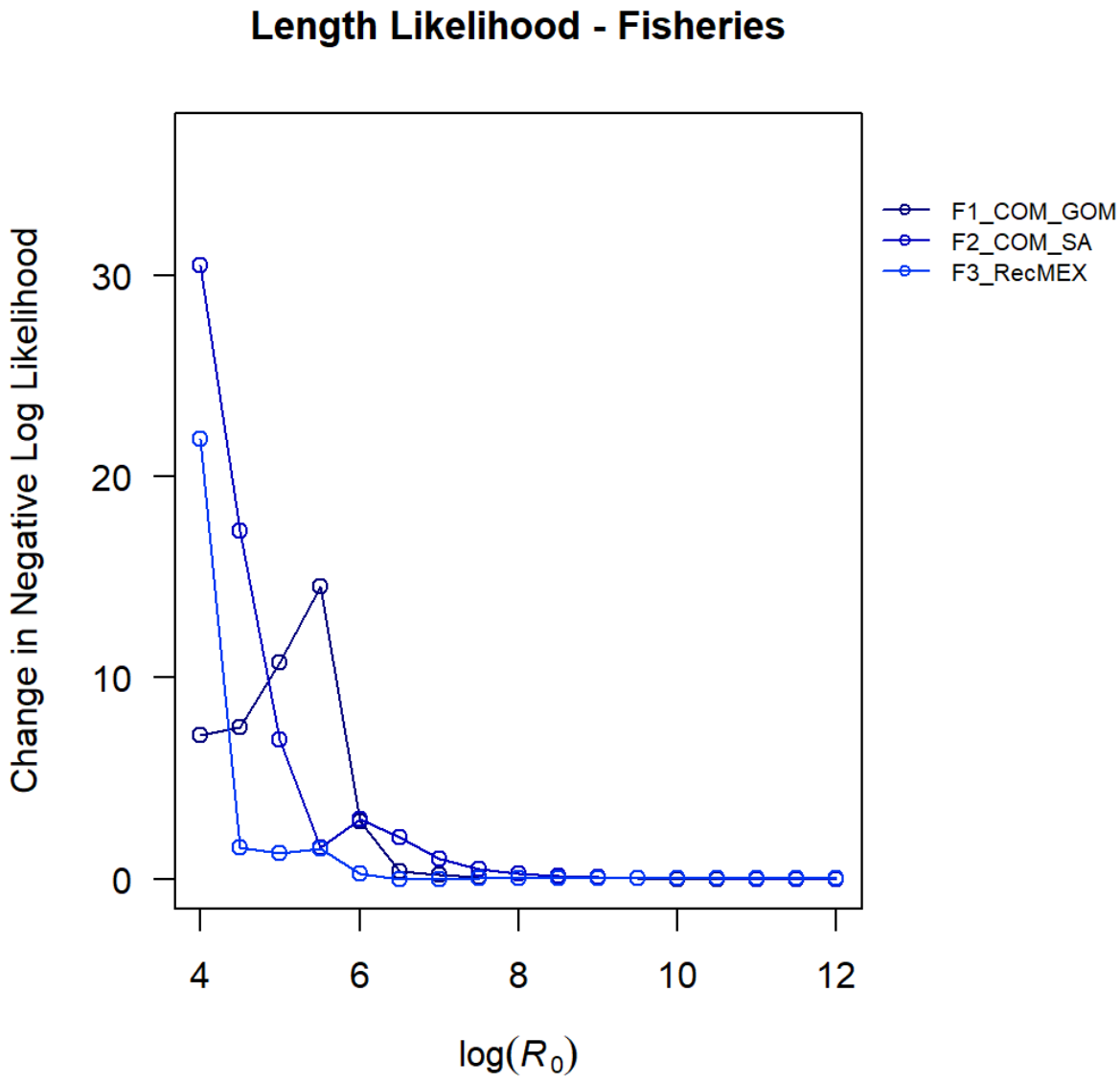


Figure 3.2.19 Profile likelihood values from the POS_1 CPUE grouping on the length composition likelihood from fisheries F1-F3.

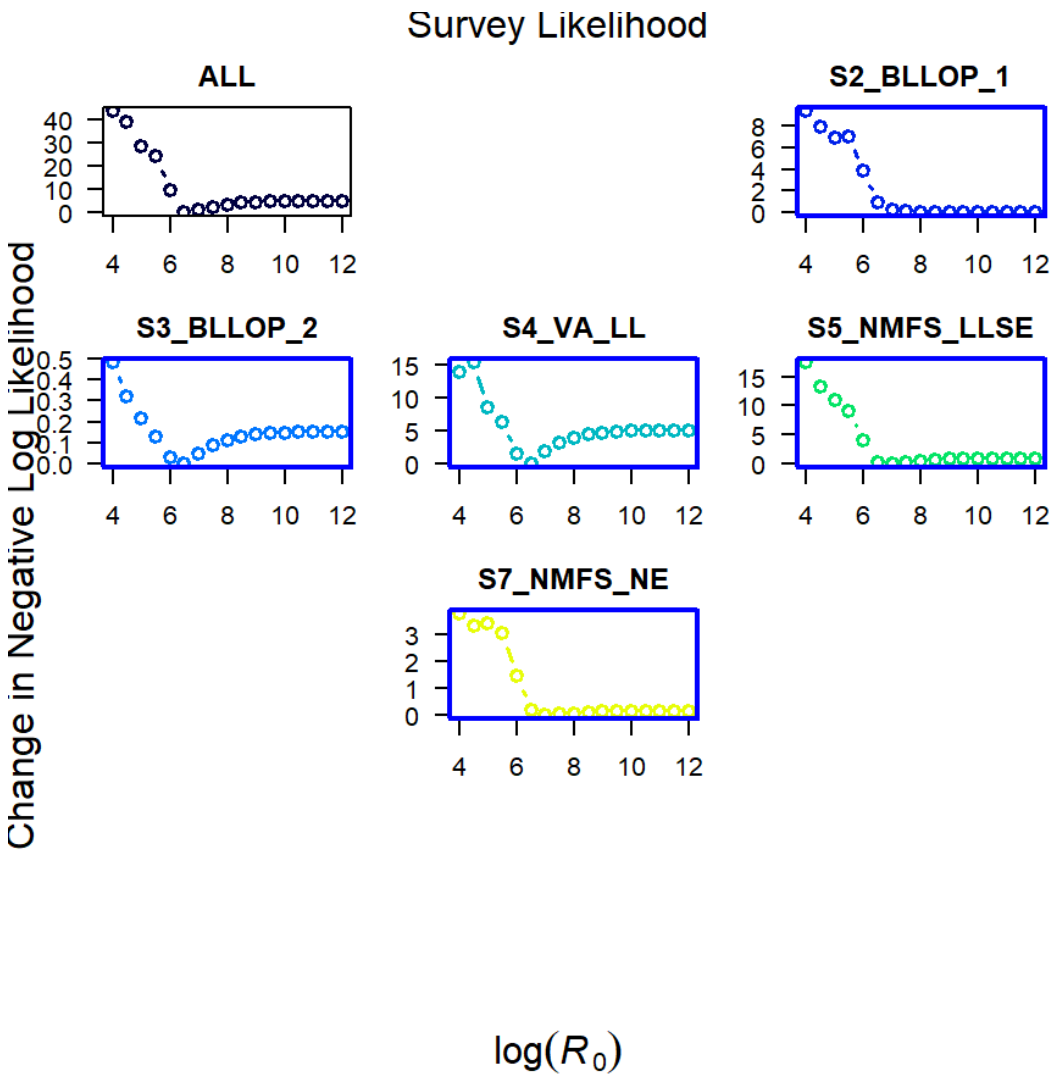


Figure 3.2.20. Profile likelihoods for the CPUE data from the model run with the POS_1 CPUE grouping.

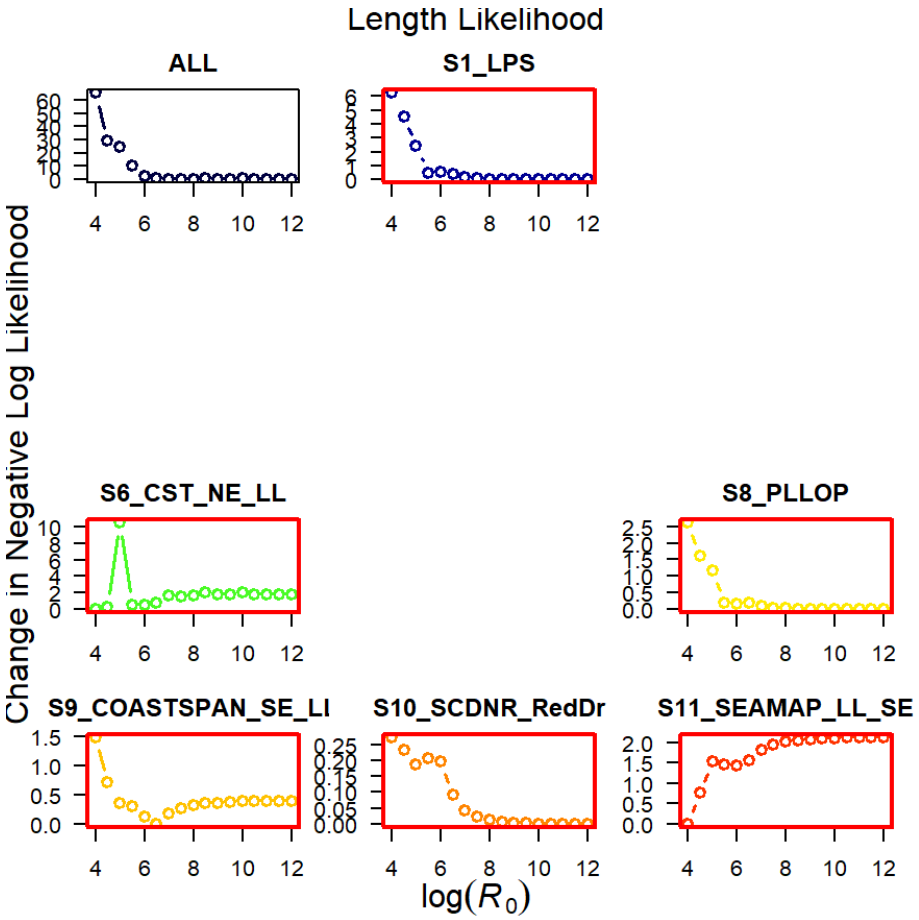


Figure 3.2.21 . Profile likelihoods for the length composition data from the model run with the NEG CPUE grouping for the length compositions associated with the CPUE series.

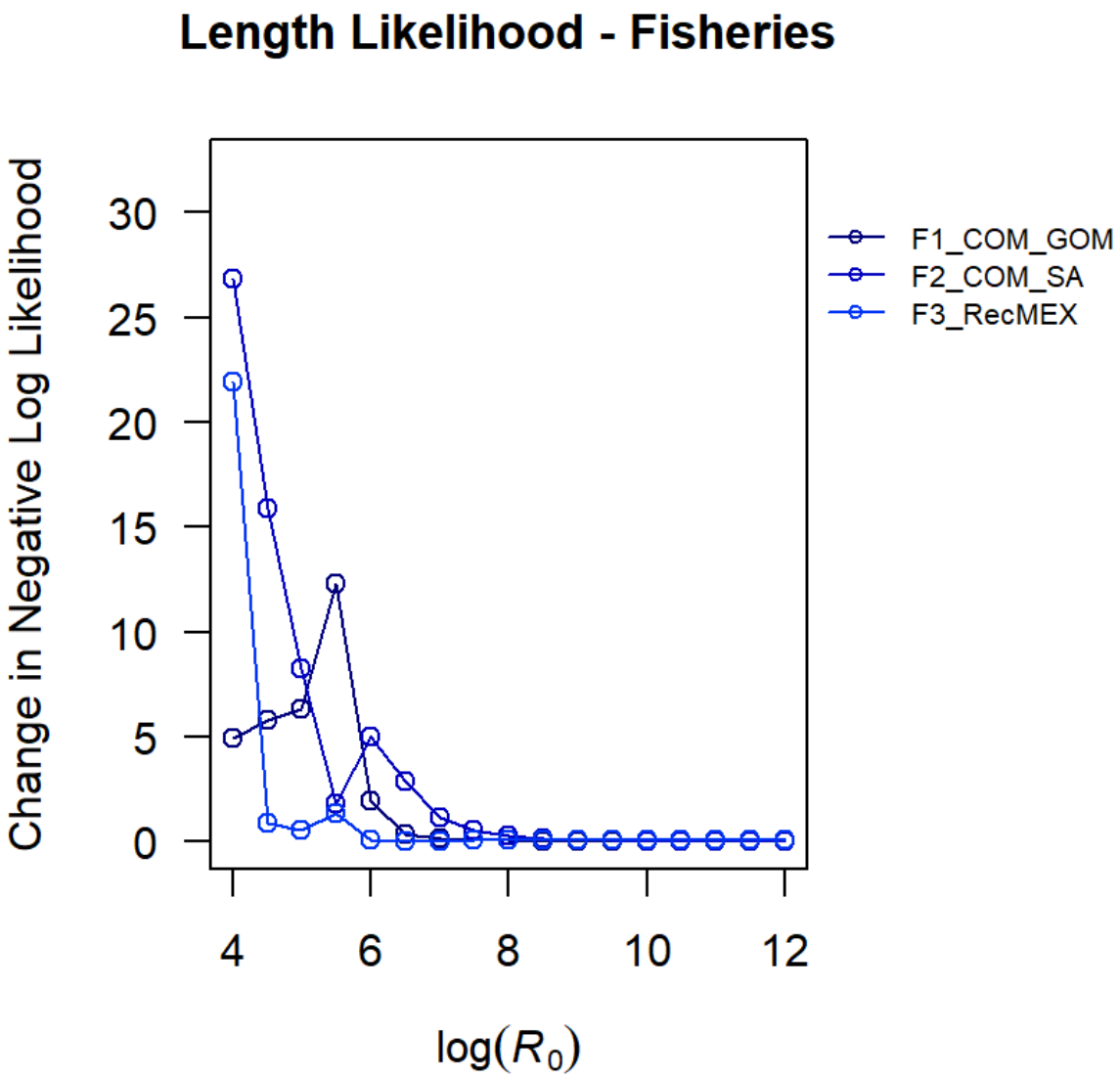


Figure 3.2.22 . Profile likelihoods for the length composition data from the model run with the NEG CPUE grouping for the length compositions associated with fisheries F1-F3.

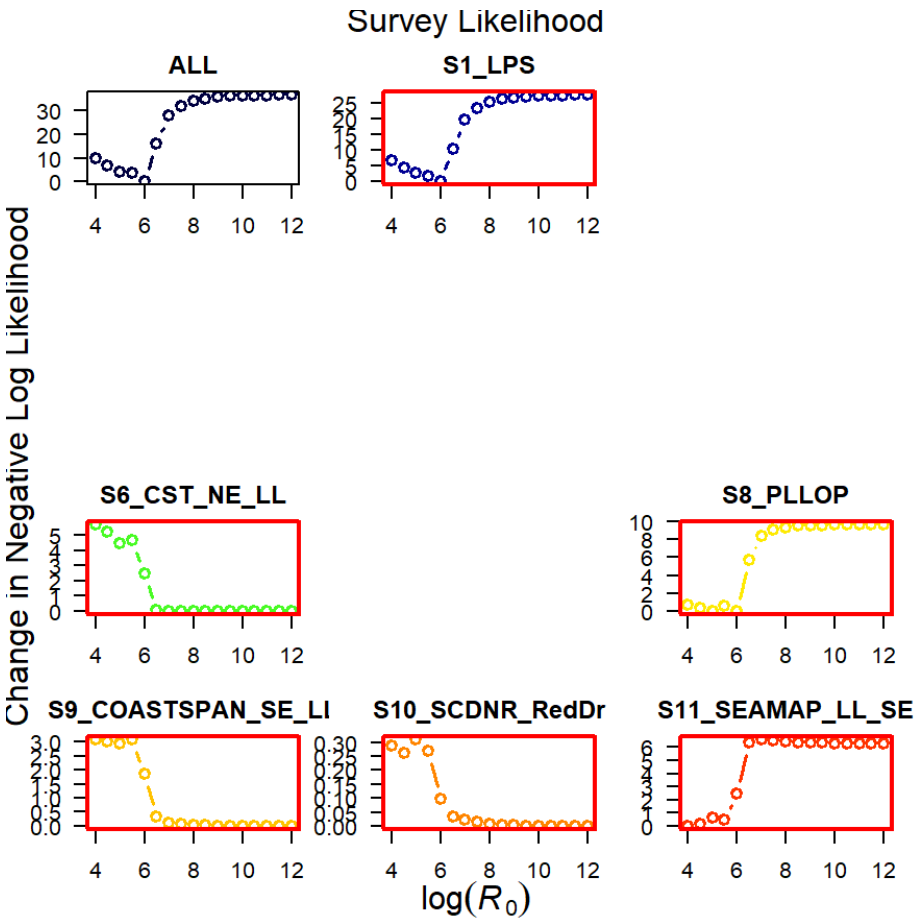


Figure 3.2.23. Profile likelihoods for the CPUE data from the model run with the NEG CPUE grouping.

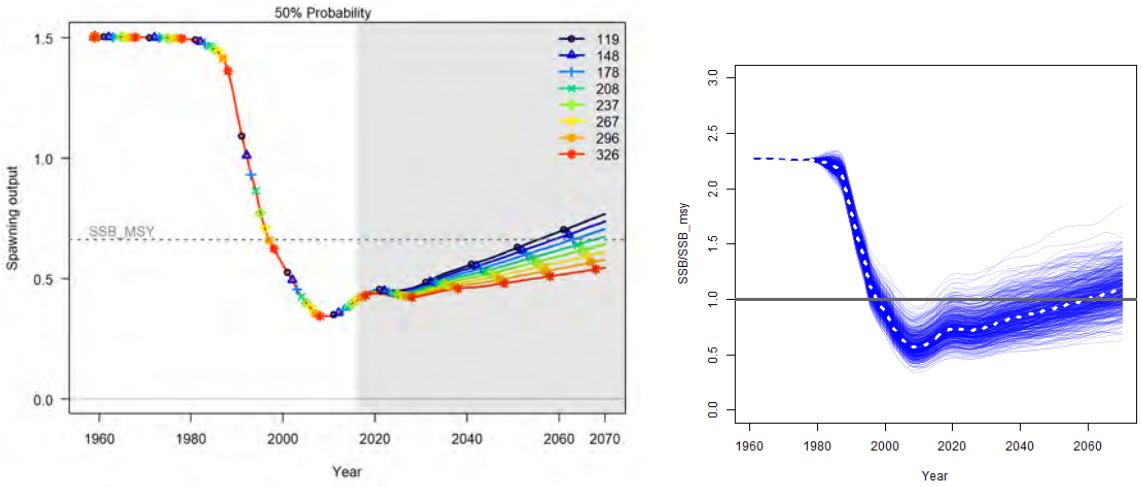


Figure 3.2.24. For the base case, projections were implemented with constant TAC allowing rebuilding of stock by 2070 with 50% and 70% probability (TOR 4A). Base case projections of spawning output (SSF in millions, left panel) under different levels of constant TAC (mt whole weight) indicate that a constant TAC of 208 mt would allow stock rebuilding by 2070 with a 50% probability. For comparison, the base case MCMC projections at a constant TAC of 208 mt are provided for SSF/SSF_{MSY} (right panel). The blue lines indicate individual MCMC runs and the stippled line in the right panel represents the 50^{th} quantile of the runs.

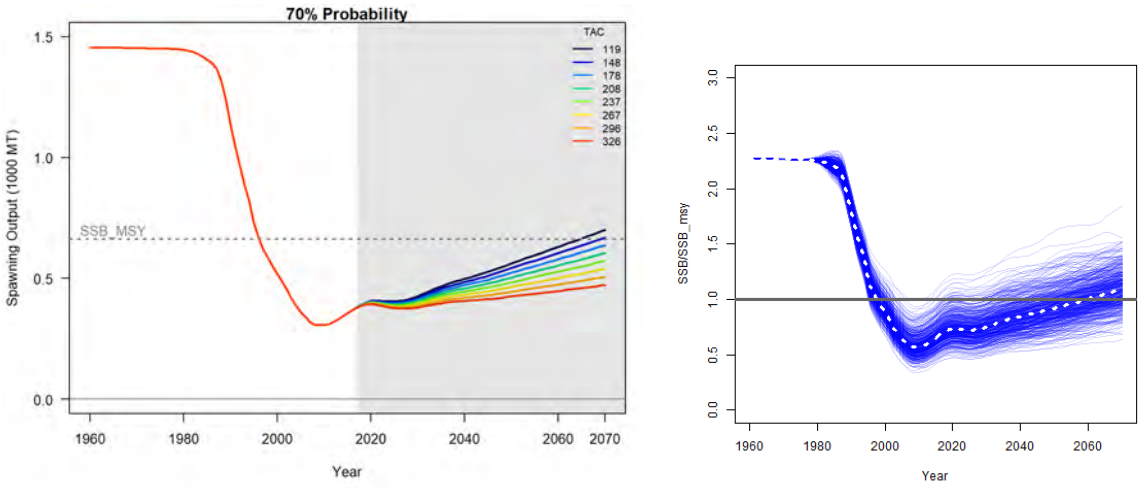


Figure 3.2.25. Base case projections of spawning output (SSF in millions, left panel) under different levels of constant TAC (mt whole weight) indicate that a constant TAC of 148 mt would allow stock rebuilding by 2070 with a 70% probability. For comparison, the base case MCMC projections at a constant TAC of 148 mt are provided for SSF/SSF_{MSY} (right panel). The blue lines indicate individual MCMC runs and the stippled line in right panel represents the 50^{th} quantile of the runs.

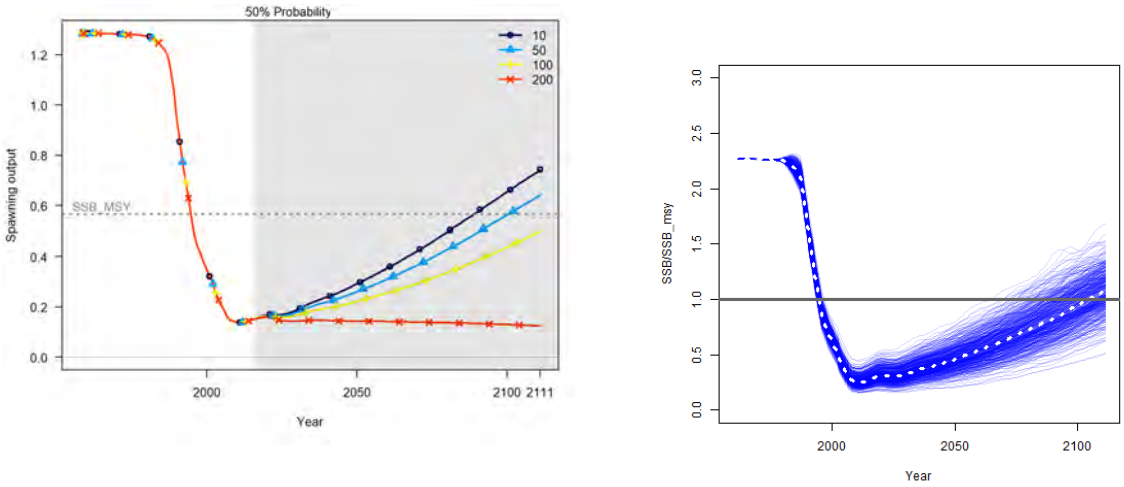


Figure 3.2.26. Under the NEG CPUE grouping, projections were implemented with constant TAC allowing rebuilding of stock by 2111 with 50% and 70% probability (TOR 4B). Projected estimates of spawning output (SSF in millions, left panel) under different levels of constant TAC (mt whole weight) indicate that a constant TAC of 71 mt would allow stock rebuilding by 2111 with a 50% probability. For comparison, the NEG CPUE grouping MCMC projections at a constant TAC of 71 mt are provided for SSF/SSF_{MSY} (right panel). The blue lines indicate individual MCMC runs and the stippled line in the right panel represents the 50^{th} quantile of the runs.

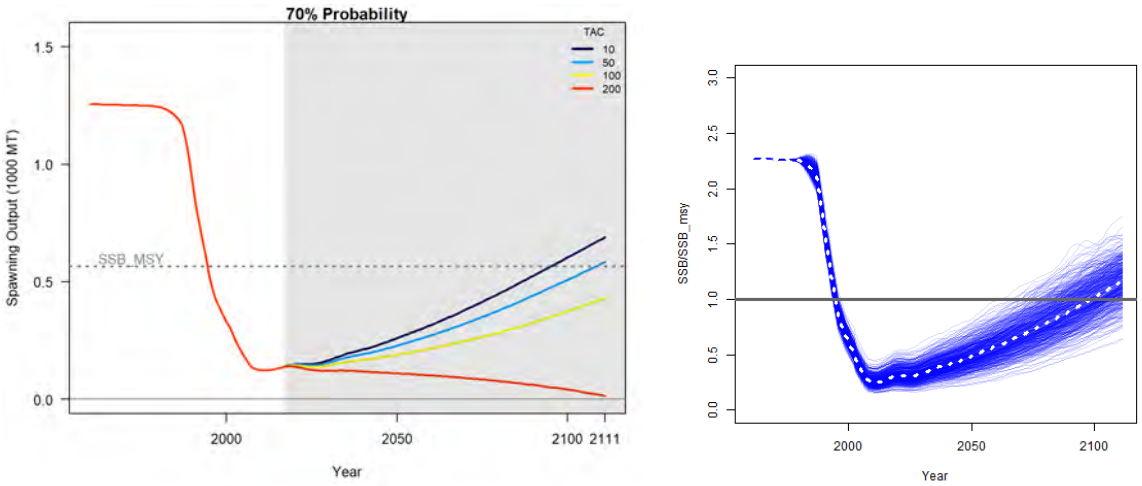


Figure 3.2.27. Projected estimates of the spawning stock biomass based on the NEG CPUE grouping (left panel) under a level of TAC projected until 2111 and estimated SSF/SSF_{MSY} based on MCMC based projections at a TAC of 53 mt which corresponds to the 70% probability of rebuilding by the estimated rebuilding year of 2111 (right panel). The blue lines indicate individual MCMC runs and the stippled line in the right panel represents the 50^{th} quantile of the runs.

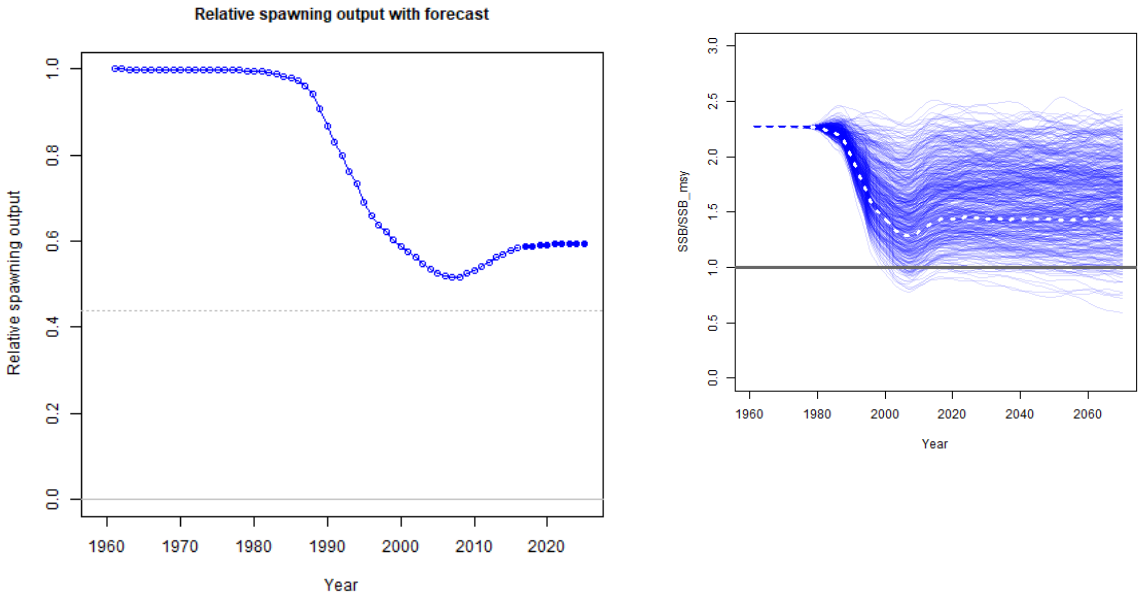


Figure 3.2.28. Under the POS_1 CPUE grouping, a projection model (TOR 4D), analogous to a P* approach associated with a 70% probability of overfishing not occurring (P* = 0.3), was implemented that projected with constant TAC so that the probability of overfishing was less than or equal to 30% in the current rebuilding year, 2070. Projected estimates of the spawning stock biomass based on the POS_1 CPUE grouping (left hand panel) under a TAC of 677 mt projected until 2070 and estimated SSF/SSF_{MSY} (right hand panel) based on MCMC based projections at the same TAC.

7 Appendix 1. MODEL FILES

STARTER FILE
sandbar.dat
sandbar.ctl
0 # 0=use init values in control file; 1=use ss2.par
1 # run display detail (0,1,2)
1 # detailed age-structured reports in REPORT.SSO (0,1)
0 # write detailed checkup.sso file (0,1)
0 # write parm values to ParmTrace.sso (0=no,1=good,active; 2=good,all;
3=every_iter,all_parms; 4=every,active)
0 # write to cumreport.sso (0=no,1=like&timeseries; 2=add survey fits)
0 # Include prior_like for non-estimated parameters (0,1)
1 # Use Soft Boundaries to aid convergence (0,1) (recommended)
0 # Number of bootstrap datafiles to produce
100 # Turn off estimation for parameters entering after this phase
10 # MCMC burn interval
2 # MCMC thin interval
0 # jitter initial parm value by this fraction
-1 # min yr for sdreport outputs (-1 for styr)

-2 # max yr for sdreport outputs (-1 for endyr; -2 for endyr+Nforecastyrs)
0 # N individual STD years
vector of year values
1973 1976

1e-004 # final convergence criteria (e.g. 1.0e-04)
0 # retrospective year relative to end year (e.g. -4)
0 # min age for calc of summary biomass
1 # Depletion basis: denom is: 0=skip; 1=rel X*B0; 2=rel X*Bmsy; 3=rel X*B_styr
1 # Fraction (X) for Depletion denominator (e.g. 0.4)
2 # SPR_report_basis: 0=skip; 1=(1-SPR)/(1-SPR_tgt); 2=(1-SPR)/(1-SPR_MSY); 3=(1-SPR)/(1-SPR_Btarget); 4=rawSPR
3 # F_report_units: 0=skip; 1=exploitation(Bio); 2=exploitation(Num); 3=sum(Frates)
2 # F_report_basis: 0=raw; 1=F/Fspr; 2=F/Fmsy ; 3=F/Fbtgt
999 # check value for end of file

FORECAST FILE #V3.24f
for all year entries except rebuilder; enter either: actual year, -999 for styr, 0 for endyr, neg number for rel. endyr
1 # Benchmarks: 0=skip; 1=calc F_spr,F_btgt,F_msy
2 # MSY: 1= set to F(SPR); 2=calc F(MSY); 3=set to F(Btgt); 4=set to F(endyr)
0.4 # SPR target (e.g. 0.40)
0.4 # Biomass target (e.g. 0.40)
#_Bmark_years: beg_bio, end_bio, beg_selex, end_selex, beg_relF, end_relF (enter actual year, or values of 0 or -integer to be rel. endyr)
 0 0 0 0 0 0
2015 2015 2015 2015 2015 2015 # after processing
1 #Bmark_relF_Basis: 1 = use year range; 2 = set relF same as forecast below
#
2 # Forecast: 0=none; 1=F(SPR); 2=F(MSY) 3=F(Btgt); 4=Ave F (uses first-last relF yrs); 5=input annual F scalar
1 # N forecast years
1 # F scalar (only used for Do_Forecast==5)
#_Fcast_years: beg_selex, end_selex, beg_relF, end_relF (enter actual year, or values of 0 or -integer to be rel. endyr)
 0 0 0 0
2015 2015 2015 2015 # after processing
1 # Control rule method (1=catch=f(SSB) west coast; 2=F=f(SSB))
0.4 # Control rule Biomass level for constant F (as frac of Bzero, e.g. 0.40); (Must be > the no F level below)
0.1 # Control rule Biomass level for no F (as frac of Bzero, e.g. 0.10)
0.75 # Control rule target as fraction of Flimit (e.g. 0.75)
3 #_N forecast loops (1=OFL only; 2=ABC; 3=get F from forecast ABC catch with allocations applied)
3 #_First forecast loop with stochastic recruitment
0 #_Forecast loop control #3 (reserved for future bells&whistles)

0 #_Forecast loop control #4 (reserved for future bells&whistles)
0 #_Forecast loop control #5 (reserved for future bells&whistles)
2010 #FirstYear for caps and allocations (should be after years with fixed inputs)
0 # stddev of log(realized catch/target catch) in forecast (set value>0.0 to cause active impl_error)
0 # Do West Coast gfish rebuilder output (0/1)
1999 # Rebuilder: first year catch could have been set to zero (Ydecl)(-1 to set to 1999)
2016 # Rebuilder: year for current age structure (Yinit) (-1 to set to endyear+1)
1 # fleet relative F: 1=use first-last alloc year; 2=read seas(row) x fleet(col) below
Note that fleet allocation is used directly as average F if Do_Forecast=4
2 # basis for fcast catch tuning and for fcast catch caps and allocation (2=deadbio; 3=retainbio; 5=deadnum; 6=retainnum)
Conditional input if relative F choice = 2
Fleet relative F: rows are seasons, columns are fleets
#_Fleet: F1_COM_GOM F2_COM_SA F3_RecMEX F4_MEN_DSC
0.0760874 0.0485518 0.871055 0.00430538
max totalcatch by fleet (-1 to have no max) must enter value for each fleet
-1 -1 -1 -1
max totalcatch by area (-1 to have no max); must enter value for each fleet
-1
fleet assignment to allocation group (enter group ID# for each fleet, 0 for not included in an alloc group)
-1 -1 -1 0
#_Conditional on >1 allocation group
allocation fraction for each of: 0 allocation groups
no allocation groups
0 # Number of forecast catch levels to input (else calc catch from forecast F)
2 # basis for input Fcast catch: 2=dead catch; 3=retained catch; 99=input Hrate(F) (units are from fleetunits; note new codes in SSV3.20)
Input fixed catch values
#Year Seas Fleet Catch(or_F)

#
999 # verify end of input

CONTROL FILE
#V3.24f
#_data_and_control_files: sandbar.dat // sandbar.ctl
1 #_N_Growth_Patterns
1 #_N_Morphs_Within_GrowthPattern
#_Cond 1 #_Morph_between/within_stdev_ratio (no read if N_morphs=1)
#_Cond 1 #vector_Morphdist_(-1_in_first_val_gives_normal_approx)
#
#_Cond 0 # N recruitment designs goes here if N_GP*nseas*area>1
#_Cond 0 # placeholder for recruitment interaction request
#_Cond 1 1 1 # example recruitment design element for GP=1, seas=1, area=1

```
#
#_Cond 0 # N_movement_definitions goes here if N_areas > 1
#_Cond 1.0 # first age that moves (real age at begin of season, not integer) also cond on
do_migration>0
#_Cond 1 1 1 2 4 10 # example move definition for seas=1, morph=1, source=1 dest=2, age1=4,
age2=10
#
0 #_Nblock_Patterns
#_Cond 0 #_blocks_per_pattern
# begin and end years of blocks
#
0.5 #_fracfemale
3 #_natM_type:_0=1Parm;
1=N_breakpoints;_2=Lorenzen;_3=agespecific;_4=agespec_withseasinterpolate
 #_Age_natmort_by gender x growthpattern
 0.160419 0.160419 0.160419 0.160419 0.160419 0.160419 0.157755 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805
 0.160419 0.160419 0.160419 0.160419 0.160419 0.160419 0.157755 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805 0.116805
0.116805 0.116805 0.116805 0.116805 0.116805
1 # GrowthModel: 1=vonBert with L1&L2; 2=Richards with L1&L2; 3=age_speciific_K; 4=not
implemented
0 #_Growth_Age_for_L1
999 #_Growth_Age_for_L2 (999 to use as Linf)
0 #_SD_add_to_LAA (set to 0.1 for SS2 V1.x compatibility)
0 #_CV_Growth_Pattern:  0 CV=f(LAA); 1 CV=F(A); 2 SD=F(LAA); 3 SD=F(A); 4
logSD=F(A)
3 #_maturity_option:  1=length logistic; 2=age logistic; 3=read age-maturity matrix by
growth_pattern; 4=read age-fecundity; 5=read fec and wt from wtatage.ss
#_Age_Maturity by growth pattern
 0.000182241 0.000352538 0.000681863 0.00131842 0.00254773 0.00491762 0.00947104
0.0181637 0.0345562 0.064767 0.118157 0.20587 0.334033 0.492501 0.652489 0.784147
0.875447 0.931502 0.963385 0.980735 0.989949 0.99478 0.997295 0.9986 0.999276 0.999626
0.999806 0.9999 0.999948 0.999973 0.999986 0.999993
13 #_First_Mature_Age
4 #_fecundity option:(1)eggs=Wt*(a+b*Wt);(2)eggs=a*L^b;(3)eggs=a*Wt^b; (4)eggs=a+b*L;
(5)eggs=a+b*W
0 #_hermaphroditism option:  0=none; 1=age-specific fxn
2 #_parameter_offset_approach (1=none, 2= M, G, CV_G as offset from female-GP1, 3=like
SS2 V1.x)
1 #_env/block/dev_adjust_method (1=standard; 2=logistic transform keeps in base parm bounds;
3=standard w/ no bound check)
#
```

```
#_growth_parms
#_LO HI INIT PRIOR PR_type SD PHASE env-var use_dev dev_minyr dev_maxyr dev_stddev
Block Block_Fxn
 10 120 58.4 58.4 -1 10 -4 0 0 0 0 0.5 0 0 # L_at_Amin_Fem_GP_1
 40 410 183.322 183 -1 10 -2 0 0 0 0 0.5 0 0 # L_at_Amax_Fem_GP_1
 0.1 0.25 0.124 0.12 -1 0.8 -4 0 0 0 0 0.5 0 0 # VonBert_K_Fem_GP_1
 0.05 0.3 0.22 0.123153 -1 99 -3 0 0 0 0 0 0 0 # CV_young_Fem_GP_1
 0.05 0.3 0.1197 0.1 -1 99 -3 0 0 0 0 0 0 0 # CV_old_Fem_GP_1
 -3 3 -0.14393 0 -1 0.8 -3 0 0 0 0 0.5 0 0 # L_at_Amin_Mal_GP_1
 -3 3 -0.0434285 0 -1 0.8 -2 0 0 0 0 0.5 0 0 # L_at_Amax_Mal_GP_1
 -3 3 0.142563 0 -1 0.8 -3 0 0 0 0 0.5 0 0 # VonBert_K_Mal_GP_1
 -3 3 0 0 -1 99 -3 0 0 0 0 0 0 0 # CV_young_Mal_GP_1
 -3 3 0 0.56 -1 99 -3 0 0 0 0 0 0 0 # CV_old_Mal_GP_1
 -3 3 1.08858e-005 1.08858e-005 -1 0.8 -3 0 0 0 0 0.5 0 0 # Wtlen_1_Fem
 -3 3.5 3.0124 3.0124 -1 0.8 -3 0 0 0 0 0.5 0 0 # Wtlen_2_Fem
 -3 300 154.9 55 -1 0.8 -3 0 0 0 0 0.5 0 0 # Mat50%_Fem
 -3 3 -0.138 -0.138 -1 0.8 -3 0 0 0 0 0.5 0 0 # Mat_slope_Fem
 -3 36 1.69908 0 -1 0.8 -3 0 0 0 0 0.5 0 0 # Eggs_intercept_Fem
 -3 30 0.01296 0 -1 0.8 -3 0 0 0 0 0.5 0 0 # Eggs_slope_len_Fem
 -3 3 1.08858e-005 1.08858e-005 -1 0.8 -3 0 0 0 0 0.5 0 0 # Wtlen_1_Mal
 -3 3.5 3.0124 3.0124 -1 0.8 -3 0 0 0 0 0.5 0 0 # Wtlen_2_Mal
 0 0 0 0 -1 0 -4 0 0 0 0 0 0 0 # RecrDist_GP_1
 0 0 0 0 -1 0 -4 0 0 0 0 0 0 0 # RecrDist_Area_1
 0 0 0 0 -1 0 -4 0 0 0 0 0 0 0 # RecrDist_Seas_1
 0 0 0 0 -1 0 -4 0 0 0 0 0 0 0 # CohortGrowDev
#
#_Cond 0  #custom_MG-env_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no MG-environ parameters
#
#_Cond 0  #custom_MG-block_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no MG-block parameters
#_Cond No MG parm trends
#
#_seasonal_effects_on_biology_parms
 0 0 0 0 0 0 0 0 0 0 #_femwtlen1,femwtlen2,mat1,mat2,fec1,fec2,Malewtlen1,malewtlen2,L1,K
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no seasonal MG parameters
#
#_Cond -4 #_MGparm_Dev_Phase
#
#_Spawner-Recruitment
3 #_SR_function: 2=Ricker; 3=std_B-H; 4=SCAA; 5=Hockey; 6=B-H_flattop;
7=survival_3Parm
#_LO HI INIT PRIOR PR_type SD PHASE
 3 10 6.27892 7 -1 1 1 # SR_LN(R0)
 0.2 0.7 0.3 0.29 -1 0.2 -3 # SR_BH_steep
 0 2 0.18 0.6 -1 0.8 -3 # SR_sigmaR
```

```
 -5 5 0 0 -1 1 -3 # SR_envlink
 -2 2 0 0 -1 0 -1 # SR_R1_offset
 0 0 0 -1 -1 99 -99 # SR_autocorr
0 #_SR_env_link
1 #_SR_env_target_0=none;1=devs;_2=R0;_3=steepness
2 #do_recdev:  0=none; 1=devvector; 2=simple deviations
1980 # first year of main recr_devs; early devs can preceed this era
2015 # last year of main recr_devs; forecast devs start in following year
3 #_recdev phase
1 # (0/1) to read 13 advanced options
 -10 #_recdev_early_start (0=none; neg value makes relative to recdev_start)
 1 #_recdev_early_phase
 0 #_forecast_recruitment phase (incl. late recr) (0 value resets to maxphase+1)
 1 #_lambda for Fcast_recr_like occurring before endyr+1
 1980.4 #_last_early_yr_nobias_adj_in_MPD
 2015 #_first_yr_fullbias_adj_in_MPD
 2015.9 #_last_yr_fullbias_adj_in_MPD
 2016 #_first_recent_yr_nobias_adj_in_MPD
 0.2543 #_max_bias_adj_in_MPD (-1 to override ramp and set biasadj=1.0 for all estimated
recdevs)
 0 #_period of cycles in recruitment (N parms read below)
 -15 #min rec_dev
 15 #max rec_dev
 0 #_read_recdevs
#_end of advanced SR options
#
#_placeholder for full parameter lines for recruitment cycles
# read specified recr devs
#_Yr Input_value
#
#
#Fishing Mortality info
0.0005 # F ballpark for tuning early phases
-2009 # F ballpark year (neg value to disable)
3 # F_Method:  1=Pope; 2=instan. F; 3=hybrid (hybrid is recommended)
5 # max F or harvest rate, depends on F_Method
# no additional F input needed for Fmethod 1
# if Fmethod=2; read overall start F value; overall phase; N detailed inputs to read
# if Fmethod=3; read N iterations for tuning for Fmethod 3
4  # N iterations for tuning F in hybrid method (recommend 3 to 7)
#
#_initial_F_parms
#_LO HI INIT PRIOR PR_type SD PHASE
 0.1 5 0 -1 0 99 -1 # InitF_1F1_COM_GOM
 0.1 5 0 -1 0 99 -1 # InitF_2F2_COM_SA
 0.1 5 0 -1 0 99 -1 # InitF_3F3_RecMEX
```

```
 1e-007 5 1e-007 -1 0 99 -1 # InitF_4F4_MEN_DSC
#
#_Q_setup
 # Q_type options:  <0=mirror, 0=float_nobiasadj, 1=float_biasadj, 2=parm_nobiasadj,
3=parm_w_random_dev, 4=parm_w_randwalk, 5=mean_unbiased_float_assign_to_parm
#_for_env-var:_enter_index_of_the_env-var_to_be_linked
#_Den-dep  env-var  extra_se  Q_type
 0 0 0 0 # 1 F1_COM_GOM
 0 0 0 0 # 2 F2_COM_SA
 0 0 0 0 # 3 F3_RecMEX
 0 0 0 0 # 4 F4_MEN_DSC
 0 0 0 0 # 5 S1_LPS
 0 0 0 0 # 6 S2_BLLOP_1
 0 0 0 0 # 7 S3_BLLOP_2
 0 0 0 0 # 8 S4_VA_LL
 0 0 0 0 # 9 S5_NMFS_LLSE
 0 0 0 0 # 10 S6_CST_NE_LL
 0 0 0 0 # 11 S7_NMFS_NE
 0 0 0 0 # 12 S8_PLLOP
 0 0 0 0 # 13 S9_COASTSPAN_SE_LL
 0 0 0 0 # 14 S10_SCDNR_RedDr
 0 0 0 0 # 15 S11_SEAMAP_LL_SE
#
#_Cond 0 #_If q has random component, then 0=read one parm for each fleet with random q;
1=read a parm for each year of index
#_Q_parms(if_any)
#
#_size_selex_types
#discard_options:_0=none;_1=define_retention;_2=retention&mortality;_3=all_discarded_dead
#_Pattern Discard Male Special
 24 0 3 0 # 1 F1_COM_GOM
 1 0 0 0 # 2 F2_COM_SA
 24 0 0 0 # 3 F3_RecMEX
 1 0 0 0 # 4 F4_MEN_DSC
 24 0 0 0 # 5 S1_LPS
 24 0 4 0 # 6 S2_BLLOP_1
 24 0 3 0 # 7 S3_BLLOP_2
 24 0 0 0 # 8 S4_VA_LL
 24 0 3 0 # 9 S5_NMFS_LLSE
 24 0 3 0 # 10 S6_CST_NE_LL
 24 0 4 0 # 11 S7_NMFS_NE
 24 0 3 0 # 12 S8_PLLOP
 27 0 0 5 # 13 S9_COASTSPAN_SE_LL
 24 0 3 0 # 14 S10_SCDNR_RedDr
 24 0 3 0 # 15 S11_SEAMAP_LL_SE
#
```

#_age_selex_types
#_Pattern ___ Male Special
0 0 0 0 # 1 F1_COM_GOM
0 0 0 0 # 2 F2_COM_SA
0 0 0 0 # 3 F3_RecMEX
0 0 0 0 # 4 F4_MEN_DSC
0 0 0 0 # 5 S1_LPS
0 0 0 0 # 6 S2_BLLOP_1
0 0 0 0 # 7 S3_BLLOP_2
0 0 0 0 # 8 S4_VA_LL
0 0 0 0 # 9 S5_NMFS_LLSE
0 0 0 0 # 10 S6_CST_NE_LL
0 0 0 0 # 11 S7_NMFS_NE
0 0 0 0 # 12 S8_PLLOP
0 0 0 0 # 13 S9_COASTSPAN_SE_LL
0 0 0 0 # 14 S10_SCDNR_RedDr
0 0 0 0 # 15 S11_SEAMAP_LL_SE
#_LO HI INIT PRIOR PR_type SD PHASE env-var use_dev dev_minyr dev_maxyr dev_stddev Block Block_Fxn
35 259 149.427 50 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_1P_1_F1_COM_GOM
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_1P_2_F1_COM_GOM
-15 15 5.45132 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_1P_3_F1_COM_GOM
-15 15 5.60819 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_1P_4_F1_COM_GOM
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_1P_5_F1_COM_GOM
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_1P_6_F1_COM_GOM
-20 200 4 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_1Male_Peak_F1_COM_GOM
-15 15 0.743742 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_1Male_Ascend_F1_COM_GOM
-15 15 -0.6 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_1Male_Descend_F1_COM_GOM
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_1Male_Final_F1_COM_GOM
-15 15 0.672785 4 -1 50 5 0 0 0 0 0 0 0 # SzSel_1Male_Scale_F1_COM_GOM
1 200 93.6324 120 -1 0.01 2 0 0 0 0 0 0 0 # SizeSel_2P_1_F2_COM_SA
1 100 29.7201 25 -1 0.1 3 0 0 0 0 0 0 0 # SizeSel_2P_2_F2_COM_SA
35 259 55.0586 55 0 1 2 0 0 0 0 0.5 0 0 # SizeSel_3P_1_F3_RecMEX
-15 15 -9.99944 -10 0 1 3 0 0 0 0 0.5 0 0 # SizeSel_3P_2_F3_RecMEX
-15 15 0 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_3P_3_F3_RecMEX
-15 15 7.24959 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_3P_4_F3_RecMEX
-15 15 -15 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_3P_5_F3_RecMEX
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_3P_6_F3_RecMEX
1 200 45.6654 45 -1 99 -2 0 0 0 0 0.5 0 0 # SizeSel_4P_1_F4_MEN_DSC
1 239 1 50 -1 99 -3 0 0 0 0 0 0 0 # SizeSel_4P_2_F4_MEN_DSC
35 259 155.527 50 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_5P_1_S1_LPS
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_5P_2_S1_LPS
-15 15 7.30304 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_5P_3_S1_LPS
-15 15 14.6321 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_5P_4_S1_LPS
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_5P_5_S1_LPS
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_5P_6_S1_LPS

```
35 259 155.527 50 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_1_S2_BLLOP_1
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_2_S2_BLLOP_1
-15 15 7.8872 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_3_S2_BLLOP_1
-15 15 5 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_4_S2_BLLOP_1
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_5_S2_BLLOP_1
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_6P_6_S2_BLLOP_1
-20 200 4 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_6Fem_Peak_S2_BLLOP_1
-15 15 -0.14 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_6Fem_Ascend_S2_BLLOP_1
-15 15 -0.6 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_6Fem_Descend_S2_BLLOP_1
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_6Fem_Final_S2_BLLOP_1
-15 15 1.02466 4 -1 50 -5 0 0 0 0 0 0 0 # SzSel_6Fem_Scale_S2_BLLOP_1
35 258 158.2 50 -1 0 -2 0 0 0 0 0.5 0 0 # SizeSel_7P_1_S3_BLLOP_2
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_7P_2_S3_BLLOP_2
-15 15 6.747 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_7P_3_S3_BLLOP_2
-15 15 6.66187 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_7P_4_S3_BLLOP_2
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_7P_5_S3_BLLOP_2
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_7P_6_S3_BLLOP_2
-20 200 4.21499 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_7Male_Peak_S3_BLLOP_2
-15 15 -0.117 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_7Male_Ascend_S3_BLLOP_2
-15 15 -0.599 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_7Male_Descend_S3_BLLOP_2
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_7Male_Final_S3_BLLOP_2
-15 15 0.704246 4 -1 50 -5 0 0 0 0 0 0 0 # SzSel_7Male_Scale_S3_BLLOP_2
35 258 45.0234 50 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_8P_1_S4_VA_LL
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_8P_2_S4_VA_LL
-15 15 -9.36124 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_8P_3_S4_VA_LL
-15 15 8.69984 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_8P_4_S4_VA_LL
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_8P_5_S4_VA_LL
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_8P_6_S4_VA_LL
35 259 161.846 50 -1 0 2 0 0 0 0 0.5 0 0 # SizeSel_9P_1_S5_NMFS_LLSE
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_9P_2_S5_NMFS_LLSE
-15 15 7.14991 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_9P_3_S5_NMFS_LLSE
-15 15 5.60914 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_9P_4_S5_NMFS_LLSE
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_9P_5_S5_NMFS_LLSE
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_9P_6_S5_NMFS_LLSE
-20 200 -6.1517 0 -1 50 4 0 0 0 0 0 0 0 # SzSel_9Male_Peak_S5_NMFS_LLSE
-15 15 -0.656603 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_9Male_Ascend_S5_NMFS_LLSE
-15 15 -0.804174 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_9Male_Descend_S5_NMFS_LLSE
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_9Male_Final_S5_NMFS_LLSE
-15 15 0.735386 4 -1 50 5 0 0 0 0 0 0 0 # SzSel_9Male_Scale_S5_NMFS_LLSE
35 258 57.0259 50 -1 0 2 0 0 0 0 0.5 0 0 # SizeSel_10P_1_S6_CST_NE_LL
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_10P_2_S6_CST_NE_LL
-15 15 -8.03807 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_10P_3_S6_CST_NE_LL
-15 15 7.57575 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_10P_4_S6_CST_NE_LL
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_10P_5_S6_CST_NE_LL
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_10P_6_S6_CST_NE_LL
-20 200 5.35953 0 -1 50 4 0 0 0 0 0 0 0 # SzSel_10Male_Peak_S6_CST_NE_LL
```

-15 15 10.9201 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_10Male_Ascend_S6_CST_NE_LL
-15 15 -0.792801 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_10Male_Descend_S6_CST_NE_LL
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_10Male_Final_S6_CST_NE_LL
-15 15 1.0764 4 -1 50 5 0 0 0 0 0 0 0 # SzSel_10Male_Scale_S6_CST_NE_LL
35 259 132.668 145 -1 0 2 0 0 0 0 0.5 0 0 # SizeSel_11P_1_S7_NMFS_NE
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_11P_2_S7_NMFS_NE
-15 15 8.03405 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_11P_3_S7_NMFS_NE
-15 15 6.32447 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_11P_4_S7_NMFS_NE
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_11P_5_S7_NMFS_NE
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_11P_6_S7_NMFS_NE
-20 200 0 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_11Fem_Peak_S7_NMFS_NE
-15 15 -1 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_11Fem_Ascend_S7_NMFS_NE
-15 15 1 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_11Fem_Descend_S7_NMFS_NE
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_11Fem_Final_S7_NMFS_NE
-15 15 2.31853 5 -1 50 5 0 0 0 0 0 0 0 # SzSel_11Fem_Scale_S7_NMFS_NE
35 259 147.3 50 -1 0 2 0 0 0 0 0.5 0 0 # SizeSel_12P_1_S8_PLLOP
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_12P_2_S8_PLLOP
-15 15 6.52378 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_12P_3_S8_PLLOP
-15 15 6.0314 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_12P_4_S8_PLLOP
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_12P_5_S8_PLLOP
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_12P_6_S8_PLLOP
-20 200 4 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_12Male_Peak_S8_PLLOP
-15 15 -0.427904 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_12Male_Ascend_S8_PLLOP
-15 15 -1.19422 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_12Male_Descend_S8_PLLOP
-15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_12Male_Final_S8_PLLOP
-15 15 1.44595 4 -1 50 5 0 0 0 0 0 0 0 # SzSel_12Male_Scale_S8_PLLOP
0 2 0 0 -1 0 -9 0 0 0 0 0 0 0 # SizeSpline_Code_S9_COASTSPAN_SE_LL_13
-0.001 10 0.004 0 -1 0.1 -3 0 0 0 0 0 0 0 # SizeSpline_GradLo_S9_COASTSPAN_SE_LL_13
-10 0.01 -0.003 0 -1 0.1 -3 0 0 0 0 0 0 0 # SizeSpline_GradHi_S9_COASTSPAN_SE_LL_13
1 150 45 0 -1 0 -99 0 0 0 0 0 0 0 # SizeSpline_Knot_1_S9_COASTSPAN_SE_LL_13
1 150 55 0 -1 0 -99 0 0 0 0 0 0 0 # SizeSpline_Knot_2_S9_COASTSPAN_SE_LL_13
1 150 65 0 -1 0 -99 0 0 0 0 0 0 0 # SizeSpline_Knot_3_S9_COASTSPAN_SE_LL_13
1 150 80 0 -1 0 -99 0 0 0 0 0 0 0 # SizeSpline_Knot_4_S9_COASTSPAN_SE_LL_13
1 150 85 0 -1 0 -99 0 0 0 0 0 0 0 # SizeSpline_Knot_5_S9_COASTSPAN_SE_LL_13
-5 5 3.35616 0 -1 0 2 0 0 0 0 0 0 0 # SizeSpline_Val_1_S9_COASTSPAN_SE_LL_13
-5 5 2.54332 0 -1 0 2 0 0 0 0 0 0 0 # SizeSpline_Val_2_S9_COASTSPAN_SE_LL_13
-5 5 2.00077 0 -1 0 2 0 0 0 0 0 0 0 # SizeSpline_Val_3_S9_COASTSPAN_SE_LL_13
-5 5 -1.04538 0 -1 0 2 0 0 0 0 0 0 0 # SizeSpline_Val_4_S9_COASTSPAN_SE_LL_13
-5 5 -4.40136 0 -1 0 -3 0 0 0 0 0 0 0 # SizeSpline_Val_5_S9_COASTSPAN_SE_LL_13
35 259 92.8542 50 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_14P_1_S10_SCDNR_RedDr
-15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_14P_2_S10_SCDNR_RedDr
-15 15 6 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_14P_3_S10_SCDNR_RedDr
-15 15 6 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_14P_4_S10_SCDNR_RedDr
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_14P_5_S10_SCDNR_RedDr
-999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_14P_6_S10_SCDNR_RedDr
-20 200 4 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_14Male_Peak_S10_SCDNR_RedDr

```
 -15 15 1.57832 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_14Male_Ascend_S10_SCDNR_RedDr
 -15 15 -0.310553 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_14Male_Descend_S10_SCDNR_RedDr
 -15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_14Male_Final_S10_SCDNR_RedDr
 -15 15 0.592267 4 1 50 5 0 0 0 0 0 0 0 # SzSel_14Male_Scale_S10_SCDNR_RedDr
 35 258 93.5684 50 -1 0 2 0 0 0 0 0.5 0 0 # SizeSel_15P_1_S11_SEAMAP_LL_SE
 -15 15 -10 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_15P_2_S11_SEAMAP_LL_SE
 -15 15 6.07161 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_15P_3_S11_SEAMAP_LL_SE
 -15 15 7.97427 0 -1 0 3 0 0 0 0 0.5 0 0 # SizeSel_15P_4_S11_SEAMAP_LL_SE
 -999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_15P_5_S11_SEAMAP_LL_SE
 -999 -999 -999 0 -1 0 -3 0 0 0 0 0.5 0 0 # SizeSel_15P_6_S11_SEAMAP_LL_SE
 -20 200 4.21499 0 -1 50 -4 0 0 0 0 0 0 0 # SzSel_15Male_Peak_S11_SEAMAP_LL_SE
 -15 15 -0.36932 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_15Male_Ascend_S11_SEAMAP_LL_SE
 -15 15 -0.279912 4 -1 50 4 0 0 0 0 0 0 0 # SzSel_15Male_Descend_S11_SEAMAP_LL_SE
 -15 15 0 4 -1 50 -4 0 0 0 0 0 0 0 # SzSel_15Male_Final_S11_SEAMAP_LL_SE
 -15 15 1.17049 4 -1 50 5 0 0 0 0 0 0 0 # SzSel_15Male_Scale_S11_SEAMAP_LL_SE
#_Cond 0 #_custom_sel-env_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no enviro fxns
#_Cond 0 #_custom_sel-blk_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no block usage
#_Cond No selex parm trends
#_Cond -4 # placeholder for selparm_Dev_Phase
#_Cond 0 #_env/block/dev_adjust_method (1=standard; 2=logistic trans to keep in base parm
bounds; 3=standard w/ no bound check)
#
# Tag loss and Tag reporting parameters go next
0  # TG_custom:  0=no read; 1=read if tags exist
#_Cond -6 6 1 1 2 0.01 -4 0 0 0 0 0 0 0  #_placeholder if no parameters
#
1 #_Variance_adjustments_to_input_values
#_fleet: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 #_add_to_survey_CV
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 #_add_to_discard_stddev
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 #_add_to_bodywt_CV
  0.2921 0.0294 0.9092 1 1.1398 0.0716 9.8483 0.1317 0.2936 1.5812 0.1447 1.0707 2.0907
0.1649 0.4257 #_mult_by_lencomp_N
  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 #_mult_by_agecomp_N
  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 #_mult_by_size-at-age_N
#
1 #_maxlambdaphase
1 #_sd_offset
#
31 # number of changes to make to default Lambdas (default value is 1.0)
# Like_comp codes:  1=surv; 2=disc; 3=mnwt; 4=length; 5=age; 6=SizeFreq; 7=sizeage;
8=catch;
# 9=init_equ_catch; 10=recrdev; 11=parm_prior; 12=parm_dev; 13=CrashPen; 14=Morphcomp;
15=Tag-comp; 16=Tag-negbin
```

```
#like_comp fleet/survey  phase  value  sizefreq_method
 1 1 1 0 1
 1 2 1 0 1
 1 3 1 0 1
 1 4 1 0 1
 1 5 1 1 1
 1 6 1 1 1
 1 7 1 1 1
 1 8 1 1 1
 1 9 1 1 1
 1 10 1 1 1
 1 11 1 1 1
 1 12 1 1 1
 1 13 1 1 1
 1 14 1 1 1
 1 15 1 1 1
 4 1 1 1 0
 4 2 1 1 0
 4 3 1 1 0
 4 4 1 0 0
 4 5 1 1 0
 4 6 1 0 0
 4 7 1 0 0
 4 8 1 1 0
 4 9 1 1 0
 4 10 1 1 0
 4 11 1 1 0
 4 12 1 1 0
 4 13 1 1 0
 4 14 1 1 0
 4 15 1 1 0
 9 1 1 0 0
#
# lambdas (for info only; columns are phases)
#  0 #_CPUE/survey:_1
#  0 #_CPUE/survey:_2
#  0 #_CPUE/survey:_3
#  0 #_CPUE/survey:_4
#  1 #_CPUE/survey:_5
#  1 #_CPUE/survey:_6
#  1 #_CPUE/survey:_7
#  1 #_CPUE/survey:_8
#  1 #_CPUE/survey:_9
#  1 #_CPUE/survey:_10
#  1 #_CPUE/survey:_11
#  1 #_CPUE/survey:_12
```

```
#  1 #_CPUE/survey:_13
#  1 #_CPUE/survey:_14
#  1 #_CPUE/survey:_15
#  1 #_lencomp:_1
#  1 #_lencomp:_2
#  1 #_lencomp:_3
#  0 #_lencomp:_4
#  1 #_lencomp:_5
#  0 #_lencomp:_6
#  0 #_lencomp:_7
#  1 #_lencomp:_8
#  1 #_lencomp:_9
#  1 #_lencomp:_10
#  1 #_lencomp:_11
#  1 #_lencomp:_12
#  1 #_lencomp:_13
#  1 #_lencomp:_14
#  1 #_lencomp:_15
#  0 #_init_equ_catch
#  1 #_recruitments
#  1 #_parameter-priors
#  1 #_parameter-dev-vectors
#  1 #_crashPenLambda
0 # (0/1) read specs for more stddev reporting
 # 0 1 -1 5 1 5 1 -1 5 # placeholder for selex type, len/age, year, N selex bins, Growth pattern, N growth ages, NatAge_area(-1 for all), NatAge_yr, N Natages
 # placeholder for vector of selex bins to be reported
 # placeholder for vector of growth ages to be reported
 # placeholder for vector of NatAges ages to be reported
999
```

8 Appendix 2. Excerpt from SEDAR_TEMP1

Example Implementation of a Hierarchical Cluster Analysis and Cross-correlations of Selected CPUE Indices for the SEDAR 54 Assessment

Summary

An example implementation of a hierarchical cluster analysis and cross-correlations of selected CPUE indices for the SEDAR 54 assessment was conducted to identify conflicting information among CPUE indices. Hierarchical cluster analysis identified two groupings of time-series. The first group was characterized by time-series which were highly correlated with each other and which had some highly negative correlations with some time-series not included in

the group. The second group was characterized by time-series which were less highly correlated with each other or were slightly negatively correlated with each other. Because CPUEs with conflicting information were identified, it may be reasonable to assume that the indices reflect alternative hypotheses about states of nature and to run scenarios for single or sets of indices identified that represent a common hypothesis as alternative sates of nature. Cross-correlations identified strong autocorrelation in some CPUE indices over 2 to 3 years, which could indicate a year-class effect. Cross-correlations also identified strong cross correlation of lagged values of some CPUE indices (at lags between 2 to 10 years) with the current values of other CPUE indices, which could indicate that some CPUE indices represent younger age-classes than others. However, the specific lagged relationships with high correlation were not consistent among the series.

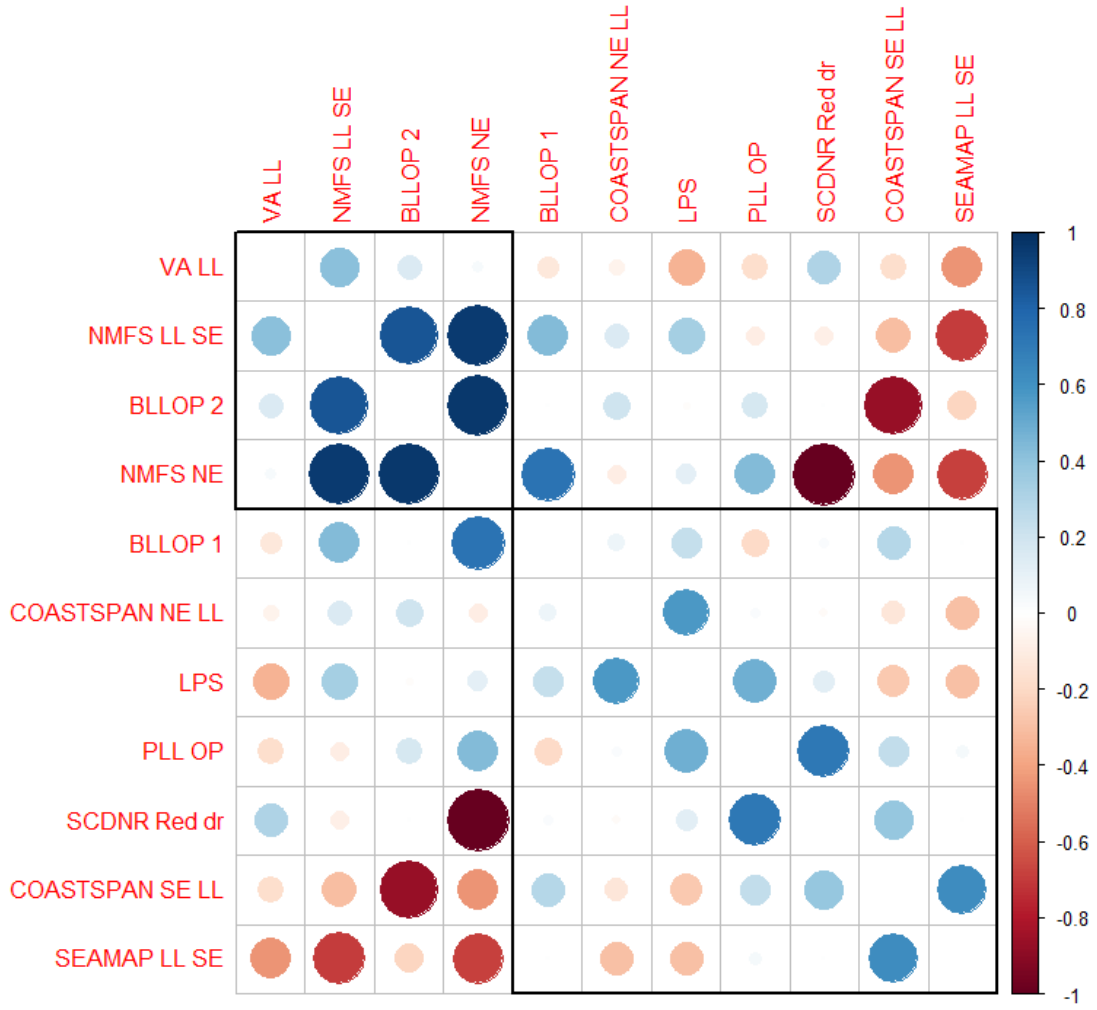


Figure A2.1. Correlation matrix for CPUE indices obtained for the SEDAR 54 assessment for the combined Gulf of Mexico and South Atlantic (GOMSA) region. Blue indicates positive and red negative correlations. The order of the indices and the rectangular boxes are chosen based on a hierarchical cluster analysis using a set of dissimilarities.

Endangered Species Act Status Review Report: Oceanic Whitetip Shark (*Carcharhinus longimanus*)


Photo credit: Andy Mann

2017
National Marine Fisheries Service
National Oceanic and Atmospheric Administration

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Executive Summary

This report was produced in response to a petition received from Defenders of Wildlife on September 21, 2015, to list the oceanic whitetip shark (*Carcharinus longimanus*) as endangered or threatened under the Endangered Species Act (ESA). On January 12, 2016, the National Marine Fisheries Service (NMFS) announced in the *Federal Register* that the petition has sufficient merit for consideration and that a status review was warranted (81 FR 1376). This report is summarizes the best available data and information on the species and presents an evaluation of its status and extinction risk.

The oceanic whitetip shark is a circumglobal species of shark, found in tropical and subtropical seas worldwide. The oceanic whitetip shark is a truly pelagic species, generally remaining offshore in the open ocean, on the outer continental shelf, or around oceanic islands in water depths greater than 184 m, and occurring from the surface to at least 152 m depth. This species has a strong preference for the surface mixed layer in warm waters above 20°C and is therefore a surface-dwelling species. Oceanic whitetip sharks are highly mobile and can travel great distances in the open ocean environment, with excursion estimates of several thousand kilometers. The oceanic whitetip shark is a long-lived, slow-growing, and late maturing species that has low-moderate productivity.

While the oceanic whitetip shark is wide-ranging, its distribution and abundance throughout its range are not well known. Historical fisheries data and observations suggest that the species was once one of the most common and ubiquitous shark species in tropical waters around the world. More recently, however, numerous lines of evidence from all three ocean basins suggest that the oceanic whitetip shark has experienced significant historical declines of varying magnitudes over the past several decades, with evidence that these declines are likely ongoing.

The most significant threat to the oceanic whitetip shark is overutilization of the species for commercial purposes. Because of the species' tropical distribution and tendency to remain in surface waters, the oceanic whitetip shark experiences high encounter and mortality rates in commercial fisheries (e.g., pelagic longline, purse seine, and gillnet fisheries) throughout its range. The species' high-value fins also create an economic incentive for retention and finning of the species for the international shark fin trade. Although there is considerable uncertainty regarding the species' current abundance throughout its range, the best available information indicates that the species has experienced population declines of potentially significant magnitude due to fisheries-related mortality throughout a large majority of its range (e.g., Eastern Pacific, Western and Central Pacific, Atlantic and Indian Oceans).

Recent evidence suggests that most populations are still experiencing various levels of decline due to continued fishing pressure and associated mortality. Efforts to address overutilization of the species through regulatory measures appear largely inadequate, with evidence of illegal retention and trafficking of oceanic whitetip fins despite prohibitions for the species in all Regional Fisheries Management Organizations (RFMOs) and its listing under the Convention on International Trade of Endangered Species of Fauna and Flora (CITES) Appendix II. As such, we conclude that overutilization will continue to be a threat to the oceanic whitetip shark through the foreseeable future (~30 years), placing the species at a moderate risk of extinction throughout its range.

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1. INTRODUCTION

Scope and Intent of the Present Document

On September 21, 2015, the National Marine Fisheries Service (NMFS) received a petition to list the oceanic whitetip shark, as either threatened or endangered under the U.S. Endangered Species Act (ESA). This document is a status review of the oceanic whitetip shark (*Carcharhinus longimanus*). Under the ESA, if a petition is found to present substantial scientific or commercial information that the petitioned action may be warranted, a status review shall be promptly commenced (16 U.S.C. 1533(b)(3)(A)). NMFS determined the petition presented substantial information for consideration and that a status review was warranted for the species (see following link for the Federal Register notice for oceanic whitetip: https://federalregister.gov/a/2016-00384). The ESA stipulates that listing determinations should be based on the best scientific and commercial information available. NMFS appointed a biologist in the Office of Protected Resources Endangered Species Conservation Division to undertake the scientific review of the biology, population status and trends, threats, and future outlook for the species. Using this scientific review, NMFS convened a team of biologists and shark experts to conduct an extinction risk analysis for the oceanic whitetip shark and make conclusions regarding the biological status of the species.

Therefore, this document reports the scientific review as well as the team's conclusions regarding the extinction risk of the oceanic whitetip shark. The conclusions in this status review are subject to revision should important new information arise in the future. Where available, we provide literature citations to review articles that provide even more extensive citations for each topic. Data and information were reviewed through October 2017.

2. LIFE HISTORY AND ECOLOGY

2.1 Taxonomy and Distinctive Characteristics

The oceanic whitetip shark is a large open ocean apex predatory shark found in tropical and subtropical waters around the globe. This species belongs to the family Carcharhinidae and is classified as a requiem shark (Order Carcharhiniformes). The oceanic whitetip belongs to the genus *Carcharhinus*, which includes other pelagic species of sharks, such as the silky shark (*C. falciformis*) and dusky shark (*C. obscuras*), and is the only truly oceanic shark of its genus (Bonfil *et al.,* 2008). Naturalist René-Primevère Lesson first described the oceanic whitetip shark in 1831 and named the shark *C. maou*. Felipe Poey later described it in 1861 as *Squalus longimanus*. The name *Pterolamiops longimanus* has also been used, but the current accepted name is *Carcharhinus longimanus*.

Compagno (1984) provides the following description of the oceanic whitetip: it has a stocky build with a large rounded first dorsal fin and very long and wide paddle-like pectoral fins. The first dorsal fin is very wide with a rounded tip, originating just in front of the rear tips of the pectoral fins. The second dorsal fin originates over or slightly in front of the base of the anal fin. The species also exhibits a distinct color pattern of mottled white tips on its front dorsal, caudal, and pectoral fins, with black tips on its anal fin and on the ventral surfaces of its pelvic fins. The head has a short and bluntly rounded nose and small circular eyes. The upper jaw contains broad,

triangular serrated teeth, while the teeth in the lower jaw are more pointed with serrations only near the tip. The color of the body varies depending upon geographic location, but is generally grayish bronze to brown, while the underside is whitish with a yellow tinge on some individuals (Compagno 1984). Oceanic whitetip sharks typically swim slowly at or near the surface; however, they are capable of making sudden dashes for short distances when disturbed (Compagno 1984).

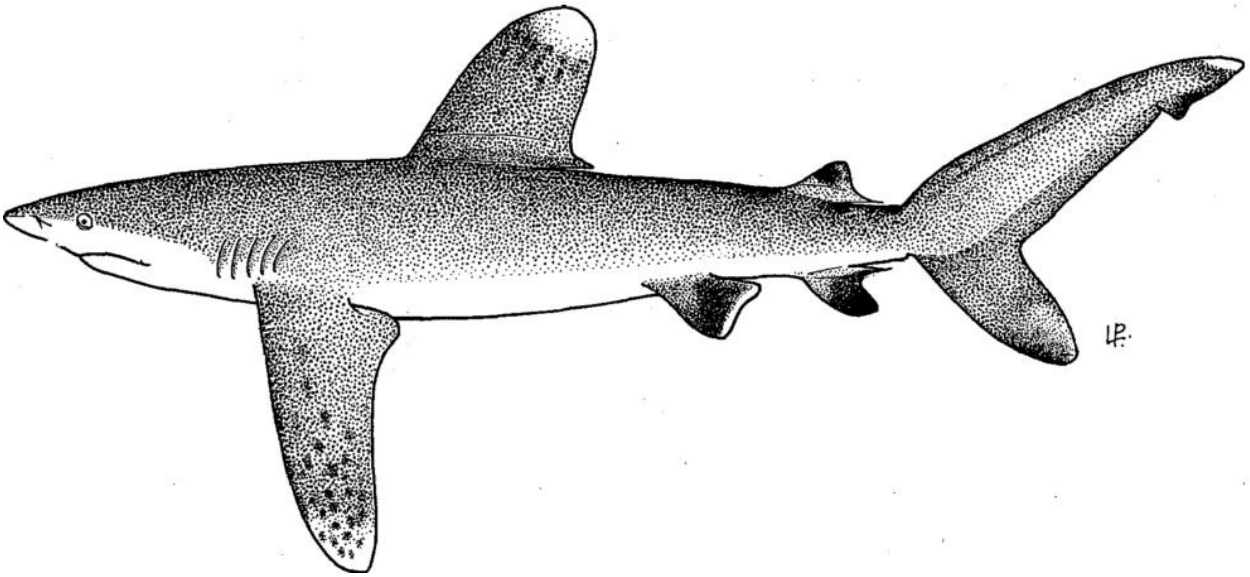


Figure 1 Oceanic whitetip. Source: Compagno 1984.

2.2 Distribution and Habitat Use

The oceanic whitetip shark is globally distributed in epipelagic tropical and subtropical waters between 30º North and 35º South latitudes (Baum *et al.,* 2006). In the Western Atlantic, oceanic whitetips occur from Maine to Argentina, including the Caribbean and Gulf of Mexico. In the Central and Eastern Atlantic, the species occurs from Madeira, Portugal south to the Gulf of Guinea, and possibly in the Mediterranean Sea. In the western Indian Ocean, the species occurs in waters of South Africa, Madagascar, Mozambique, Mauritius, Seychelles, India, and within the Red Sea. Oceanic whitetips also occur throughout the Western and Central Pacific, including China, Taiwan, the Philippines, New Caledonia, Australia (southern Australian coast), Hawaiian Islands south to Samoa Islands, Tahiti and Tuamotu Archipelago and west to Galapagos Islands. Finally, in the eastern Pacific, the species occurs from southern California to Peru, including the Gulf of California and Clipperton Island (Compagno 1984).

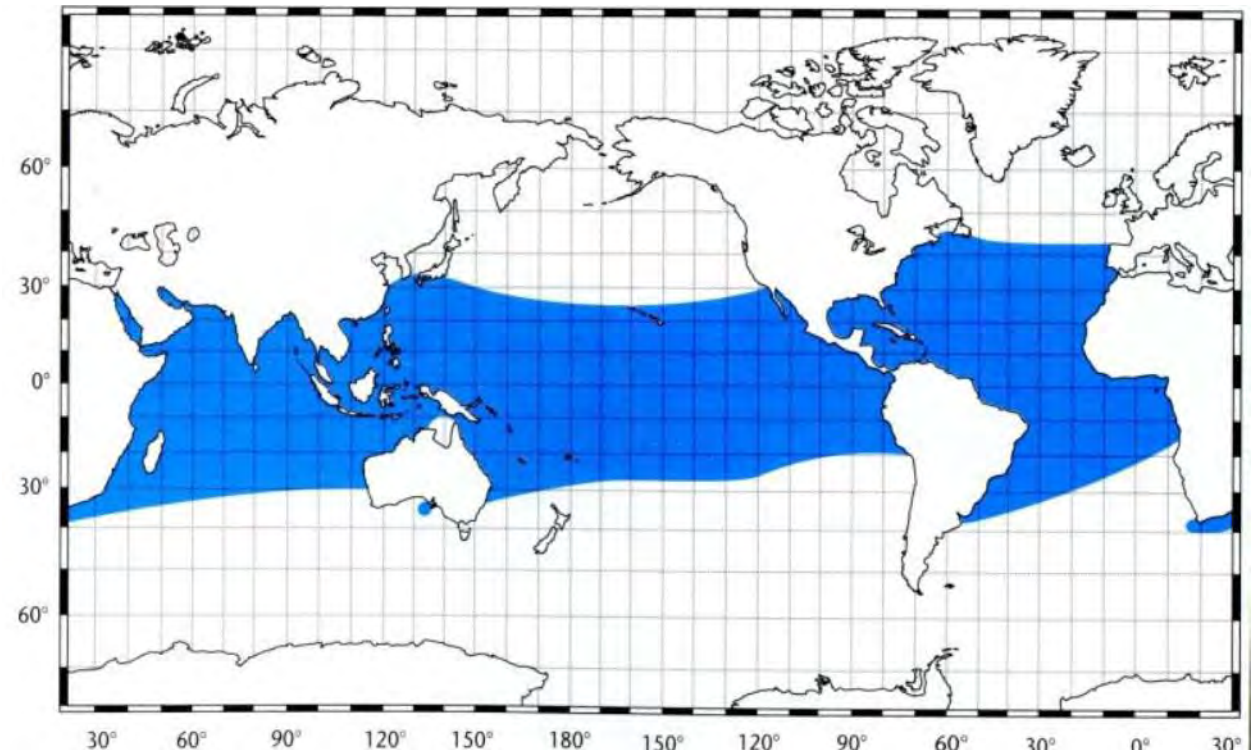


Figure 2 Geographic distribution of oceanic whitetip shark. Source: Last and Stevens 2009.

The oceanic whitetip shark was historically characterized as one of the most abundant oceanic sharks (Backus *et al.,* 1956; Compagno 1984); it is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water greater than 184 m, and occurs from the surface to at least 152 m depth. This species has a clear preference for open ocean waters between 10˚N and 10˚S, but can be found in decreasing numbers out to latitudes of 30˚N and 35˚S, with abundance decreasing with greater proximity to continental shelves (Backus *et al.,* 1956; Strasburg 1958; Compagno 1984; Bonfil *et al.,* 2008). Although the oceanic whitetip occurs in waters between 15ºC and 28ºC, this species exhibits a strong preference for the surface mixed layer in warm waters above 20°C (Bonfil *et al*., 2008). It is, however, capable of tolerating colder waters down to 7.75°C for short durations, as shown by brief, deep dives into the mesopelagic zone below the thermocline (>200 m) (Howey-Jordan *et al.,* 2013; Howey *et al.,* 2016). This indicates that the oceanic whitetip shark may commonly explore extreme environments (e.g., deep depths, low temperatures) as a potential foraging strategy. However, exposures to these cold temperatures are not sustained (Musyl *et al.,* 2011; Tolotti *et al.,* 2015a) and there is some evidence to suggest the species tends to withdraw from waters below 15ºC (e.g., the Gulf of Mexico in winter; Compagno (1984)). The thermal preferences of oceanic whitetip sharks in conjunction with their reported range within 30° N and S suggest possible thermal barriers to inter-ocean basin movements around the southern tips of Africa and South America (Bonfil *et al.,* 2008; Musyl *et al.,* 2011; Howey-Jordan *et al.,* 2013; Gaither *et al.,* 2015).

Information regarding movement patterns or possible migration paths for oceanic whitetips is limited. In the Pacific, Musyl *et al.,* (2011) used pop-up satellite tags (PSATs) to describe the behavior of several shark species, including the oceanic whitetip, which showed a complex movement pattern generally restricted to tropical waters of the central Pacific north of the North

Equatorial Countercurrent (NEC) near the original tagging location (Musyl *et al*. 2011; see Figure 3 below). Results showed that oceanic whitetips remained in the near-surface mixed layer within 2°C of the sea surface temperature (SST; >25°C) over 95% of the time. Maximum time at liberty was 243 days, but the largest linear movement was 2,314 nmi (4,285 km) in 95 days (Musyl *et al*., 2011).

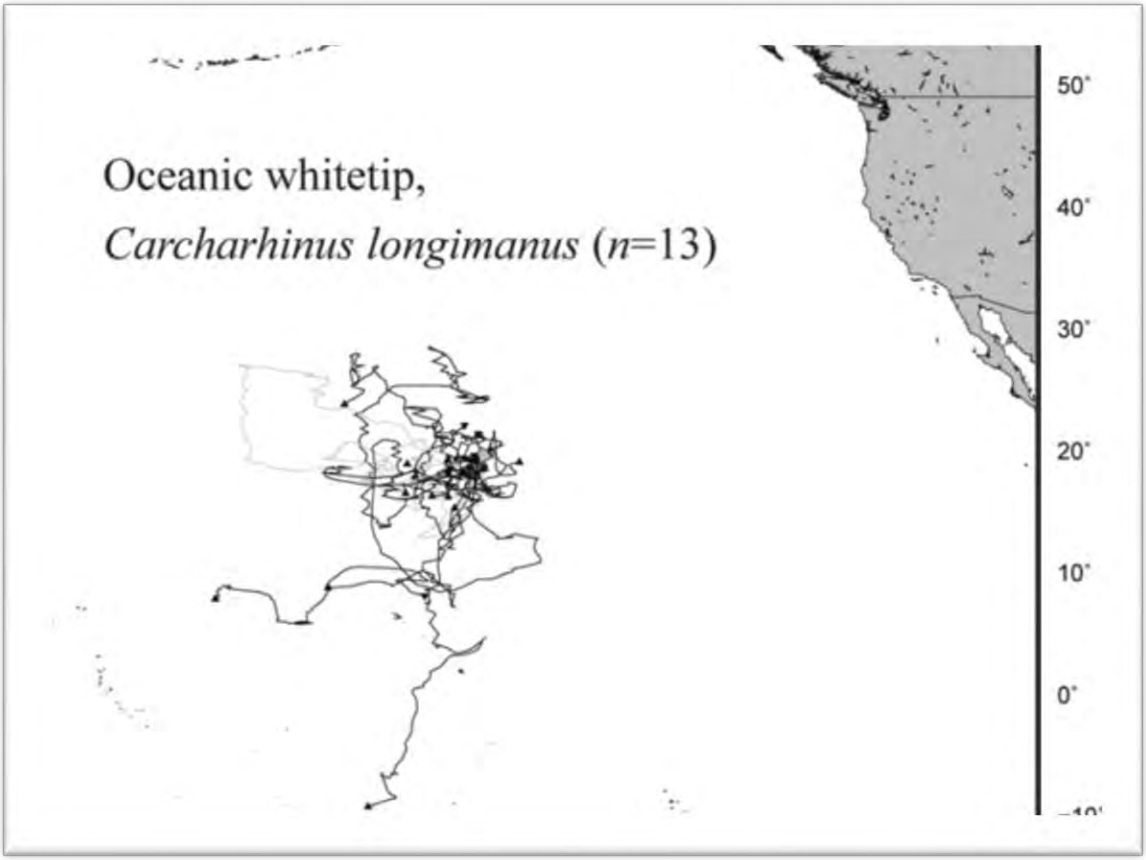


Figure 3 Most probable tracks for oceanic whitetip sharks tagged with PSATs and released in the central Pacific Ocean were estimated from the raw geolocations using the Kalman filter-sea surface temperature state-space model (see Appendix 1 in Musyl et al. 2011).

In the Atlantic Ocean, participants in the NMFS Cooperative Shark Tagging Program (CSTP) tagged 645 oceanic whitetips between 1962 and 2015, but only 8 were recaptured. Maximum time at liberty was 3.3 years, maximum distance traveled was 1,225 nmi (2,270 km), and maximum estimated speed was 17 nmi/day (32 km/day; Kohler *et al.,* (1998); NMFS unpublished data). These data show movements by juveniles from a variety of locations, including from the northeastern Gulf of Mexico to the East Coast of Florida, from the Mid-Atlantic Bight to southern Cuba, from the Lesser Antilles west into the central Caribbean Sea, from east to west along the equatorial Atlantic, and from off southern Brazil in a northeasterly direction (Kohler *et al.,* (1998); Bonfil *et al.,* (2008); see Figure 4 below). An immature female was also tagged in the waters between Cuba and Haiti and was recaptured the next day within 6 nmi (11 km) of the tagging location (NMFS unpublished data; see Figure 4 below). Additionally, an adult of unknown sex was tagged and recaptured three years apart in the vicinity of Cat Island, Bahamas (NMFS unpublished data; see Figure 4 below).

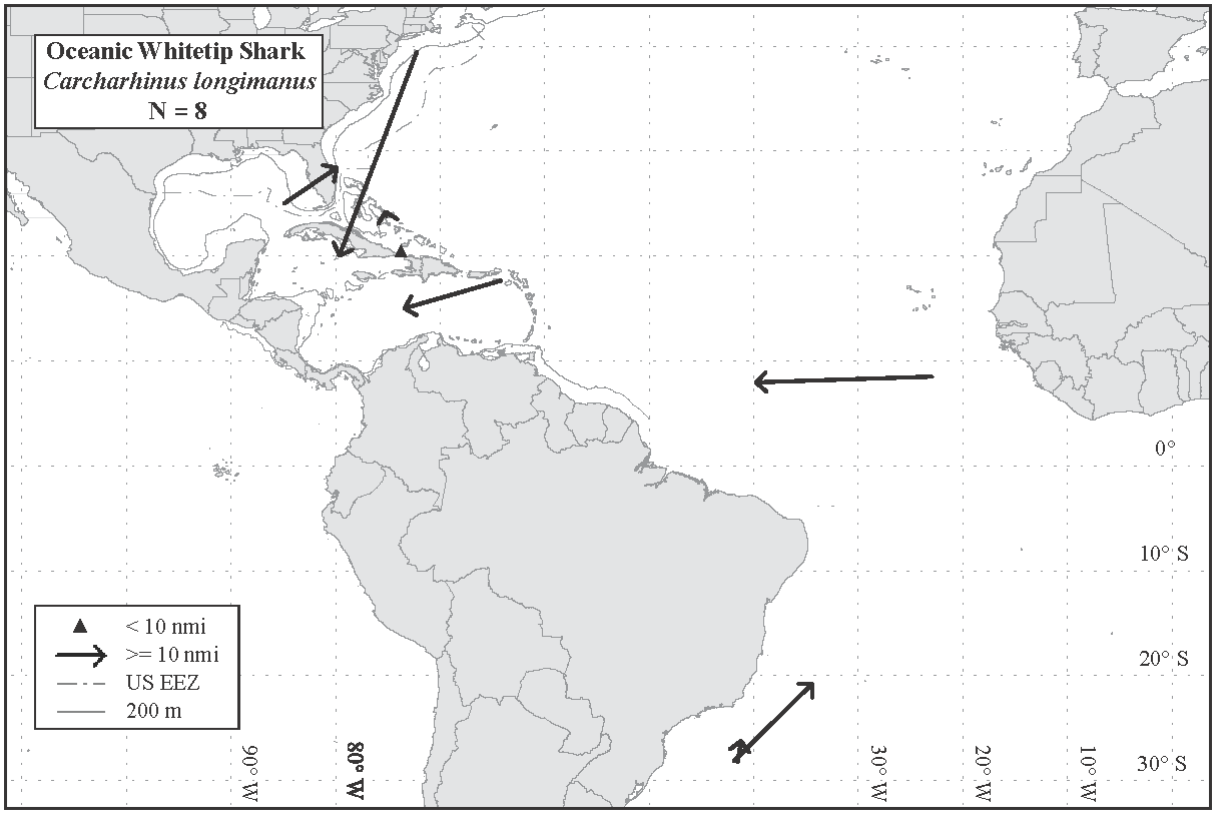


Figure 4 Recapture distribution for the oceanic whitetip shark, *C. longimanus*, from the NMFS Co-operative Shark Tagging Program during 1962-93 and NMFS unpublished data.

In the Gulf of Mexico, a satellite tagged oceanic whitetip shark moved a straight-line distance of 238 km from southeast Louisiana to the edge of the continental shelf about 300 km north of the Yucatan Peninsula. During the track, the shark rarely dove below 150 m staying above the thermocline, and only one dive to 256 m was recorded. The most frequently occupied depth during the entire track was 25.5-50 m (49.8% total time) and temperature was 24.05-26 °C (44.7% total time) (Carlson and Gulak 2012). More recently, a study from Cat Island, Bahamas tagged and tracked 11 mature oceanic whitetip sharks (10 females, 1 male). Individuals tagged at Cat Island stayed within 500 km of the tagging site for ~30 days before scattering across 16,422 km^2 of the western North Atlantic (Howey-Jordan *et al*. 2013). Times at liberty ranged from 30-245 days, after which the largest movement by an individual from the tagging site ranged from 290–1,940 km. Individuals moved to several different destinations thereafter (e.g., the northern Lesser Antilles, the northern Bahamas, and north of the Windward Passage (the strait between Cuba and Haiti)), with many returning to the Bahamas after ~150 days. Howey-Jordan *et al.* (2013) found generally high residency times of oceanic whitetips in the Bahamas Exclusive Economic Zone (mean = 68.2% of time). Similar to the tagging study in the Pacific by Musyl *et al.,* (2011), oceanic whitetip sharks in the Bahamas spent 99.7% of their time in waters shallower than 200 m and did not show differences mean depths between day and night, with average day and night temperatures of 26.26±0.003ºC and 26.23±0.003ºC, respectively. According to Howey-Jordan et al. (2013):

"There was a positive correlation between daily sea surface temperature (SST) and mean depth occupied (i.e., as individuals experienced warmer SST, likely resulting from seasonal sea surface warming or migration to areas with warmer SST, mean daily depth increased, suggesting possible behavioral thermoregulation. All individuals made short duration (mean=13.06 minutes) dives into the mesopelagic zone (down to 1,082 m and 7.75°C), which occurred significantly more often at night."

These tracking data also suggest that oceanic whitetip sharks exhibit site fidelity to Cat Island, Bahamas, although the reasons for this are still unclear. NMFS CSTP data (discussed earlier) from an adult oceanic whitetip, tagged and recaptured three years later in this area, provides supporting evidence of site fidelity to the waters around Cat Island. This information is important given the characterization of this species as highly migratory (Howey-Jordan *et al.,* 2013).

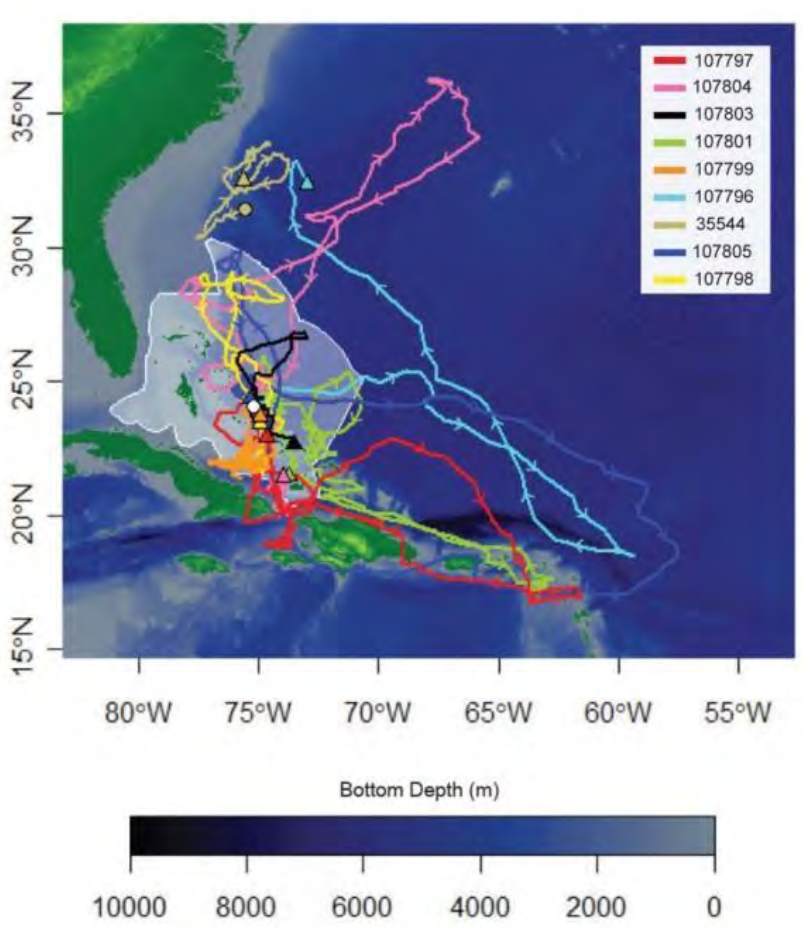


Figure 5 Map with bottom depth (m) showing filtered tracks for nine oceanic whitetip sharks equipped with Standard Rate tags. Colored lines represent tracks from individuals (listed by tag ID); triangle indicate pop-up location. Arrows on colored lines show direction of movement. Source: Howey-Jordan et al. 2013.

In the equatorial and southwestern Atlantic, Tolotti *et al*. 2015(a) obtained fisheries independent data from eight oceanic whitetip sharks tagged with PSATs in the area overlapping the operations of the Brazilian longline fleet. Tag deployment periods (i.e., the number of days the tag was deployed before it stopped recording data) varied from 60 to 178 days between 2010 and 2012. Similar to the study from Cat Island, Bahamas, this study showed that oceanic whitetip

sharks exhibit some degree of site fidelity. Tagging and pop-up sites were relatively close to each other, although individuals tended to travel long distances before returning to the tagging area. In fact, 5 of the 8 tagged sharks concluded their tracks relatively close to their starting points, even after traveling several thousand kilometers (See Figure 6 below). Overall, the horizontal movements were more prominent in terms of latitude, whereas longitudinal movements were more restricted. Tolotti *et al*. (2015a) demonstrated that the sharks exhibited a strong preference for the warm and shallow waters of the mixed layer, and spent more than 70% of the time above the thermocline and 95% above 120 m. Additionally, for approximately 96% of the monitoring period, tagged individuals remained at temperatures between 24 and 30°C (Tolotti *et al.,* 2015a).

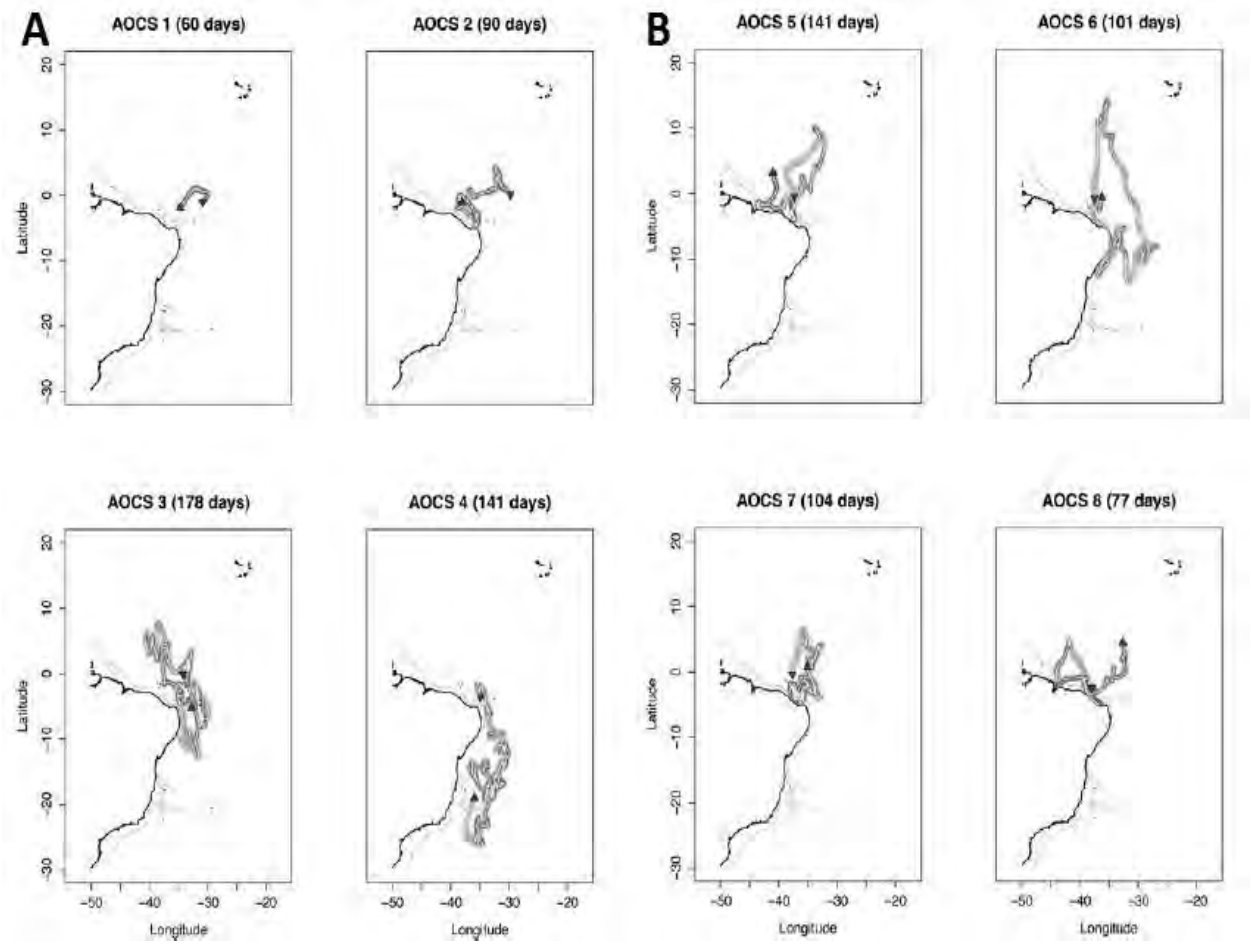


Figure 6 Post-processed tracks of oceanic whitetip sharks tagged in the western Atlantic Ocean. The downward triangles represent the tagging position and the upward triangles the end of the track. The grey-shaded area represents the error around estimated positions. (A) Oceanic whitetip sharks tagged in 2010 and 2011. (B) Oceanic whitetip sharks tagged in March 2012. Source: Tolotti *et al.,* (2015a).

Tagging data from the Indian Ocean is limited. Observations from the Spanish longline fishery targeting swordfish from 1993-2011 indicate that the distribution of oceanic whitetip in the Indian Ocean likely falls mainly within the warm water regions to North of 25ºS (Zones 1 and 2; see Figure 7 below) and with less probability in some of the nearby areas located slightly farther South, which are influenced by the seasonal expansion of warm water masses (García-Cortés *et al.,* 2012). It should be noted that in this case, the distribution of oceanic whitetip sharks is

shown in total catches rather than CPUE; therefore, the results and patterns shown in the figure are highly influenced by the effort of the fleet.

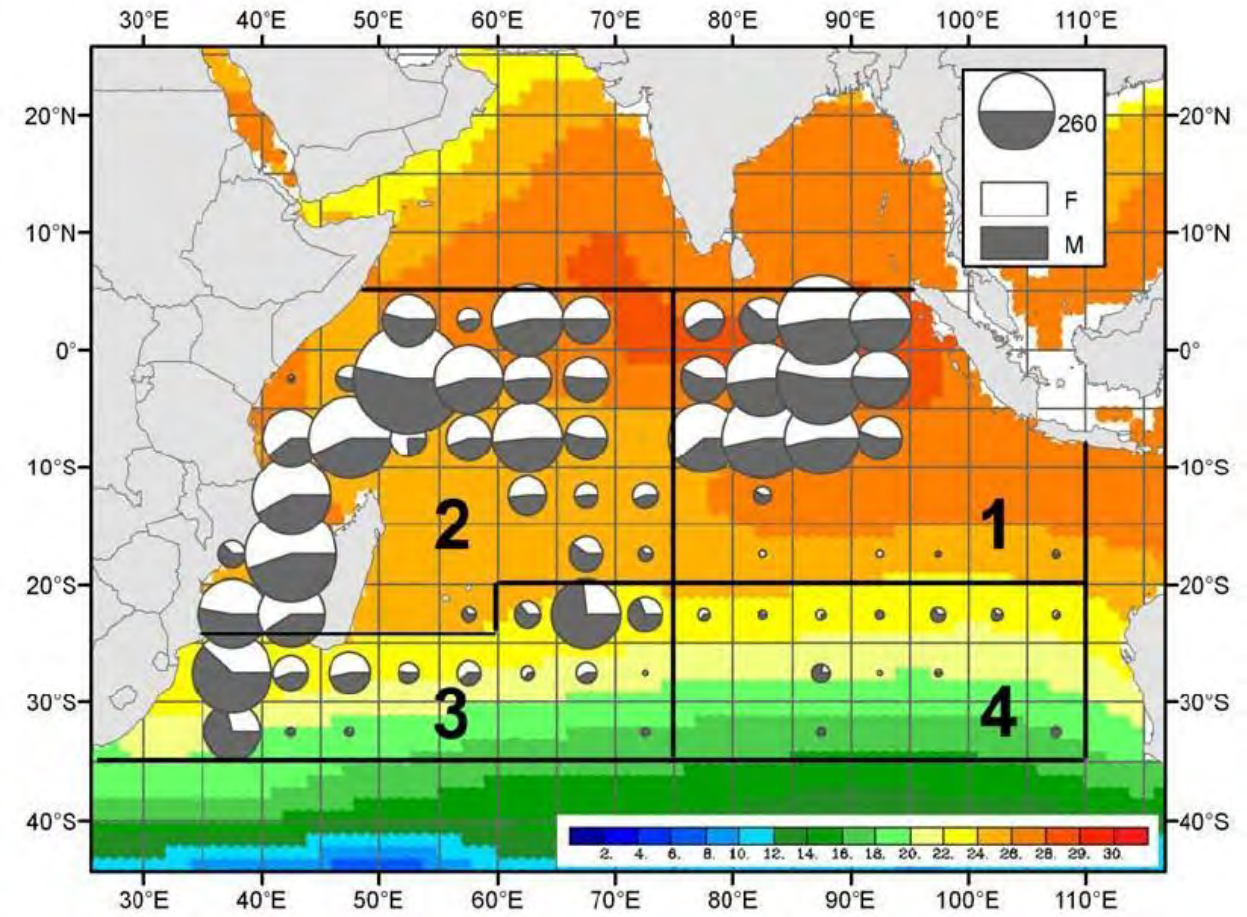


Figure 7 Observations of *C. longimanus* by 5ºx5º areas and sex in the Spanish longline fleet. The size of the circles is proportional to the number of observations available for both sexes combined. Sea temperature at 50m depth (yearly average) according to a color scale. Source: Garcia-Cortes *et al.* 2012.

Filmalter *et al.,* (2012) used pop-up archival tags (PATs) as well as mini-PATs to examine the vertical and horizontal behavior of oceanic whitetip sharks in the western Indian Ocean from 2009 to 2012. Similar to studies from the Atlantic and Pacific oceans, the two oceanic whitetip sharks tagged spent the majority of their time between 50 and 100 m depths. Long distance movements were also observed, with one tag that remained attached for 100 days. Filmalter *et al*. (2012) noted that this particular individual showed extensive horizontal movement; the shark traveled a distance of approximately 6,500 km during the study period, moving from the Mozambique Channel up the African east coast of Somalia and then traveling back down towards the Seychelles. The second tagged individual was monitored for only 19 days, during which time Filmalter *et al*. (2012) estimated the shark traveled 1,100 km in the southern Mozambique Channel. Both results demonstrate the ability of these sharks to travel large distances in the pelagic environment (Filmalter *et al.,* (2012); see Figure 8 below).

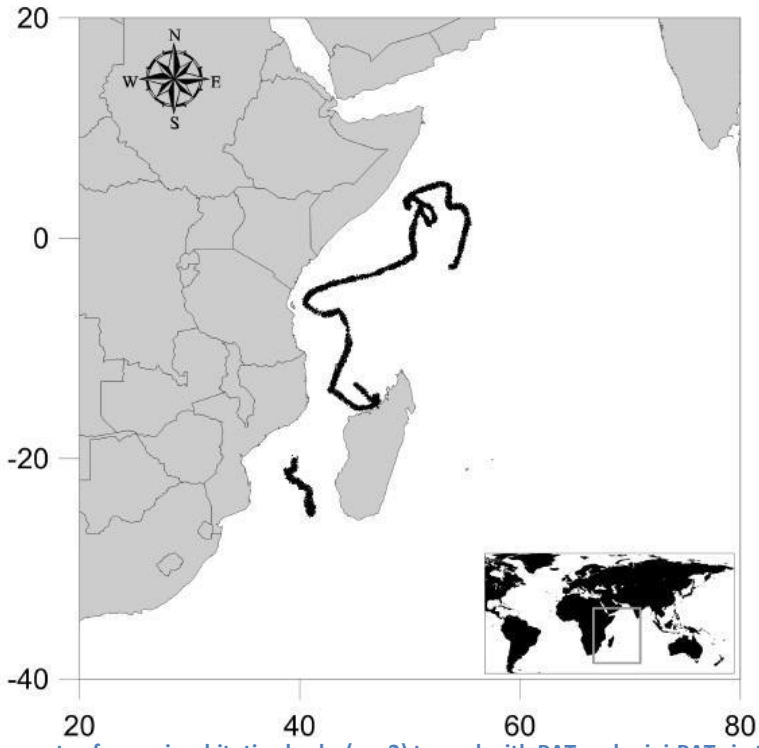


Figure 8 Horizontal movements of oceanic whitetip sharks (n = 2) tagged with PAT and mini-PATs in the western Indian Ocean. Source: Filmalter *et al.* 2012.

Finally, the Spanish fleet opportunistically tagged and released hundreds of sharks in the Indian Ocean, including oceanic whitetip (n= 56) from 1985-2004 (Mejuto *et al*. 2005). Results from this study (see Figure 9 below) indicate that the oceanic whitetip shark exhibits a trans-equatorial migration in the Indian Ocean (Mejuto *et al.,* 2005).

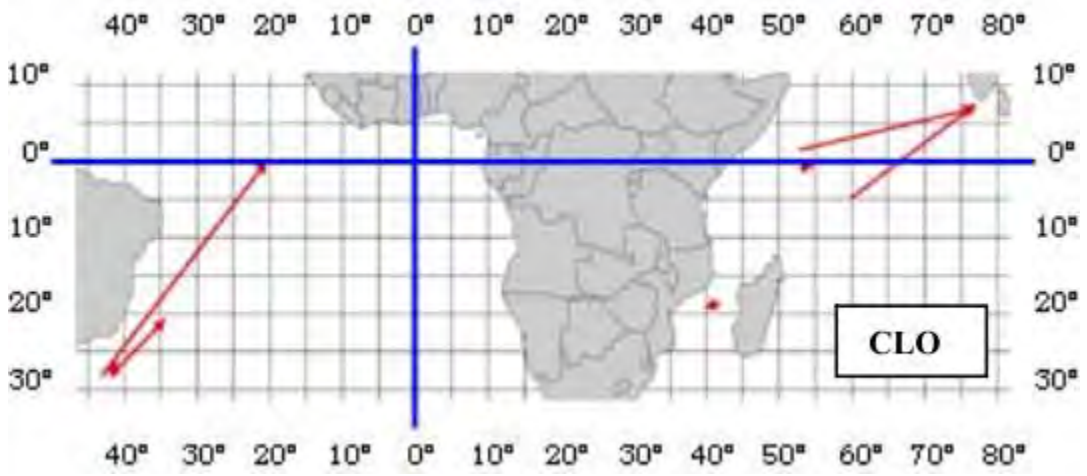


Figure 9 Rectilinear movements estimated on the basis of the tagging-recapture of Carcharhinus longimanus in the Atlantic and Indian Oceans. Source: Mejuto *et al.* 2005.

2.3 Feeding and Diet

Oceanic whitetip sharks are top-level predators in pelagic ecosystems and feed primarily on teleosts and cephalopods (Bonfil *et al.,* 2008), although studies have also reported that they consume sea birds, marine mammals, other sharks and rays, molluscs, crustaceans, and even

garbage (Compagno 1984; Cortés 1999). Backus *et al.,* (1956) recorded various fish species in the stomachs of oceanic whitetip sharks, including blackfin tuna, barracuda, and white marlin. Historically, oceanic whitetip sharks were described as pests to pelagic longline fisheries for tuna, as the sharks would persistently follow boats and cause significant damage to the catches (Compagno 1984). The oceanic whitetip has also been observed scavenging off dead marine mammal carcasses off South Africa (Bass *et al.,* 1973; Compagno 1984). Based on the species' diet, the oceanic whitetip has a high trophic level, with a score of 4.2 out of a maximum 5.0 (Cortés 1999). The available evidence suggests that oceanic whitetip sharks are opportunistic feeders. For example, large pelagic teleosts (e.g. billfish, tunas, and dolphinfish) are abundant in the Bahamas, and anecdotal reports suggest that oceanic whitetips feed heavily on recreationally caught teleosts in the region (Madigan *et al.,* 2015). In a recent study of an oceanic whitetip shark aggregation at Cat Island, Bahamas, Madigan *et al*. (2015) used SIA-based Bayesian mixing model to estimate short-term (near Cat Island) diets, which showed more large pelagic teleosts (72%) than in long-term diets (47%), thus showing a spatial and temporal difference in feeding habits of oceanic whitetip sharks. The study concluded that the availability of large teleost prey and supplemental feeding from recreational sport fishermen may be potential mechanisms underpinning site-fidelity and aggregation of oceanic whitetips at Cat Island (Madigan *et al.,* 2015). This further supports the notion that oceanic whitetip sharks are opportunistic predators.

2.4 Growth and Reproduction

Despite its worldwide distribution and common occurrence in most high-seas fishery catches in tropical seas, the oceanic whitetip shark's biology and ecology remain understudied. To date, studies on the life history parameters of the oceanic whitetip shark are limited, with only a few publications available: two from the North Pacific (Joung *et al*. 2016 and Seki *et al*. 1998), one from the Western and Central Pacific in Papua New Guinea (D'Alberto *et al.,* 2017), one from the Indian Ocean (Varghese *et al.,* 2016) and two from the Southwest Atlantic Ocean (Lessa *et al.,* 1999; Rodrigues *et al.,* 2015). The results of these papers are summarized below.

The theoretical maximum age for the oceanic whitetip shark ranges from ~25-36 years (D'Alberto *et al*., 2017; Rice and Harley 2012). However, observed maximum ages based on vertebral ring counts are much lower, and range from 12 to 18 years in the North Pacific and Western and Central Pacific, respectively (Joung *et al*., 2016; D'Alberto *et al*., 2017), and from 13 to 19 in the South Atlantic (Seki *et al.,* 1998; Lessa *et al.,* 1999; Rodrigues *et al.,* 2015). However, these maximum observed ages may be underestimates of the species' actual maximum longevity, because vertebral band counts are not necessarily a full-proof methodology for estimating maximum age (D'Alberto *et al*., 2017). In fact, several other shark species have documented longevities that double what the vertebral band pair counts estimated (D'Alberto *et al.,* 2017). For purposes of this document, we consider the oceanic whitetip to live at least 20 years, and thus is a long-lived species.

In terms of size, the maximum length effectively measured for oceanic whitetip was 350 cm total length in the 1940s (TL; Bigelow and Schroder 1948 cited in Lessa *et al*. 1999), with "gigantic individuals" perhaps reaching 395 cm TL (Compagno 1984), though Compagno's length was never confirmed (Lessa *et al.,* 1999). Given the rarity of specimens larger than 270 cm TL, Lessa *et al.* (1999) noted that the length composition of the species may have been altered since the

1940s due to fishing pressure. D'Alberto *et al.* (2017) reiterated this possibility, given the lack of specimens large specimens >200 cm TL in their study. Lessa *et al.,* (1999) recorded a maximum size of 250 cm TL in the Southwest Atlantic, and estimated a theoretical maximum size of 325 cm TL (Lessa *et al.,* 1999); however, the most common sizes are below 300 cm TL (Compagno 1984).

The oceanic whitetip shark seems to have variable growth rates throughout its range. Earlier studies suggested that the oceanic whitetip shark is slow growing, but more recent studies have shown faster growth rates similar to blue and silky sharks (Clarke *et al.,* 2015b). In the Southwest Atlantic, male and female growth rates are similar; observed and back-calculated length-at age von Bertalanffy parameters from Lessa *et al.* (1999) are as follows:

Observed asymptotic length (L_∞) = 284.9 cm; growth coefficient (K) = 0.099 yr^{-1}, and T_0 = -3.391 yr^{-1}

Back-calculated asymptotic length (L_∞) = 325.4 cm; growth coefficient (K) = 0.075 yr^{-1}, and T_0 = -3.342 yr^{-1}

Growth rates are 25.2 cm yr^{-1} in the first free-living year; 13.6 cm yr^{-1} from ages 1 to 4; 9.7 cm yr^{-1} for adolescents of age 5; and 9.10 cm yr^{-1} for mature individuals (Lessa *et al.,* 1999). In a more recent study from the western North Pacific (Joung *et al.,* 2016), growth rates were also found to be similar between sexes. The von Bertalanffy growth parameters combining both sexes were as follows:

Asymptotic length (L_∞) = 309.4 cm TL; growth coefficient (K) = 0.0852 yr^{-1}

According to Branstetter (1990), growth coefficients (K) falling in the range of 0.05-0.10/yr is a slow-growing species; 0.1-0.2 is a moderate-growing species; and 0.2-0.5 is a fast-growing species. Under these parameters, the oceanic whitetip shark is considered a slow-growing species. Figure 10 below shows the various growth curves for the oceanic whitetip shark.

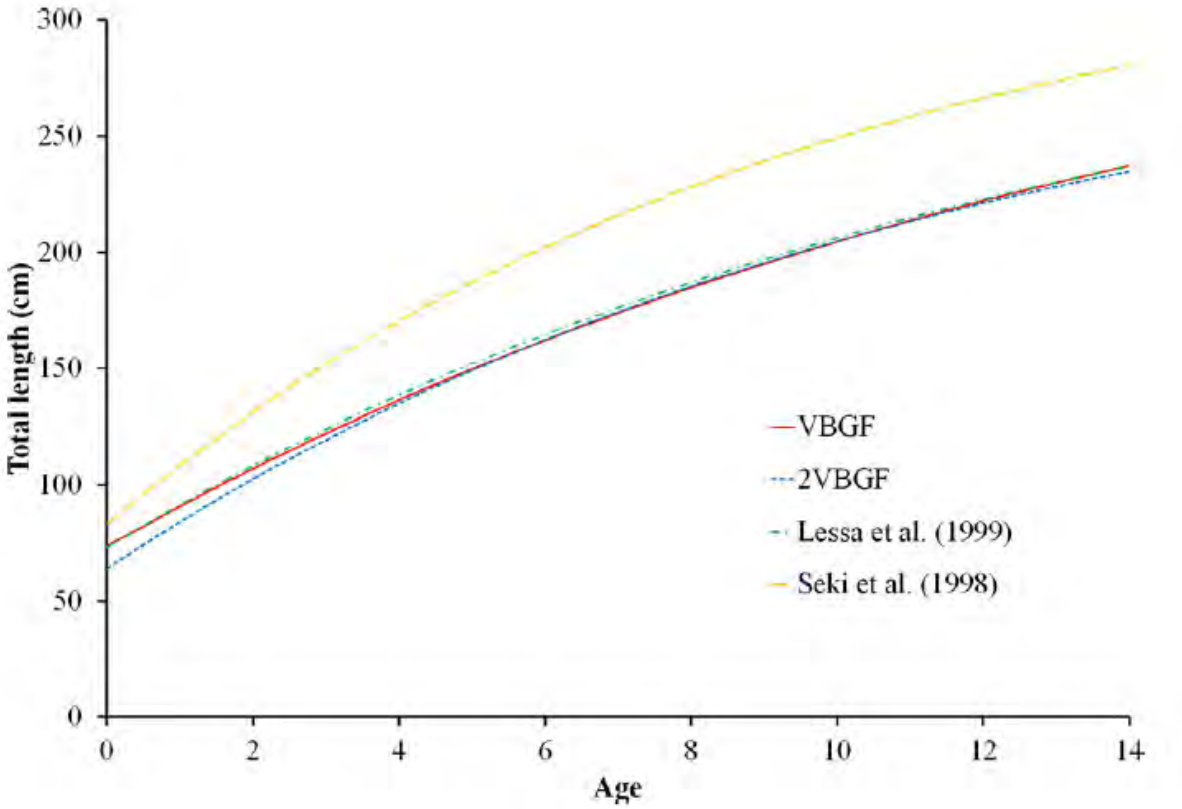


Figure 10 Comparison of the growth curves of the oceanic whitetip shark in different regions, from Seki *et al.* (1998), Lessa *et al.* (1999) and Joung *et al.* (2016). VBGF = von Bertalanffy growth function. 2VBGF was only used in Joung *et al.* (2016) and VBGF was used in the other studies. Source: Joung *et al.* 2016.

A length-weight equation is given by Romanov and Romanova (2009) from the Indian Ocean (Figure 11) for total weight (TW): TW=(.386e-4)*FL^((2.75586)) (n = 587; both sexes).

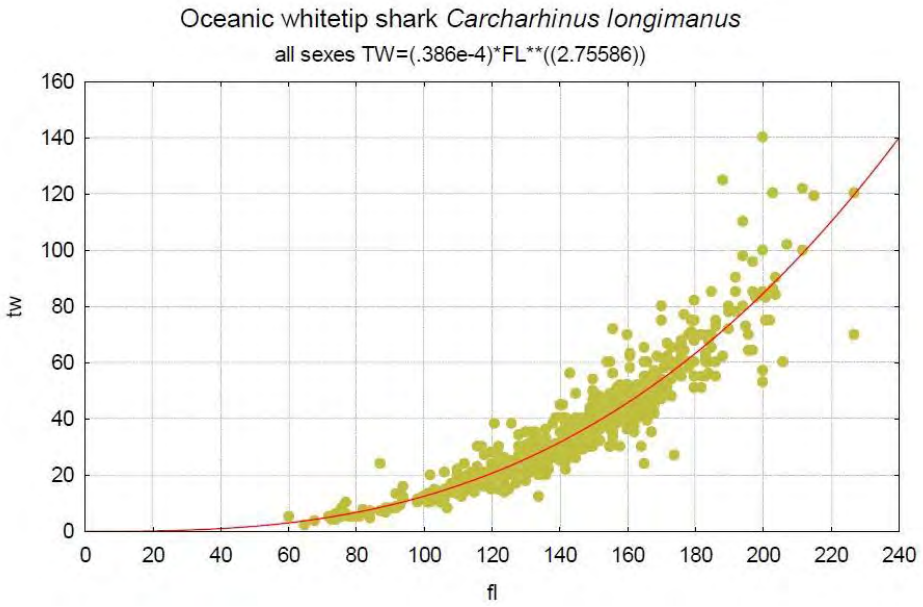


Figure 11 Length-weight scatterplot and relationship for oceanic whitetip shark (all sexes, n=587). Source: Romanov and Romanova 2009.

Age of maturity varies depending on geographic location. For example, in the Southwest Atlantic, age and size of maturity in oceanic whitetips was estimated to be 6-7 years and 180-190 cm TL, respectively, for both sexes (Lessa *et al.,* 1999). In the North Pacific, females become mature at about 168-196 cm TL, and males at 175-189 cm TL, which corresponds to an age of 4 and 5 years, respectively (Seki *et al.,* 1998). However, more recently Joung *et al*. (2016) determined a later age of maturity in the North Pacific of approximately 8.5-8.8 years for females and 6.8-8.9 years for males. In the Indian Ocean, both males and females mature at around 185-200 cm TL (IOTC 2014), although Varghese *et al.,* (2016) estimates the lengths of maturity to include slightly larger sizes (189-287 cm for males and 188-311 cm for females).

Like other carcharhinid species, the oceanic whitetip shark is viviparous (i.e., the species gives birth to live young) with placental embryonic development. The reproductive cycle is thought to be biennial, giving birth on alternate years, after a lengthy 10-12 month gestation period (Backus *et al.*, 1956; Seki *et al.,* 1998; Bonfil *et al.,* 2008; Tambourgi *et al.,* 2013). The number of pups in a litter ranges from 1 to 14, with an average of 6, and there is a likely positive correlation between female size and number of pups per litter, with larger sharks producing more offspring in all three ocean basins (Bass *et al.,* 1973; Compagno 1984; Seki *et al.,* 1998; Bonfil *et al.,* 2008; IOTC 2015a; Varghese *et al.,* 2016). Size at birth also varies slightly but is generally similar across geographic locations, ranging from 55 to 75 cm TL in the North Pacific, around 65-75 cm TL in the northwestern Atlantic, and 60-65 cm TL off South Africa. Several studies suggest that oceanic whitetip sharks give birth from late spring to summer (Backus *et al.,* 1956; Bass *et al.,* 1973; Compagno 1984; Bonfil *et al.,* 2008). In contrast, Seki *et al*. (1998) found no apparent parturition period in the North Pacific, as embryo occurrence was observed in almost every month in which data was acquired, which is indicative of an extended parturition duration throughout the year. The locations of the nursery grounds are not well known but they are thought to be in oceanic areas.

Records of pregnant females and newborns from the tropical Pacific are concentrated between 20ºN and the equator, from 170ºE to 140ºW (see original citations in CITES 2013). In the Atlantic, young oceanic whitetip sharks have been observed well offshore along the southeastern coast of the United States, suggesting the possible presence of a nursery area in pelagic waters over the continental shelf (Compagno 1984; Bonfil *et al.,* 2008). In the equatorial and southwestern Atlantic, the prevalence of immature sharks, both female and male, in fisheries catch data suggests that this area may serve as potential nursery habitat for the oceanic whitetip shark (Coelho *et al.,* 2009; Tambourgi *et al.,* 2013; Tolotti *et al.,* 2013; Frédou *et al.,* 2015). Juveniles seem to be concentrated in equatorial latitudes, while specimens in other maturational stages are more widespread (Tambourgi *et al.,* 2013). Pregnant females have been found often close to shore, particularly around the Caribbean Islands, and one pregnant female was found washed ashore near Auckland, New Zealand. This may be indicative of females coming close to shore to give birth (Clarke *et al*. 2015b). Sexual segregation has been documented in oceanic whitetip sharks and may be related to the seasonal congregation of females in favored pupping grounds. For example, in the Gulf of Mexico, captures of oceanic whitetips were predominantly female (13 females and 3 males were caught in August 1954; Backus 1956). In contrast, Coelho *et al.* (2009) observed a sex ratio (male:female) of 1.2:1 in the southwestern equatorial region of the Atlantic, and individuals in this region seemed to be spatially segregated by size, with the large majority of individuals (80.7% of males and 89.4% of females) being immature. Similarly, Tambourgi *et al*., 2013) observed a nearly 1:1 ratio in the southwestern equatorial Atlantic. Although many pelagic shark species exhibit spatial/temporal separation between sizes, and are often segregated sexually once they reach reproductive maturity, it is unclear whether this has been demonstrated in the oceanic whitetip shark. Table 1 below provides a summary of life history characteristics reported in published literature.

Table 1 Life history parameters of *C. longimanus* from published literature (obs. = observed; m = male; f = female; PCL = Pre-caudal length; TL = Total Length).

Parameter	Estimate	Reference
Growth rate (von Bertalanffy k)	0.075-0.099 $year^{-1}$ (SW Atlantic; both sexes)	Lessa *et al.,* (1999)
	0.103 $year^{-1}$ (N. Pacific; both sexes)	Seki *et al.,* (1998)
	0.0852 $year^{-1}$ (western N. Pacific; both sexes	Joung *et al.* (2016)
Max length	325 cm TL (SW Atlantic)	Lessa *et al.,* (1999)
	245 cm PCL (342 cm TL; N. Pacific)	Seki *et al.,* (1998)
	246 TL (f; obs; N. Pacific) 268 TL (m, obs; N. Pacific)	Joung *et al.* (2016)
	272 cm TL (Atlantic)	Cortés (2002); (2008b)
	252 cm TL (f; obs; SW Atlantic) 253 cm TL (m; obs; SW Atlantic)	Coelho *et al.,* (2009)

Parameter	Estimate	Reference
	227 cm TL (f; obs; SW Atlantic) 242 cm TL (m; obs; SW Atlantic) 252 cm TL (f; obs S. Atlantic) 242 cm TL (m; obs; S. Atlantic)	Tambourgi *et al.,* (2013) Rodrigues *et al.,* (2015)
Age at maturity (years)	6-7 (SW Atlantic; both sexes) 4–5 (N. Pacific; both sexes) 8.5-8.8 years (N. Pacific; females) 6.8 – 8.9 years (N. Pacific; males)	Lessa *et al.,* (1999) Seki *et al.,* (1998) Joung *et al.* (2016)
Length at maturity (cm TL)	180-190 (SW Atlantic; both sexes) 170 (SW Atlantic; f) 170-190 (SW Atlantic; m) 168-196 (N. Pacific; f) 175-189 (N. Pacific; m) 190 cm TL (N. Pacific; f) 172 cm TL (N. Pacific; m) 190-240 (Indian Ocean; both sexes) 185 cm TL (Arabian Sea; f) 202 cm TL (Arabian Sea; m)	Lessa *et al.,* (1999) Tambourgi *et al.,* (2013) Seki *et al.,* (1998) Joung *et al.,* (2016) IOTC (2015a) Varghese *et al.*, (2016)
Longevity (years)	19 (obs; SW Atlantic) 17 (theoretical; SW Atlantic) 11-12 (obs; N. Pacific) 36 (theoretical; WCPO but based on theoretical max length from N. Pacific from Seki *et al.* 1998) 24.9 (theoretical; WCPO; f) 24.6 (theoretical; WCPO; m) 18 (obs; WCPO; f) 17 (obs; WCPO; m)	Rodrigues *et al.,* (2015) Lessa *et al.,* (1999) Seki *et al.,* (1998); Joung *et al.* 2016 Rice and Harley 2012 D'Alberto *et al.*, (2017)

Parameter	Estimate	Reference
Gestation period	9 months (Pacific) 12 months (Pacific) 10-12 months (SW Atlantic)	Bonfil *et al.,* (2008) Chen 2006 in Liu and Tsai (2011) Coelho *et al.,* (2009)
Reproductive[1] periodicity	Every year (Pacific) Every other year (SW Atlantic) Resting period of 12 months (Pacific)	Chen 2006 in Liu and Tsai (2011) Tambourgi *et al.,* (2013) Backus *et al.,* (1956); Seki *et al.,* (1998)
Size at birth	63-77 cm TL (N. Pacific) 64 cm TL (N. Pacific) 50-65 cm TL (Indian Ocean) 64.2-65.0 TL (Arabian Sea)	Seki *et al.,* (1998) Joung *et al.,* (2016) White (2007) Varghese *et al*., (2016)
Litter size (# of pups)	5-6 (SW Atlantic) 1-14 (average = 6; N. Pacific) 10-11 (N. Pacific) 12 (Indian Ocean) 3-9 (Indian Ocean; Arabian Sea)	Lessa *et al.,* (1999) Seki *et al.,* (1998); Joung *et al.,* (2016) IOTC (2015a) Varghese *et al.* (2016)
Generation Time	7 years 11.1 years	Cortés (2002) Smith *et al.,* (2008)
Productivity (r, intrinsic rate of population increase, yr^{-1})	r= 0.067 (0.028-0.112) r= 0.094 (0.06-0.137) r= 0.111 (0.038-0.197) r= 0.121 (0.104-0.137) r= 0.15 (0.12-0.18)	Cortés (2008b) Cortés *et al.,* (2010)[2] Cortés (2002) Cortés *et al.,* (2012) Murua *et al.,* (2012)

It is not unusual for elasmobranchs to display variation in their life history characteristics across ocean basins or even regions. In fact, many other shark species show similar regional differences like those seen in the oceanic whitetip, including bonnethead sharks (*Sphyrna tib*uro), blacknose sharks (*Carcharhinus acronotus*), and blacktip reef sharks (*Charcharhinus melanopterus*), (Lombardi-Carlson *et al.,* 2003; Driggers *et al.,* 2004; Chin *et al.,* 2013) to name a few. Although regional differences can be indicative of variable population dynamics and resilience to fishing

[1] Most data suggest a resting period of one year (Clarke et al. 2015b)

[2] This value was deemed the most reasonable in a review conducted by the Pacific Shark Life History Expert Panel Workshop (Clarke et al. 2015b).

pressure (D'Alberto *et al.,* 2017), variation in life history parameters across ocean basins can also result from temporal and methodological differences across studies (Goldman and Cailliet 2004).

2.5 Population Structure and Genetics

To date, only two studies (one published journal article and one Master's thesis) have been conducted on the genetics and population structure of the oceanic whitetip shark, which provide some preliminary evidence of genetic differentiation between various populations of the species. The first study (Camargo *et al.,* 2016) compared the mitochondrial control region in 215 individuals from the Indian Ocean and eastern and western Atlantic Ocean (Figure 12 below). They identified a total of 12 haplotypes. A total of 129 individuals shared one haplotype, which was the most common haplotype in all locations. Two additional haplotypes were found in all regions, and another two haplotypes were found in eastern and western Atlantic Ocean populations. The remaining seven haplotypes were each found in only one or two sharks. While results showed significant genetic differentiation (based on haplotype frequencies) between the eastern and western Atlantic Ocean (Φ_{ST} = 0.1039, P <0.001; Camargo *et al.,* (2016)), pairwise comparisons among populations within the regions revealed a complex pattern. Though some eastern Atlantic populations were significantly differentiated from western Atlantic populations (F_{ST} = 0.09 – 0.27, P < 0.01), others were not (F_{ST} = 0.02 – 0.03, P > 0.01), even after excluding populations with sample sizes of less than 10 individuals (Camargo *et al.,* 2016). Additionally, the sample size from the Indian Ocean (N = 9) may be inadequate to detect statistically significant genetic structure between this and other regions (Camargo *et al.,* 2016). Furthermore, since this study only used mitochondrial markers, male mediated gene flow is not reflected.

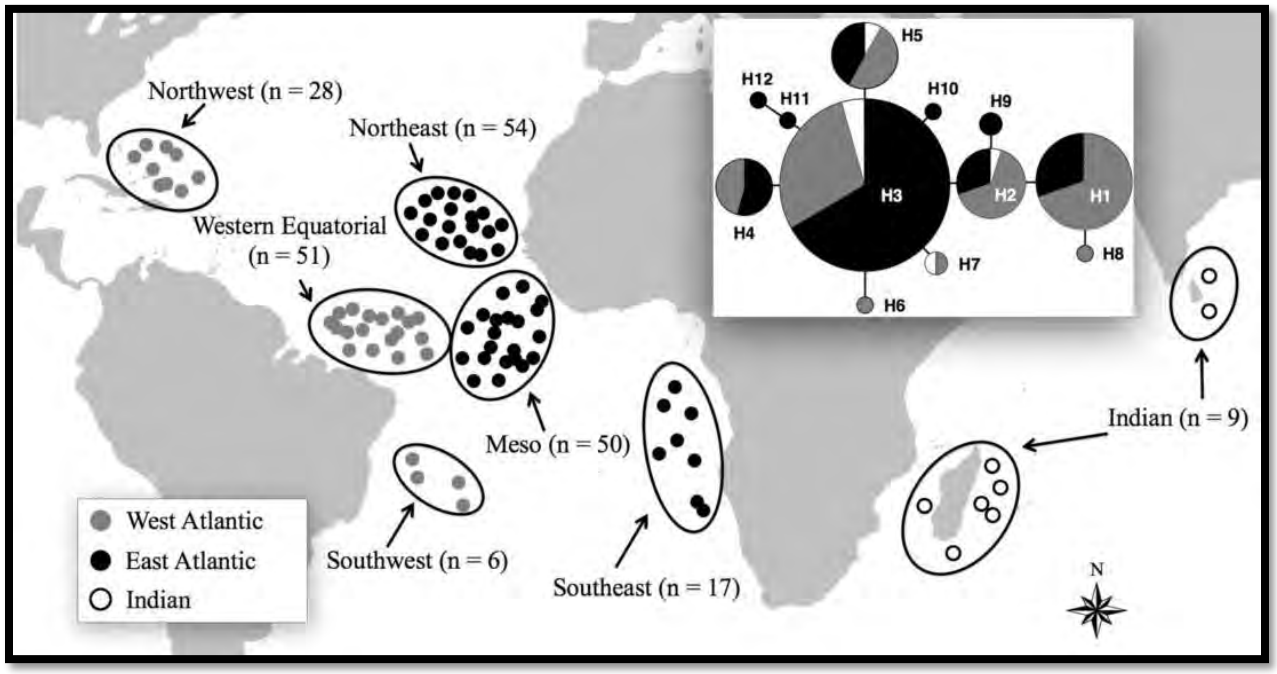


Figure 12 Geographic distribution of samples of *C. longimanus* with the network haplotypes analyzed and compiled from the sequences of the mitochondrial DNA control region. Source: Camargo *et al.* 2016.

In the second study, Ruck (2016) compared the mitochondrial control region, a protein-coding mitochondrial region, and nine nuclear microsatellite loci in 171 individuals sampled from the western Atlantic, Indian, and Pacific Oceans. Using three population-level pairwise metrics (PhiST, FST, and Jost's D), Ruck (2016) detected no fine-scale matrilineal structure within ocean basins. However, after comparing and analyzing the genetic samples of the two studies together (i.e., Camargo *et al.* 2016 and Ruck 2016), results showed significant maternal population structure within the western Atlantic with evidence of three matrilineal lineages (C. Ruck, personal communication, 2016). Specifically, the Northwest Atlantic samples show significant differentiation from the samples obtained from the rest of the western Atlantic (i.e., the Western Central Atlantic and Brazilian samples; Φ_{ST} Range: 0.058 – 0.078, F_{ST} Range: 0.063 – 0.078 ($P \leq 0.02$)) (Ruck, unpublished data). However, while this information is informative, the data showing population structure within the Atlantic relies solely on mitochondrial DNA and does not reflect male mediated gene flow.

On a global scale, Ruck (2016) found that the most common mitochondrial haplotypes were shared by individuals in the Atlantic, Indian, and Pacific Oceans, with no clear phylogeographic partitioning of haplotypes. Mitochondrial and nuclear analyses indicated weak but significant differentiation between western Atlantic and Indo-Pacific Ocean populations ($\Phi_{ST} = 0.076$, $P = 0.0002$; $F_{ST} = 0.017$, $P < 0.05$ after correction for False Discovery Rate). Although significant inter-basin population structure was evident (see Figure 13 below), Ruck (2016) also noted an association with deep phylogeographic mixing of mitochondrial haplotypes and evidence of contemporary migration between the western Atlantic and Indo-Pacific Oceans.

Figure 13 DISTRUCT plots summarizing STRUCTURE results of all genotyped samples: K = 2. The DISTRUCT plots clearly indicated strong sorting of two clusters: the Western Atlantic and the Indo-Pacific. Source: Ruck 2016.

Philopatry is another factor that could influence population structure within ocean basins. For example, Camargo *et al*., (2016) notes that the trans-Atlantic structure observed in their study may have developed in oceanic whitetips because females remain within or return to give birth on one side of the basin or the other (Camargo *et al.,* 2016). This is supported by recent tagging studies described previously, that suggest although oceanic whitetip sharks are highly migratory in terms of extensive travel distances, they seem to exhibit a high degree of philopatry to certain sites and may not mix with other regional populations (Howey-Jordan *et al.,* 2013; Tolotti *et al.,* 2015a). The shortest physical distance between the western and eastern Atlantic is between Brazil and Guinea-Bissau, requiring an oceanic crossing of approximately ~2,400 km (Camargo *et al.* 2016). Although the oceanic whitetip shark is likely physically capable of making this migration distance, this does not seem to be a typical behavioral characteristic of oceanic whitetip females, evidenced by genetic differentiation in those regions (western and eastern Atlantic) by female lineages (Camargo *et al*. 2016). However, as noted previously, this study

relied on mitochondrial DNA (mtDNA) and does not reflect male mediated gene flow. Additionally, although the current telemetry tracking studies indicate patterns of site philopatry (Musyl *et al.,* 2011; Howey-Jordan *et al.,* 2013; Tolotti *et al.,* 2015a), sample sizes in the tracking studies are very small and may not necessarily be representative of the behavior of the species as a whole (Ruck 2016). For example, as shown previously in the NMFS CSTP tagging data, an immature female showed a large East to West Atlantic equatorial movement (refer back to Figure 4 above).

Both studies discussed above differ in genetic markers and sampling locations, but neither provides strong evidence for genetic discontinuity. Camargo *et al*. (2016) compared mitochondrial DNA sequences of samples collected in eight locations, including the southeast Atlantic and the southwest Indian Oceans (i.e., on either side of the southern tip of Africa). They concluded an absence of genetic structure between the East Atlantic and Indian Ocean subpopulations. Though the Indian Ocean sample size was small (n = 9), it included four haplotypes, all of which were also found in Atlantic Ocean subpopulations. Camargo *et al.* (2016) explained that this genetic connectivity (i.e., the existence of only one genetic stock around the African continent) may be facilitated by the warm Agulhas current, which passes under the Cape of Good Hope of South Africa and may transport oceanic whitetips from the Indian Ocean to the eastern Atlantic. Ruck (2016) compared longer mitochondrial DNA sequences and 11 microsatellite DNA loci of samples collected in seven locations; however, there were no samples from the southeast Atlantic and the southwest Indian Oceans (i.e., the closest sampling locations were Brazil and Arabian Sea). Ruck (2016) found weak but statistically significant differentiation between West Atlantic and Indo-Pacific subpopulations but explained that her study shows genetic evidence for contemporary migration between the West Atlantic and Indo-Pacific as a result of semi-permeable thermal barriers (i.e., the warm Agulhas current). Thus, we compare one study which may lack resolution but demonstrates genetic connectivity between the southeast Atlantic and the southwest Indian Ocean subpopulations (i.e., across the Agulhas current; Camargo *et al.,* 2016) to another that finds weak genetic structure and low-level contemporary migration across great distances (i.e., the West Atlantic and the northern Indian Ocean; Ruck 2016). We conclude that neither study provides unequivocal evidence for genetic discontinuity or marked separation between Atlantic and Indo-Pacific subpopulations.

In both studies, genetic diversity appears to be low. Compared to eight other circumtropical elasmobranch species, including the basking shark (*Cetorhinus maximus*), smooth hammerhead (*Sphyrna zygaena*), great hammerhead (Sphyrna mokarran), tiger shark (*Galeocerdo cuvier*), blacktip reef shark (*Carcharhinus limbatus*), sandbar shark (*Carcharhinus plumbeus*), silky shark (*Carcharhinus falciformis*), and the whale shark (*Rhincodon typus*), the oceanic whitetip shark ranks the fourth lowest in global mtCR genetic diversity (0.33% ± 0.19%). The oceanic whitetip has diversity similar to the smooth hammerhead (0.32% ± 0.18%, (Testerman 2014) and greater than tiger and basking sharks (0.27% ± 0.16%; Bernard 2014 and 0.13% ± 0.09%; Hoelzel *et al.,* (2006), respectively). The mtCR genetic diversity of the oceanic whitetip is about half that of the closely related silky shark (0.61% ± 0.32%; (Clarke *et al.,* 2015a)) and about a third that of the whale shark (1.1% ± 0.6%; (Castro *et al.,* 2007). Ruck (2016) noted that the relatively low mtDNA genetic diversity (concatenated mtCR-ND4 nucleotide diversity π = 0.32% ± 0.17%) compared to other circumtropical elasmobranch species raises potential concern

for the future genetic health of this species. Camargo *et al.,* (2016) also observed low levels of genetic variability for the species, with both haplotype and nucleotide diversity significantly lower in the eastern Atlantic population than the western Atlantic population (34.2% and 36.9%, respectively). Low genetic variability rates, as exhibited by the oceanic whitetip shark, may represent a risk in terms of the species' ability to adapt, leading to a weaker ability to respond to environmental changes (Camargo *et al.,* 2016).

2.6 Demography

Oceanic whitetip sharks exhibit life history traits and population parameters that are generally moderate among other shark species, although there has been some disagreement in the literature regarding the species' productivity. In a 1998 study of Pacific sharks, productivity values and rebound rates were derived for 26 shark species, in which the oceanic whitetip shark ranked among the most productive species (6 out of 26) (Smith *et al.,* 1998). Cortés (2002) also found that the oceanic whitetip ranked among the more productive species of sharks, with an annual population growth rate (λ) of 1.117 year^{-1}. Similar results were found in Smith *et al.* (2008), in which the oceanic whitetip shark ranked the 2nd most productive species of 11 pelagic elasmobranchs evaluated. In contrast, a recent Ecological Risk Assessment (ERA) study, determined an intrinsic rate of population increase (i.e., the rate at which a population increases in size if there are no density-dependent forces regulating the population) (r) of 0.094, and identified the oceanic whitetip shark as the 5th most vulnerable species of 11 pelagic shark species (Cortés *et al.,* 2010). However, in an expansion of that ERA, Cortes calculated a higher intrinsic rate of increase (r) of 0.121 (Cortés *et al.,* 2012).

Smith *et al.,* (2008) estimated a natural mortality rate of 0.203 year^{-1}, assuming a maximum age of 22 years. Estimated generation times range from 7 to 11.1 years (Cortés 2008b; Smith *et al.,* 2008). Finally, the oceanic whitetip shark ranked among the highest in productivity when compared with other pelagic shark species (ranking 5 out of 26 overall) in terms of its egg production, rebound potential, potential for population increase, and for its stochastic growth rate (Chapple and Botsford 2013). However, overall, the growth rate (as indexed by the von Bertalanffy K parameter), natural mortality and the intrinsic rate of population increase are all consistent with low productivity while the ages of maturity and generation times indicate moderate productivity (or low to moderate) (FAO 2012). Thus, the biology of the oceanic whitetip shark indicates that it is likely to be a species with low resilience to fishing and minimal capacity for compensation (Rice and Harley 2012). Therefore, for the purpose of this status review, we consider the oceanic whitetip shark to have low-moderate productivity.

3. GLOBAL AND REGIONAL ABUNDANCE ESTIMATES AND TRENDS

Overall, global quantitative abundance estimates and trends are lacking for the oceanic whitetip. However, there are several studies on the abundance trends for a few regions and/or populations of oceanic whitetip sharks. There is also a recent stock assessment for the oceanic whitetip shark in the Western and Central Pacific (Rice and Harley 2012). Thus, the following section provides some insight into the abundance trends of the species. It should be noted that catch records of sharks, especially non-target shark species, are often inaccurate and incomplete. The oceanic whitetip shark is predominantly caught as bycatch and the reporting requirements for bycatch species have changed over time and differ by organization, and have therefore affected the reported catch.

3.1 Global Population Trends

Worldwide catches of oceanic whitetip shark are reported in the Food and Agricultural Administration (FAO) of the United Nations (UN) Global Capture Production dataset. According to the FAO, total catches of oceanic whitetip shark increased drastically in the late 1990s, peaking at 1,480 mt in 2000, and declining to 271 mt as of 2013 (Figure 14). Reported worldwide catches for oceanic whitetip shark for the last 10 years of available data (2003-2013) have ranged from 150 to 468 mt per year.

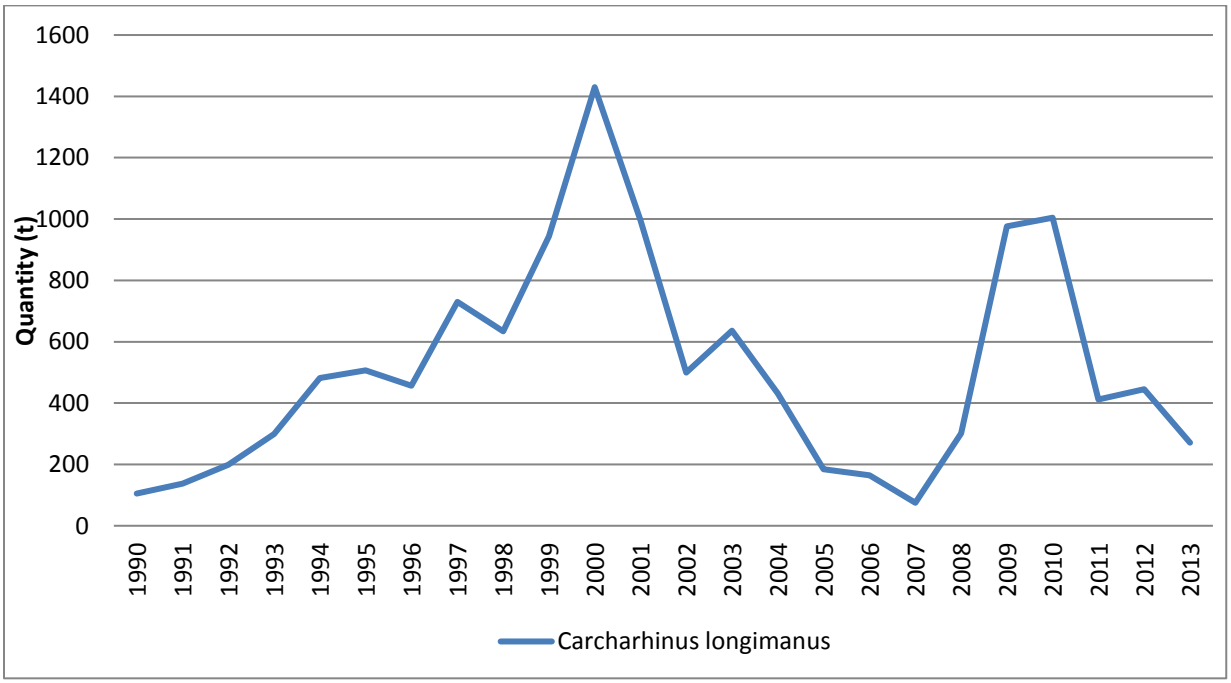


Figure 14 Global capture production for oceanic whitetip shark from 1990-2013; global capture production is production weight of the retained individuals before processing and thus may differ from landings weights. Source: FAO Global Capture Production; accessed January 28, 2016.

Although the FAO dataset supposedly represents the most comprehensive data available on world fisheries production, there are several caveats to interpreting these data and the data are likely not representative of oceanic whitetip catches through time. Because FAO data are generated from fisheries agencies reports of individual countries, the data suffer from the same limitations in reporting capabilities, including issues related to species identification and a lack of species-specific reporting altogether (Rose 1996). Further, some species may only be reported by a few nations despite the species having a very wide distribution and records in local fisheries. Additionally, many nations that report catch volumes to the FAO do not include catches that are discarded at sea (e.g., incidental catch or bycatch) (Rose 1996), with many countries not required to report discards at all. Although more countries and Regional Fishery Management Organizations (RFMOs) are working towards improving reporting of species-specific fish catches, catches of oceanic whitetip sharks have likely gone and continue to go unrecorded in many countries. Further, some catch records that do include oceanic whitetip sharks may not even differentiate between shark species in general. As described previously, these numbers are also likely under-reported as many catch records report dressed weights as

opposed to live weights and/or do not account for discards (e.g., fins are kept but the carcass is discarded; IOTC 2015b). Additionally, in the case of no-retention rules (either RFMO or national laws) many annual catch records are now zero, either because species are discarded whole or because they simply aren't reported. Research suggests that annual global catch data compiled by the FAO are significantly underestimated for all sharks (Clarke *et al.,* 2006b). Thus, given these types of data, with current estimates highly uncertain, a quantitative global population trend for the oceanic whitetip shark would not be reliable at this time.

3.2 Regional Population Trends

The following section describes the available information regarding regional catch and abundance trends for the oceanic whitetip shark from the following regions: Eastern Pacific, Western and Central Pacific, North Atlantic, South Atlantic, and Indian Ocean. Some of the available information is derived from the relevant RFMOs, which are international organizations that have been formed by countries with fishing interests in a particular region of international waters or who are interested in fishing for a highly migratory species. Their purpose is to sustainably manage these shared fishery resources and they may advise cooperating countries on their fishing practices or even set catch and effort limits or other management measures. As oceanic whitetip sharks are global, highly migratory species that cross international boundaries, they are often caught as bycatch in the convention areas of those RFMOs for highly migratory fish stocks. Descriptions and information on these RFMOs and available catch data of oceanic whitetip sharks from vessels operating in these convention areas are provided below.

Eastern Pacific Ocean

There is a lack of quantitative abundance trends of oceanic whitetip shark in the Eastern Pacific Ocean. Historically, the oceanic whitetip shark was the third most abundant shark species after blue sharks (*Prionace glauca*) and silky sharks (*C. falciformis*). However, there is some evidence to suggest that the species has undergone significant population declines in this region. For example, in the eastern Pacific tropical tuna purse seine fisheries, unstandardized nominal catch data from the Inter-American Tropical Tuna Commission (IATTC) for the oceanic whitetip shark from purse seine sets on floating objects, unassociated sets and dolphin sets all show declining trends since 1994 (IATTC 2007). In particular, presence of oceanic whitetip sharks on sets with floating objects, which are responsible for 90% of the shark catches in Eastern Pacific purse seine fishery, has declined significantly (Hall and Román 2013). Figure 15 below shows the nominal catches per set of oceanic whitetip shark in floating object sets, and Figure 16 below shows a map describing the distribution of encounters with oceanic whitetip sharks. Both maps show four periods of time (1994-1997; 1998-2001; 2002-2005; and 2006-2009).

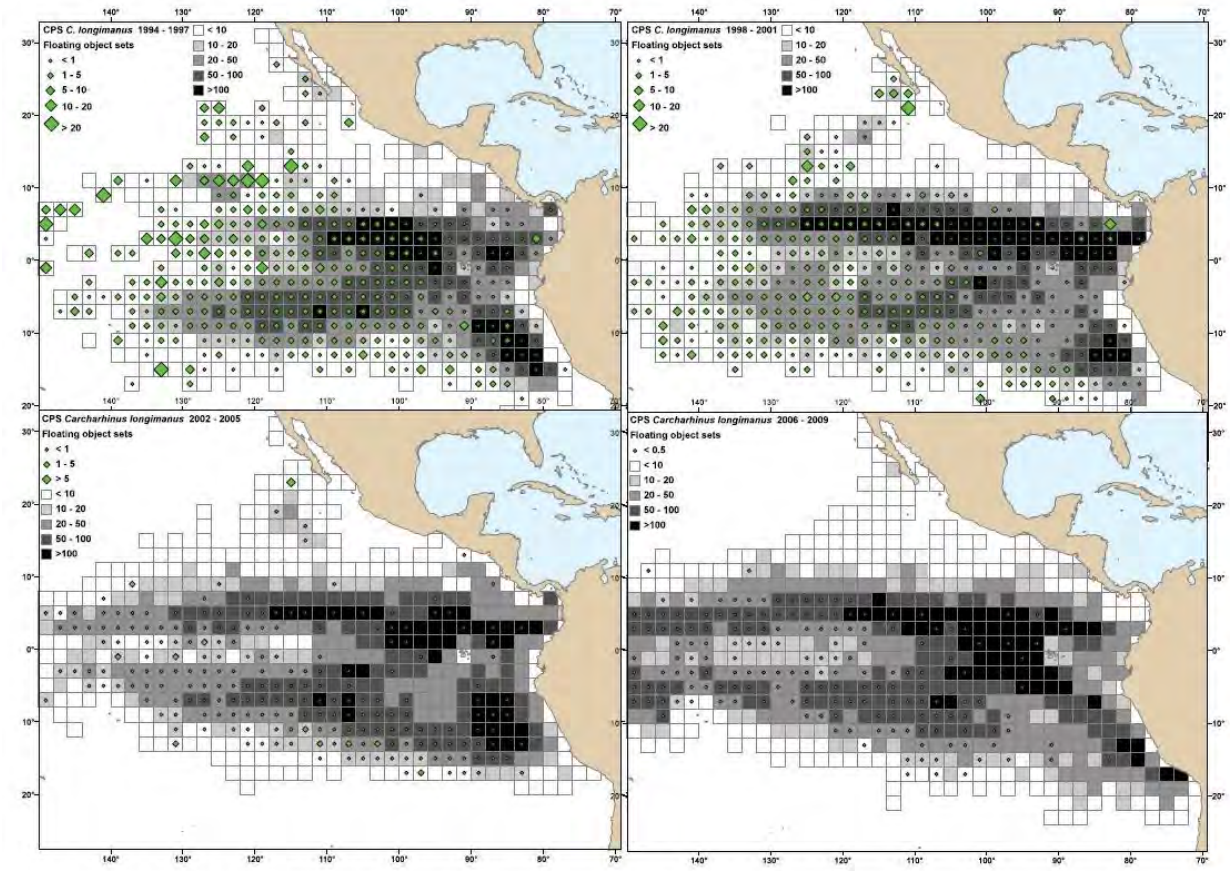


Figure 15 Numbers per set of oceanic whiteitp sharks in floating object sets in four periods (1994-1997; 1998-2001; 2002-2005; 2006-2009. The green diamonds represent numbers of oceanic whitetip shark caught; the gray shaded squares represents fishing effort (numbers of sets deployed). Source: Hall and Roman 2013.

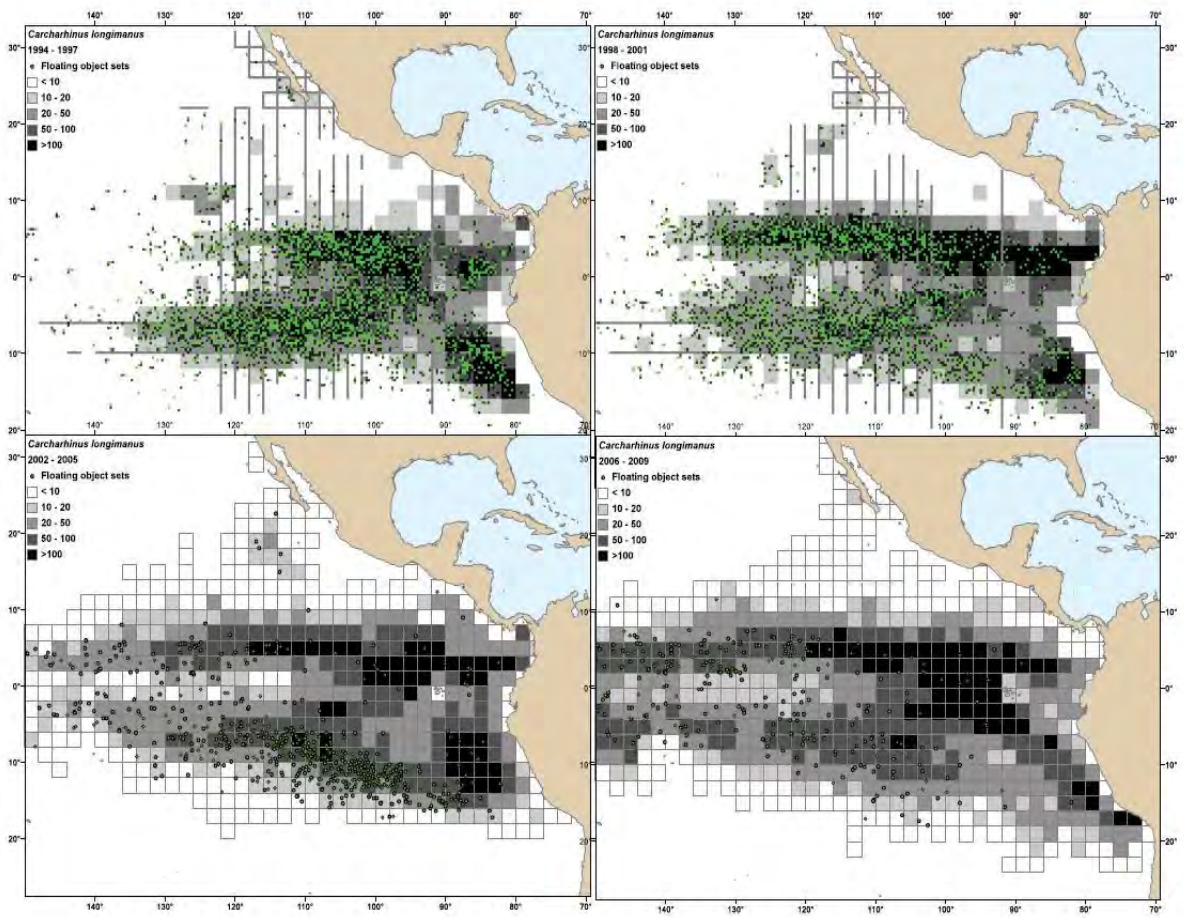


Figure 16 Encounters with oceanic whitetip sharks in floating object sets in four periods (1994-1997; 1998-2001; 2002-2005; 2006-2009). The green dots represent encounters with oceanic whitetip sharks in floating object sets (i.e., sets with oceanic whitetip sharks present); the gray shading represents fishing effort (number of sets deployed). Source: Hall and Roman 2013.

Figures 15 and 16 above provide a clear illustration of the decline in catches per set that accompanied a significant reduction in oceanic whitetip frequency (Hall and Roman 2013). Based on Figures 15 and 16 above, it is evident that the species has virtually been wiped out from the fishing grounds, in a seemingly north to south progression, with similar trends also observed in dolphin and school sets. These declines in nominal CPUE or the frequency of occurrence equates to an of 80–95% decline from population levels in the late 1990s (Hall and Román 2013).

Western and Central Pacific Ocean

The oceanic whitetip shark was historically considered one of the most abundant pelagic shark species throughout the Western and Central Pacific Ocean. For example, tuna longline survey data from the 1950s indicate oceanic whitetip sharks comprised 28% of the total shark catch of fisheries south of 10ºN (Strasburg 1958). Likewise, Japanese research longline records during 1967-1968 indicate that oceanic whitetip sharks were among the most common shark species taken by tuna vessels in tropical waters of the Western and Central Pacific, and comprised 22.5% and 23.5% of the total shark catch west and east of the International Date line, respectively (Taniuchi 1990). However, several recent lines of evidence indicate that the oceanic whitetip in

has suffered significant population declines throughout the region, including declining trends in standardized CPUE, biomass and size indices.

In 2011, a "status snapshot" was developed for the oceanic whitetip shark to depict its status in the Western and Central Pacific Ocean (Clarke 2011; See Figure 17 below). This status snapshot summarizes the findings from several papers based on data from the Secretariat of the Pacific Community (SPC) (Clarke *et al.,* 2011a; Lawson 2011), Japan (from both commercial longlines and research training vessels (RTV) (Clarke *et al.,* 2011b), information from an ecological risk assessment (Kirby and Hobday 2007), and catch estimates based on shark fin trade records (Clarke 2009). The downward arrows in Figure 17 depict the various CPUE trends; all available abundance, size, and catch trend indices show declining trends.

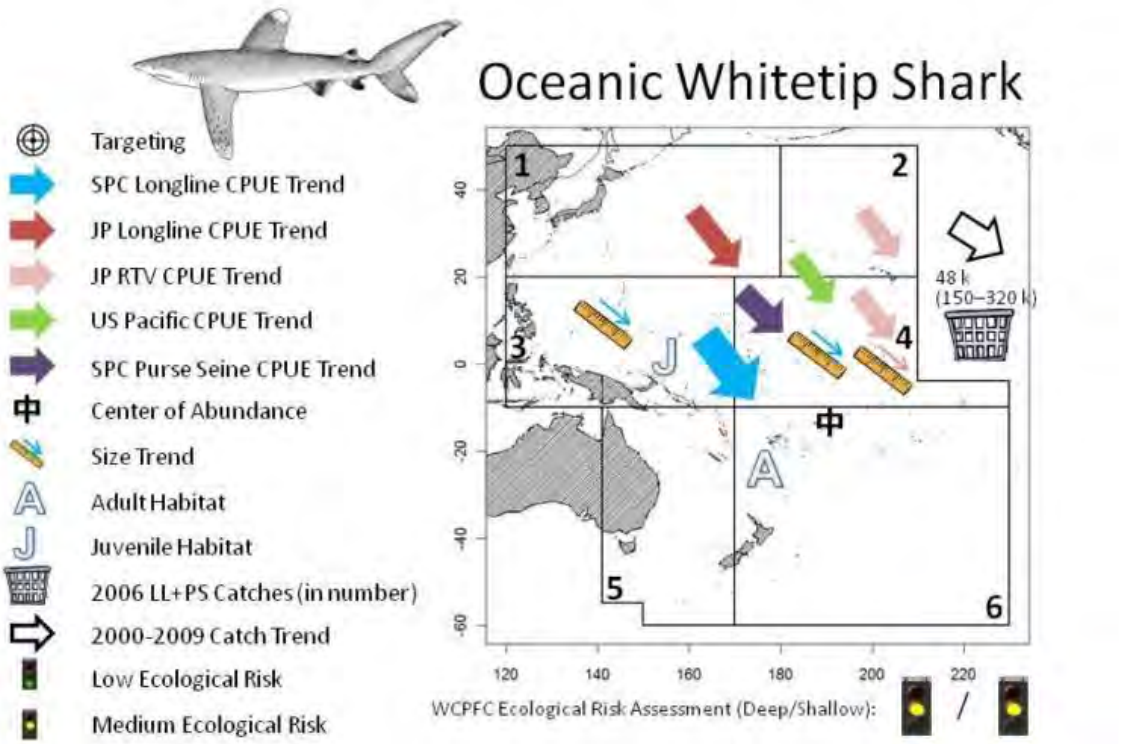


Figure 17 Status snapshot of oceanic whitetip shark in the Western and Central Pacific Fisheries Commission (WCPFC) Statistical Area. JP = Japanese; RTV – Research Training Vessels; SPC = Secretariat of the Pacific Community. Source: Clarke (2011).

In addition to the status snapshot, Rice and Harley (2012) conducted a stock assessment for the oceanic whitetip, in which standardized CPUE series were estimated in the Western and Central Pacific based on observer data from the SPC and collected from 1995-2009. Results show that the median estimate of oceanic whitetip biomass in the Western Central Pacific in 2010 was 7,295 tons (Rice and Harley 2012), which, when extrapolated, equaled a population of roughly 200,000 individuals (FAO 2012). Rice and Harley (2012) concluded that catch, CPUE, and size composition data for oceanic whitetip all show consistent declines from 1995-2009. Additionally, estimated spawning biomass, total biomass and recruitment also declined consistently throughout the time series. Specifically, current estimates of oceanic whitetip stock depletion indicate that the total biomass has been reduced to 6.6% of theoretical equilibrium

virgin biomass (i.e., ~93% decline), with spawning biomass reduced by 86% since 1995 (Rice and Harley (2012); see Figures 18 and 19 below).

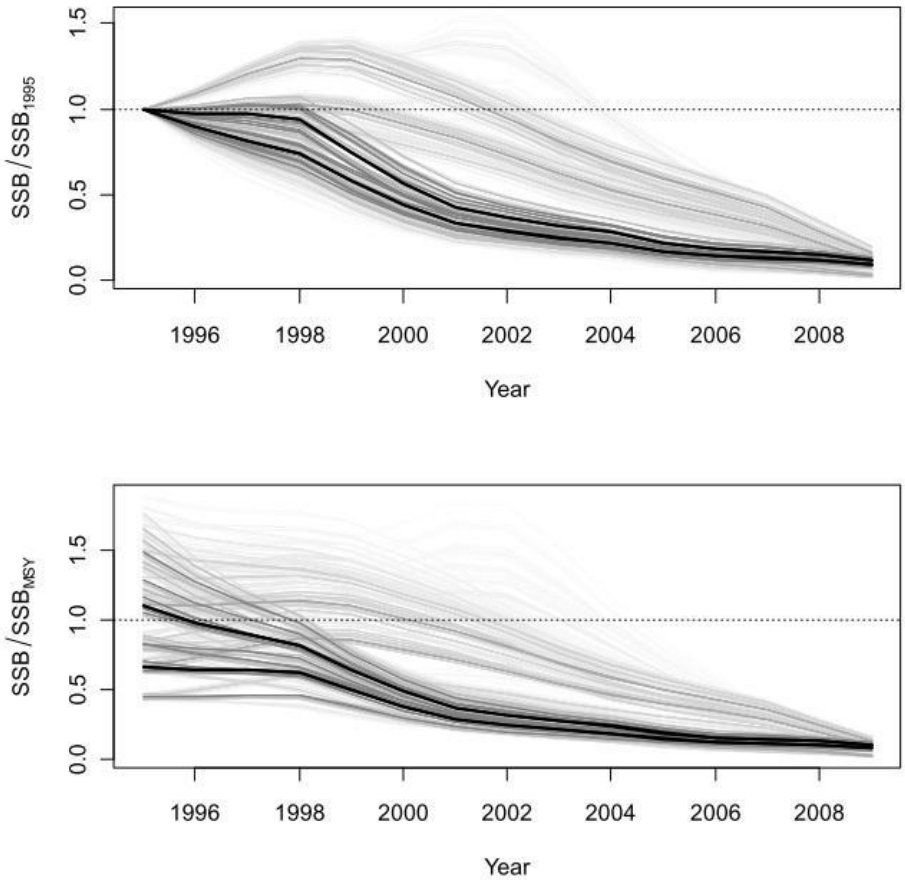


Figure 18 Changes in the spawning biomass relative to the first year of the model (1995 – top panel) and SBMSY (equilibrium spawning potential, referred to as spawning biomass at MSY; bottom panel). Each line represents one of 648 runs from the grid and the darker the line, the higher the assigned weight (plausibility) for that model run. Source: Rice and Harley 2012.

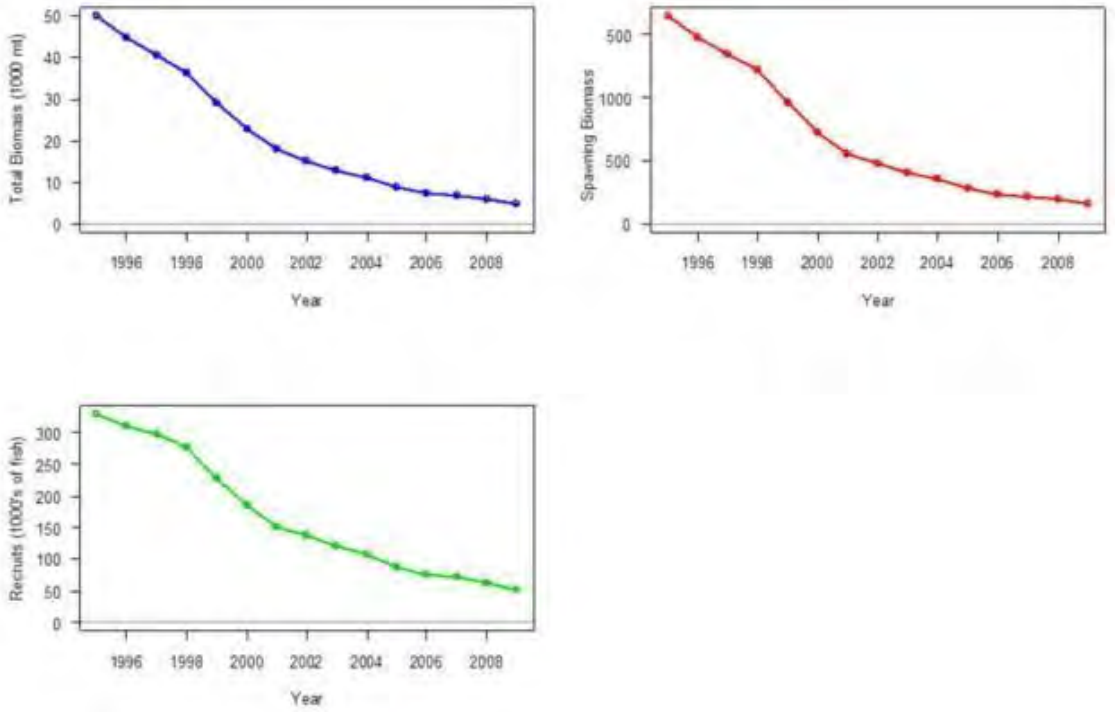


Figure 19 Estimated total biomass (top left in blue, 1000 metric tons), estimated spawning biomass (top right in red) and estimated annual recruitment (1000's of fish; bottom left in green) in the WCPO for the reference case. Source: Rice and Harley 2012.

More recently, Rice *et al.,* (2015) confirmed that population declines of oceanic whitetips have continued since the stock assessment report was completed in 2012. The proportion of positive oceanic whitetip catch in longline sets has also been steadily declining since the mid-1990s (see Figures 20 and 21 below).

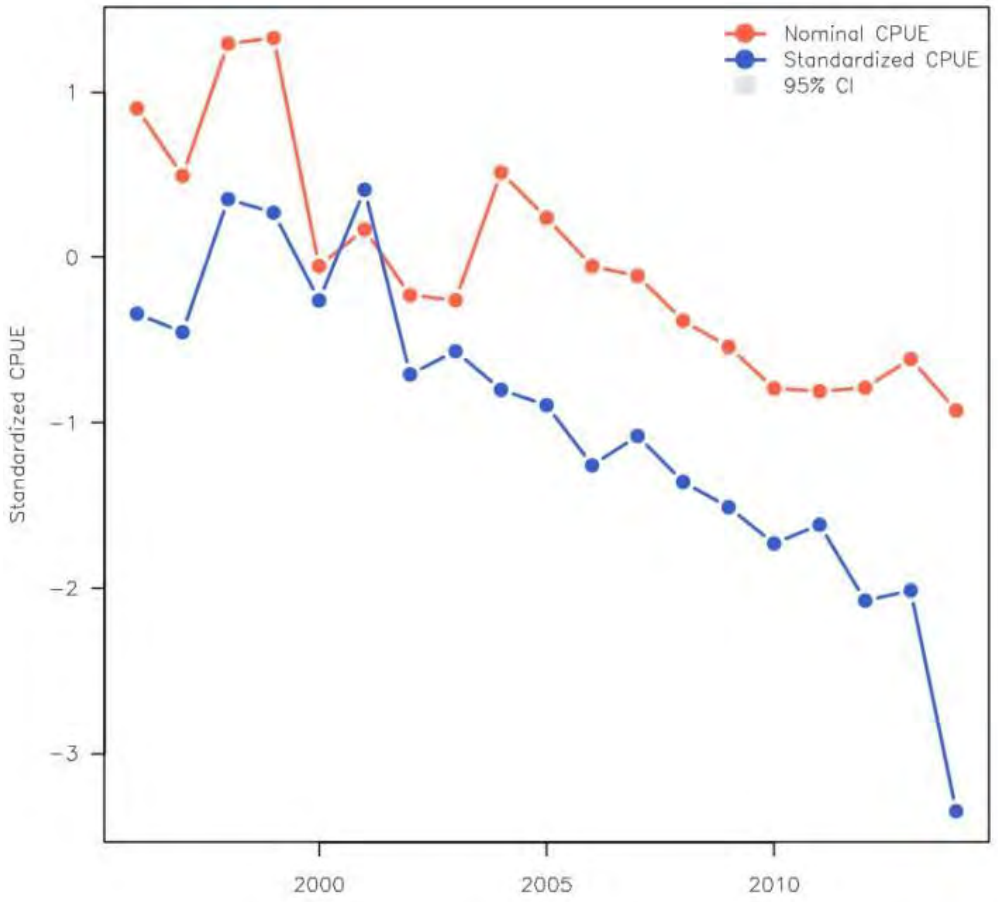


Figure 20 Nominal and Standardized CPUE trends of oceanic whitetip shark in the WCPFC. Source: Rice *et al.* 2015.

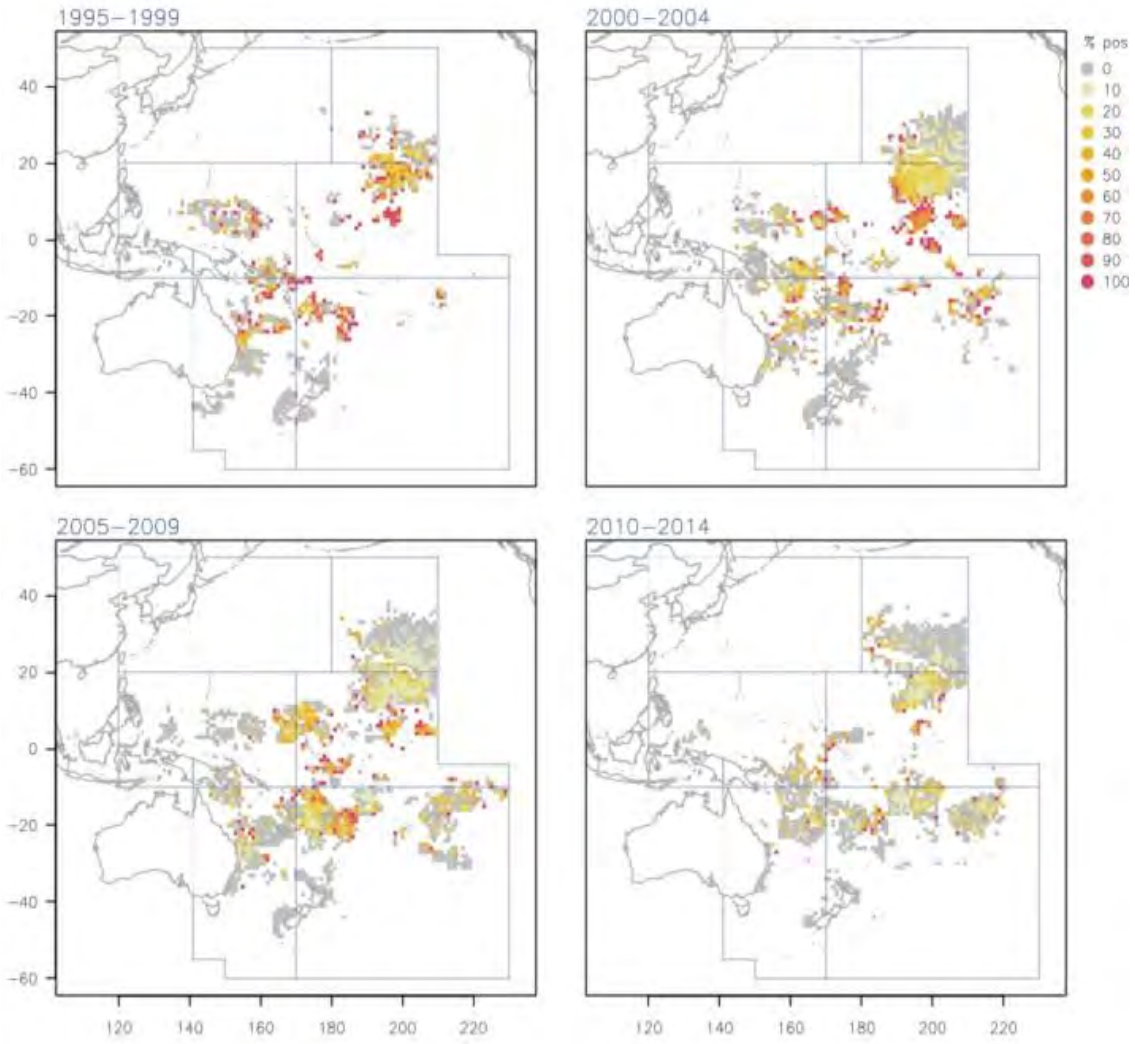


Figure 21 Spatial distribution of the proportion of longline sets for which one or more oceanic whitetip shark were caught for each five year period between 1995 and 2014. Source: Rice *et al.* 2015.

Overall, results from Rice *et al.* (2015) indicate that oceanic whitetip sharks in the Western and Central Pacific were more common prior to 2000, when the species frequently comprised >20% of the overall shark catch. However, the oceanic whitetip has not exceeded more than 20% of the total shark catch in their core tropical habitat area for over a decade, which is a significant contrast from the first ten years of the study. These results also confirm that oceanic whitetip shark abundance continues to decline throughout the tropical waters of the Western and Central Pacific Ocean (Rice *et al*., 2015). Although the trend may be exaggerated in the last year due to a lack of complete data for the last year of the dataset, the overall trend still shows a steady decline of oceanic whitetip shark abundance in the Western and Central Pacific Ocean. Additionally, while standardized CPUE data for the purse seine fishery are not available, the oceanic whitetip is one of only two species frequently caught in this fishery (the other being the silky shark) and nominal CPUE data from the purse seine fishery shows that the species has exhibited declines similar to those in the longline fishery (see Figure 22 below; Clarke *et al.,* (2012)).

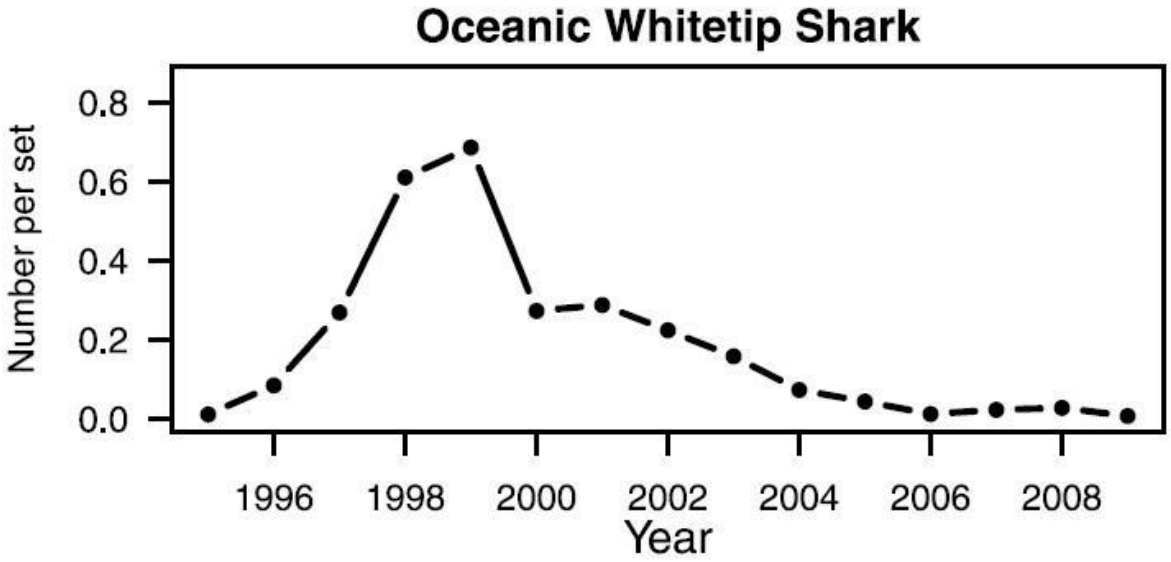


Figure 22 Nominal purse seine CPUE trend for oceanic whitetip in the western and central Pacific Ocean, 1996–2009. Source: Clarke *et al.,* (2012).

Separate analyses have also been conducted for the Hawaii-based pelagic longline fishery that found similar abundance declines (Walsh and Clarke 2011; Brodziak *et al.,* 2013). Based on observer data from the Pacific Islands Regional Observer Program (PIROP), mean annual nominal CPUE of oceanic whitetip decreased significantly from 0.428 sharks/1000 hooks in 1995 to 0.036 sharks/1000 hooks in 2010. This reflected a significant decrease in nominal CPUE on longline sets with positive catch from 1.690 sharks/1000 hooks to 0.773 sharks/1000 hooks, and a significant increase in longline sets with zero catches from 74.7% in 1995 to 95.3% in 2010. After accounting for various factors (e.g., sea surface temperature, fishery sector, and latitude), Walsh and Clarke (2011) concluded that oceanic whitetip CPUE declined by more than 90% in the Hawaii-based longline fishery since 1995.

Using the same data, Brodziak *et al*. (2013) found similar results by using several models in order to assess the species' CPUE from 1995 to 2010 in the Hawaii-based longline fisheries (both shallow and deep set). This study also found a decreasing trend in standardized CPUE from 1995 to 2010, which equates to a 90% decline in relative abundance due to increased sets with zero catches as well as decreased CPUE on sets with positive catch (Brodziak *et al.,* 2013; See Figure 23 below). The authors note that the similarity in the results from Hawaii in comparison to studies based on SPC observer data for the rest of the Western and Central Pacific suggest that declines of oceanic whitetip populations are not just local to Hawaii, but rather a Pacific-wide phenomenon. However, the authors emphasized that the closeness in alignment between the trends in Hawaii and the Western and Central Pacific Ocean may be partly due to the use of datasets that partially overlap for years prior to 2005. However, even after 2005, the trends show similar results suggesting that the patterns are fair representations of regional trends in oceanic whitetip abundance. Additionally, tuna purse seine fishery data documented a similar decrease in oceanic whitetip shark catches (79%) from 20°S to 20°N and 150°W to 130°E between 1999 and 2010 (Lawson 2011; Clarke *et al.,* 2012).

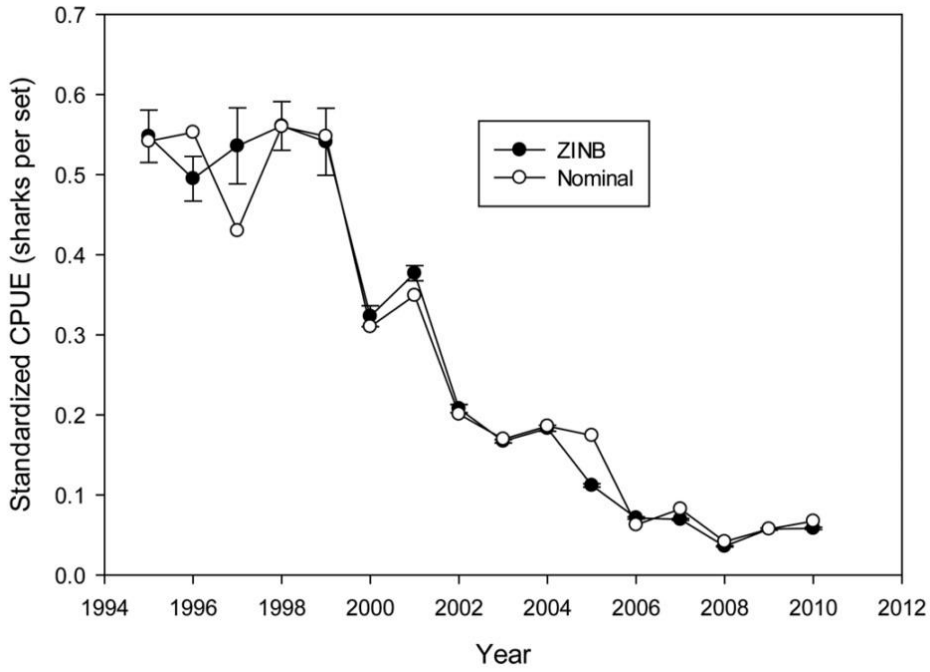


Figure 23 Comparisons of estimates of annual standardized CPUE (mean sharks per standardized longline set) for oceanic whitetip shark in the Hawaii-based pelagic longline fishery in 1995–2010 for the best-fitting model (ZINB) and the best-fitting model showing 95% confidence bars for the standard error of the mean CPUE and the nominal CPUE. Source: Brodziak *et al.* 2013.

The federally-mandated observer program accurately distinguishes the oceanic whitetip shark to species, and their occurrence in the data were examined in further detail by the ERA team, primarily to update the Brodziak *et al.,* (2013) publication with 4 additional years 2011-2014 (Figure 24 below). A standardized CPUE annual index was estimated using a generalized linear model (GLM) with a delta lognormal modeling approach in the statistical programming language R. This approach is fundamentally similar to the original study in which a zero-inflated negative binomial approach was used; both are well-suited methodologies to deal with relatively uncommon events. The delta lognormal is a 2-stage modeling approach, often termed a "hurdle" model (Cragg 1971; Maunder and Punt 2004), whereby the first model estimates the hurdle or probability of experiencing a non-zero catch. This probability is merged with the results of a second model, which estimates the magnitude of the non-zero catch. Two models are needed due to the different probability distributions associated with these two processes and the prevalence of zero catches. Using a binomial distribution for the proportion of zeros and a logarithmic Gaussian distribution for the positive catch component, the final GLM annual CPUE index is shown in Figure 39 below. The suite of variables used in the 2 modeling steps include haul quarter of the year, sea surface temperature, haul year, set type (i.e. shallow set or deep-set), hooks per float, region, vessel length, and interaction terms. The analysis presented here is not a formal stock assessment but is a preliminary exercise to glean relative abundance and trend information from a historically reliable data stream using a traditional approach, and to update the Brodziak *et al.* (2013) study with 4 additional years of information. Results show that the oceanic whitetip population in this area may have stabilized at a post-decline depressed state in

recent years.

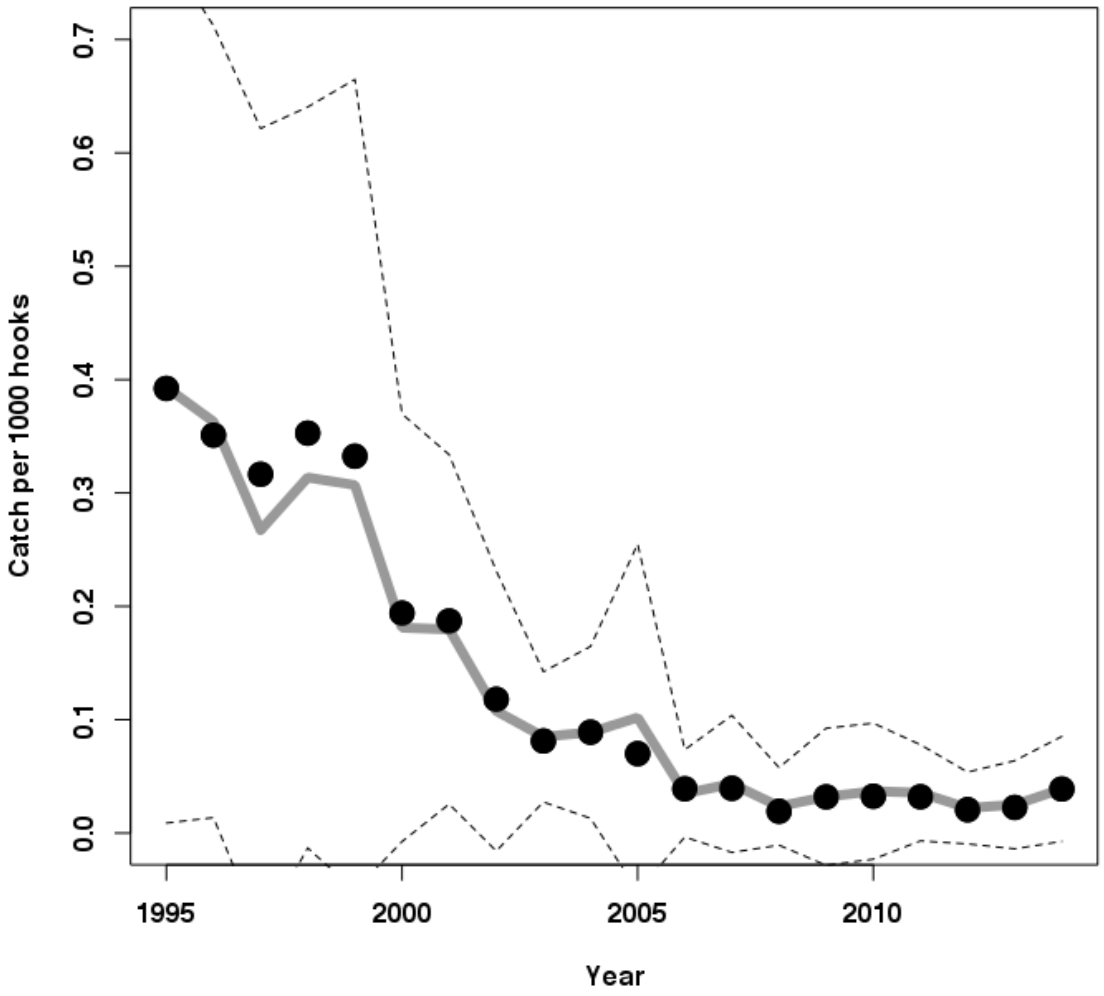


Figure 24 Comparisons of estimates of annual standardized CPUE (mean sharks per standardized longline set) for oceanic whitetip shark in the Hawaii-based pelagic longline fishery in 1995–2014. Source: NMFS PIROP Observer data; adapted from Brodziak *et al.* 2013.

Based on the foregoing information, the oceanic whitetip shark has experienced, and in most cases continues to experience, abundance declines across the Western and Central Pacific Ocean.

Atlantic Ocean

Northwest and Central Atlantic and Gulf of Mexico

Historically, the oceanic whitetip shark was described as widespread, abundant, and the most common pelagic shark in the warm parts of the North Atlantic (Mather and Day 1954; Backus *et al.,* 1956; Strasburg 1958). Historical accounts of the oceanic whitetip during exploratory research surveys in the western North Atlantic during the 1950s noted that several individuals often gathered at the surface around longlines, persistently investigated baited hooks, and occasionally attacked dead or dying tuna before they were hauled in (Backus *et al*., 1956). In fact, the sharks were so persistent, even attempts to drive them away via the use of underwater explosives were unsuccessful (Backus *et al.,* 1956). Recent information, however, suggests the

species is now relatively rare in this region. Several studies have been conducted in this region to determine trends in abundance of various shark species, including the oceanic whitetip shark. In a study of observer data from the U.S. pelagic longline (PLL) fishery operating off the southeastern United States, Beerkircher *et al.,* (2002) showed highly variable annual mean CPUE estimates from 1992-2000, with nominal CPUE (numbers caught per 1,000 hooks) declining significantly between 1981-1983 (CPUE = 0.87; Berkeley and Campos (1988)) and 1992-2000 (CPUE = 0.48). In total, from 1992-2002, 407 oceanic whitetip sharks were caught as bycatch, and approximately 30% were discarded dead (Beerkircher *et al.,* 2004).

Baum *et al.,* (2003) analyzed logbook data for the U.S. pelagic longline fleets targeting swordfish and tunas in the Northwest Atlantic (see Figure 25 below), and reported a 70% decline in relative abundance for the oceanic whitetip shark from 1992 to 2000.

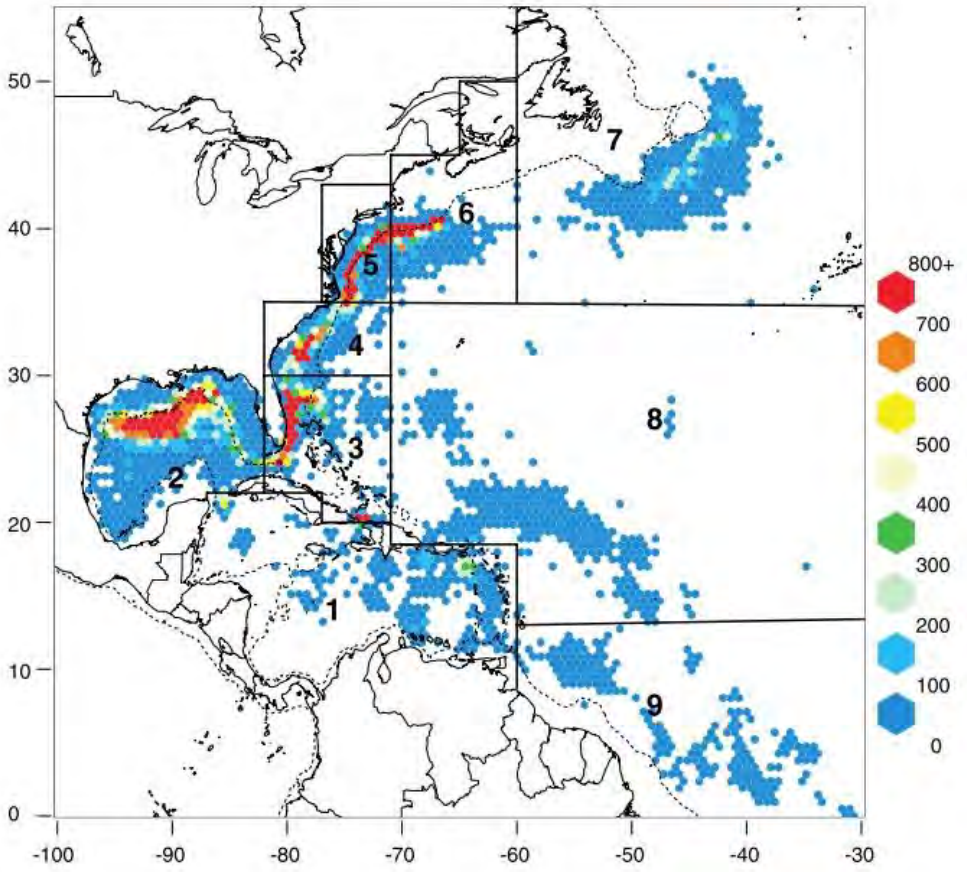


Figure 25 Map of the Northwest Atlantic showing the distribution of effort in the U.S. pelagic longline fishery between 1986 and 2000, categorized by number of sets (0 to 800), within the nine areas assessed: 1, Caribbean; 2, Gulf of Mexico; 3, Florida East Coast; 4, South Atlantic Bight; 5, Mid Atlantic Bight; 6, Northeast Coastal; 7, Northeast Distant; 8, Sargasso/North Central Atlantic; 9, Tuna North/Tuna South. Areas were modified from the U.S. National Marine Fisheries Service classification for longline fisheries. The 1000-m coastal isobath (dotted line) is given for reference. Source: Baum *et al*. 2003.

Similarly, Baum and Myers (2004) compared longline CPUE from research surveys from 1954-1957 to observed commercial longline sets from 1995-1999, and determined that the oceanic whitetip had declined by more than 150-fold, or 99.3% (95% CI: 98.3-99.8%) in the Gulf of Mexico during that time. However, the methods and results of Baum *et al*. (2003) and Baum and

Myers (2004) were challenged (see discussions in Burgess *et al.,* (2005b) and Burgess *et al.,* (2005a) on the basis of whether correct inferences were made regarding the magnitude of shark population declines in the Atlantic). More specifically, while the authors agreed that abundance of large pelagic sharks had declined, they presented arguments that the population declines were probably less severe than indicated. Of particular relevance to the oceanic whitetip, Burgess *et al.,* (2005b) noted that the change from steel to monofilament leaders between the 1950s and 1990s could have reduced the catchability of all large sharks, and the increase in the average depth of sets during the same period could have reduced the catchability of the surface-dwelling oceanic whitetip (FAO 2012). Driggers *et al.,* (2011) conducted a study on the effects of different leader materials on the CPUE of oceanic sharks and determined that with equivalent methods but using a wire leader, the catch rates of Baum and Myers (2004) for the recent period would have been 0.55 rather than 0.02 (as estimated by Baum and Myers (2004) using nylon leaders). Comparing the recent 0.55 value with the Baum *et al*. (2003) value of 4.62 for the 1950s results in an approximate decline of 88% (FAO 2012).

In a more recent re-analysis of the same U.S. pelagic longline logbook dataset using a similar methodology as Baum *et al*. (2003), Cortés *et al.,* (2007) reported a 57% decline from 1992-2005. The decline was predominantly driven by a 37% decline from 1992 to 1993 and a subsequent decline of 53% from 1997 to 2000, after which the time series remained stable (2000–2005). The number of positive observations progressively dropped after 1997. However, an analysis of the observer dataset from the same fishery showed a significantly lower decline than that of the logbook analysis, with a 9% decline in abundance from the same period of 1992-2005. It should be noted that although the authors attempted to include all areas in the analysis, in some cases, the dataset was restricted to certain areas due to insufficient or unbalanced observations by year in the remaining areas. Thus, only areas 1, 2, 3, 4, and 8 were included for oceanic whitetip sharks (refer back to Figure 25 above).

In 2010, Baum and Blanchard (2010) also analyzed observer data from 1992-2005 and reported a 50% decline (95% CI: 17–70%). However, the authors explained that although model estimates suggest significant declines in oceanic whitetip sharks between 1992 and 2005, there was a high degree of interannual variability in the individual year estimates (i.e., covariates that significantly influence catch rates of these species were not included in the models). Therefore, the catch rates were not fully standardized, limiting what can reasonably be inferred regarding the relative abundance of the species (Baum and Blanchard 2010). Finally, the Extinction Risk Analysis team conducted an updated analysis (1992-2015) using the same observer data analyzed by Cortés *et al.,* (2007) and Baum and Blanchard (2010). Similar to previous analyses, there was high variability in the initial years of the time series but overall the trend in abundance was relatively flat with about a 4% decline over the times series (Figure 26 below).

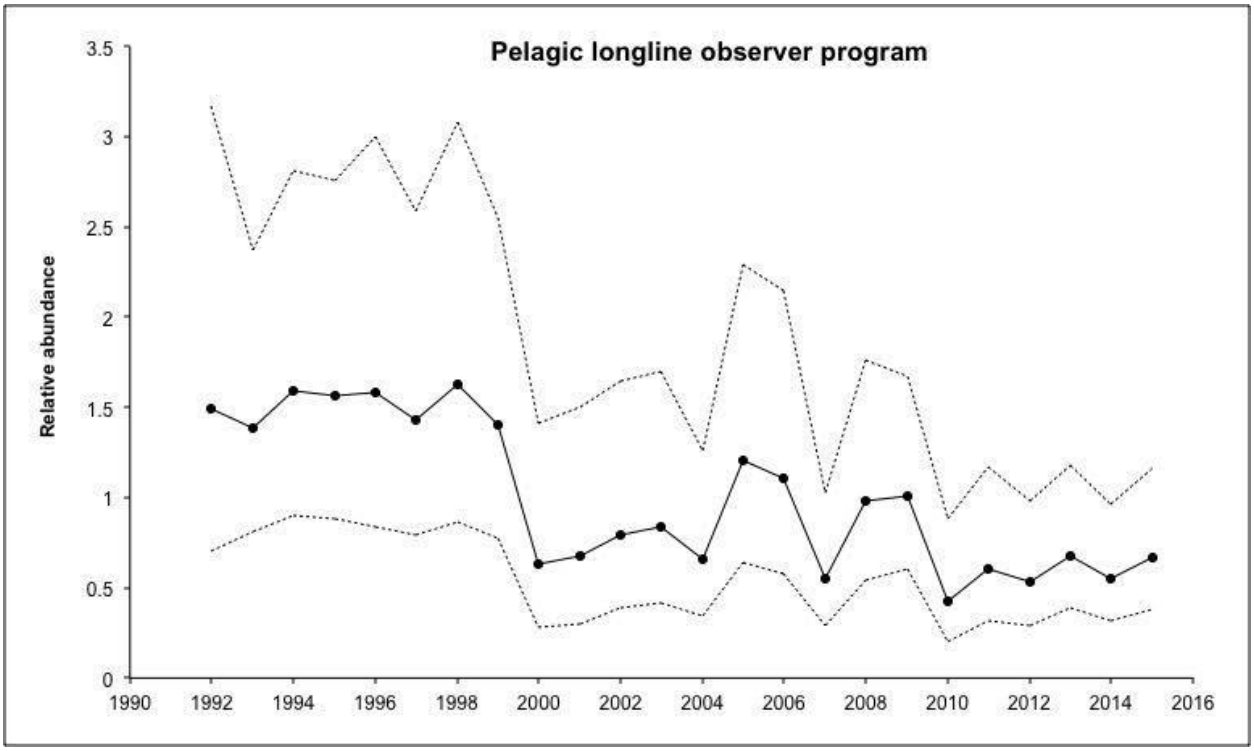


Figure 26 Estimated change in relative abundance (standardized catch per 1000 hooks) between 1992 and 2015 based on the Northwest Atlantic Pelagic Longline observer data for oceanic whitetip sharks. Relative abundance is expressed as the year's estimated mean index divided by the maximum estimated yearly mean index in each time series. Dotted lines represent upper and lower 95% confidence limits. Source: NMFS Observer Database).

Although observer data are generally regarded as more reliable than logbook data for non-target shark species (Walsh *et al.,* 2002), it should be noted that the sample size of oceanic whitetip in the observer data was substantially smaller than for other species, and thus the trends estimated should be regarded with caution. Although misreporting and species misidentification are likely to be much more prevalent in logbooks, and can obscure accurate abundance trends, species misidentification is not considered an issue for oceanic whitetip. It should also be noted that fishing pressure on the oceanic whitetip shark began decades prior to the time series covered in these studies, thus the percentage declines discussed here do not represent percentage declines from historical virgin biomass. Given all of the caveats and limitations of the studies discussed above, it appears that the oceanic whitetip shark population in the Northwest Atlantic and Gulf of Mexico suffered significant historical declines; however, relative abundance of oceanic whitetip shark may have stabilized in the Northwest Atlantic since 2000 and in the Gulf of Mexico/Caribbean since the late 1990s (Cortés *et al.,* 2007) coinciding with the first Federal Fishery Management Plan for Sharks and subsequent regulations that included trip limits and quotas.

Northeast Atlantic and Mediterranean

There is very little information regarding oceanic whitetip sharks in the Northeast Atlantic and Mediterranean. According to the International Council for the Exploration of the Sea (ICES), there is limited information with which to examine the stock structure of oceanic whitetip, and the ICES area would only be the northern extreme of its Northeast Atlantic distribution range. Oceanic whitetip sharks are found mostly in the southwestern parts of the ICES areas (e.g.,

Iberian Peninsula), though some may occasionally occur farther north (ICES 2014). Although oceanic whitetip sharks have been recorded from Portuguese waters, landings of the species are unconfirmed (Correia and Smith 2001). In the Mediterranean, Bigelow and Schroeder (1948) (cited in Backus *et al*., 1956) assumed the oceanic whitetip was historically common; however, they were not included in a comprehensive species checklist of cartilaginous fishes in the Mediterranean or overview of elasmobranchs of the Mediterranean Sea (Cavanagh and Gibson 2007; Bradai *et al.,* 2012). Additionally, of twelve species of shark identified in a study of incidental catch and estimated discards of pelagic sharks from the swordfish and tuna fisheries in the Mediterranean Sea, oceanic whitetip sharks were not identified as present (Megalofonu *et al.,* 2005). Thus, it appears that the occurrence of oceanic whitetip shark in the Northeast Atlantic and Mediterranean is likely rare, as these areas represent the northern extent of the species' range.

South Atlantic

There is very little information on the abundance trends of oceanic whitetip shark in the South Atlantic Ocean. Some countries in this region still do not collect shark data while others collect it but fail to report (Frédou *et al.,* 2015). Historically, the oceanic whitetip was considered one of the most abundant species of pelagic shark in this region. For example, it was the third most commonly caught shark species out of a total 33 shark species caught year-round in the prominent Brazilian Santos longline fishery, and one of 7 species that comprised >5% of total shark catches from 1971-1995 (Amorim 1998). In Itajai, southern Brazil, oceanic whitetip sharks were considered "abundant" and "frequent" in the surface longline and gillnet fleets, respectively, from 1994-1999 (Mazzoleni and Schwingel 1999). Abundant means the oceanic whitetip was observed in most of the landings (i.e., surface longline), whereas frequent means the species occurred in at least half of the landings recorded in one of the seasons of the year (i.e., surface gillnet). In northern Brazil, the oceanic whitetip was considered one of the most abundant shark species landed from 2000-2002, comprising 3% of the total catch weight (including tunas, billfishes and other sharks; Asano-Filho *et al.,* (2004)). In equatorial waters, the oceanic whitetip shark was historically reported as the second most abundant elasmobranch species, outnumbered only by the blue shark (*P. glauca*) in research surveys conducted within the EEZ of Brazil during the 1990s, and comprised 29% of the total elasmobranch catch (Lessa *et al.,* 1999). García-Cortés and Mejuto (2002) found that the oceanic whitetip comprised 17% of the total shark catch in the Spanish longline fishery targeting swordfish from 1990-2000. The research surveys conducted in the 1990s covered a limited area that ranged from 1˚N to 9˚S latitude and 40˚W to 30˚W longitude, which corresponds to the northeastern sector of the Brazilian EEZ (see Figure 27 below).

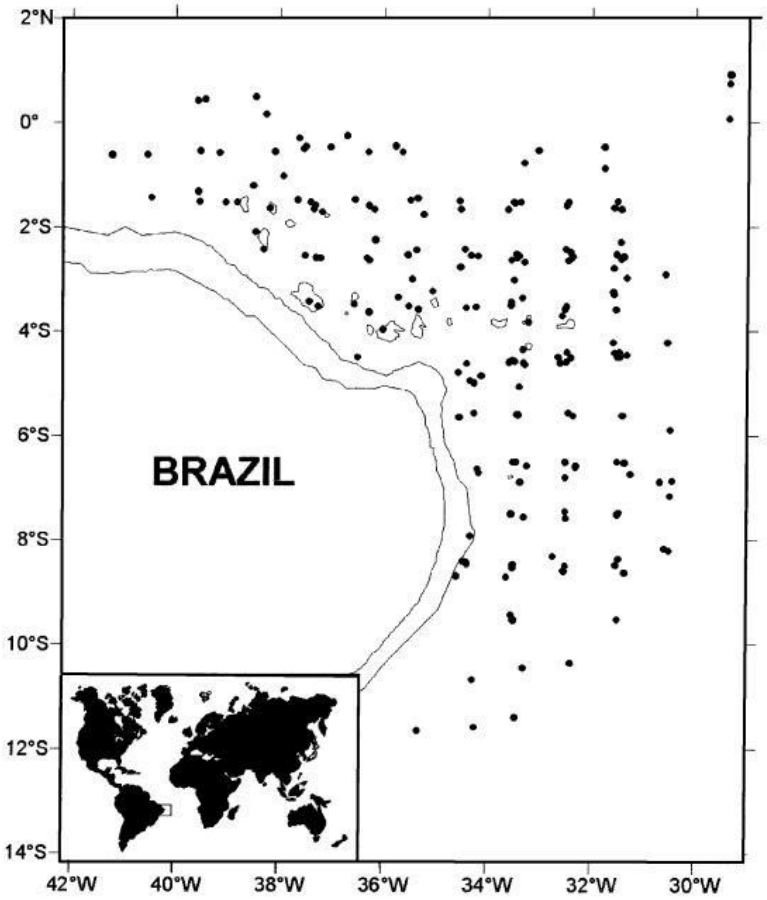


Figure 27 Location of the sampling area (small map) and station position (n = 197) performed for oceanic whitetip shark collected off northeastern Brazil (Source: Lessa *et al.* 1999).

From 1992-2002, oceanic whitetip CPUE in this area averaged 2.18 individuals/1000 hooks (Domingo *et al.,* 2007). More recently, however, average CPUE in this same area has seemingly declined to 0.1-0.3 individuals/1000 hooks (Figure 28 below). Additionally, none of the other areas within the region exhibit CPUE rates anywhere near the rates seen in the 1990s.

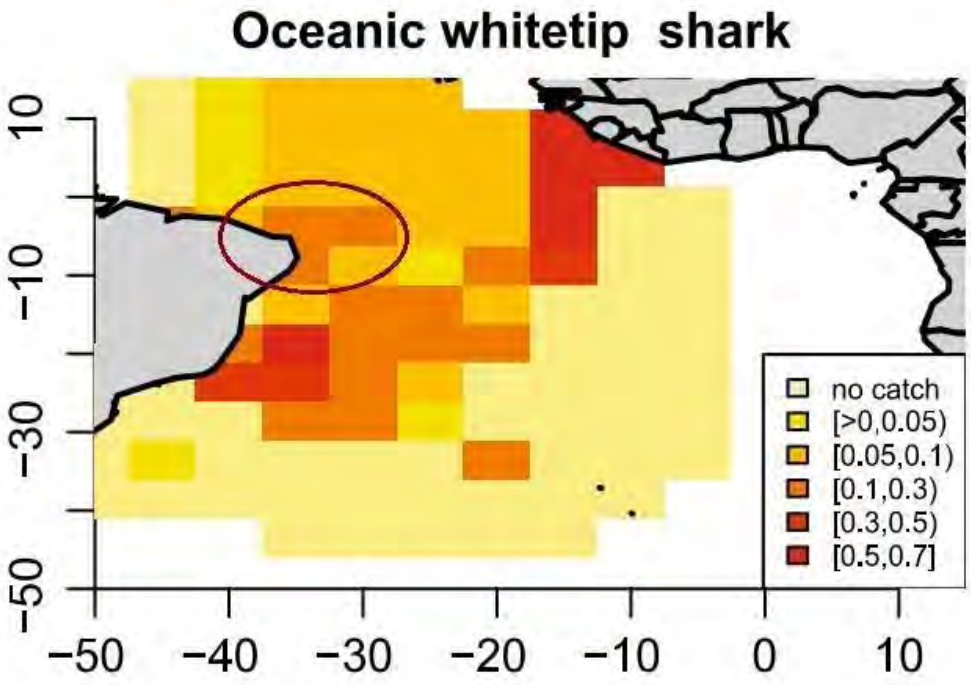


Figure 28 Longline catch per unit effort (CPUE individuals per 1,000 hooks) of the Brazilian chartered tuna longline fleet for the oceanic whitetip shark from 2004-2010 (Source: Frédou *et al.,* (2015).

Additionally, in earlier years the proportion of the oceanic whitetip shark in relation to the total catches of elasmobranches was very low at 2.7%; it showed a peak of 8.2% in 2008, and ranged from 0.8% to 3.4% in the remaining years. These values from 2004-2010 are much lower than the nearly 30% observed by Lessa *et al*. (1999) described previously. However, the results are not directly comparable due to the operational differences in the fishing gear and methods used by the experimental and the commercial operations. For example, the experimental vessels operated in much shallower layers of the water column, where encounters of oceanic whitetip shark is known to be much more frequent (Tolotti *et al.,* 2013).

More recently, Tolotti *et al*. (2013) analyzed catch and effort data from 14,835 longline sets conducted by foreign tuna longline vessels chartered by Brazil from 2004-2010 to assess the size, distribution and relative abundance of the oceanic whitetip shark in the southwestern and equatorial Atlantic Ocean. Standardized CPUE data showed a gradually increasing trend in oceanic whitetip shark abundance from 2004 to 2010. However, the authors noted that the CPUE standardization may have been compromised due to the low number of years in the data series as well as a lack of a homogeneous distribution of fishing effort and fishing strategy, both spatially and temporally. For example, although the Japanese fishing strategy (which typically catches fewer oceanic whitetip sharks due to deeper hook depth) accounted for the majority of hooks deployed in 2004 and 2005, the Spanish strategy (which has shown to catch more oceanic whitetip sharks due to the deployment of hooks at shallower depths) was consistently dominant from 2006 onwards. Further, in the last three years of the time series (i.e., 2008, 2009, and 2010) the Brazilian fleet consisted entirely of vessels fishing with the Spanish strategy, which may have influenced the gradual increase in CPUE over the time series. Overall, the authors concluded that the oceanic whitetip shark was encountered more frequently but in fewer numbers over time (Tolotti *et al*. 2013) and that CPUE of this species is particularly sensitive to changes

in fishing strategy. However, definitive conclusions regarding abundance trends from this study could not be determined.

In northeastern Brazil, Santana *et al.,* (2004) conducted a demographic analysis for oceanic whitetip shark. In this analysis, the authors noted that natural mortality of oceanic whitetip shark is high, corresponding to a survival rate between birth and the first year of life of only 58.7%. From these rates, the authors analyzed various scenarios in order to observe the population's behavior based on different mortality rates. Thus, by using actual mortality rates, the authors concluded that the oceanic whitetip population of Northeast Brazil has declined approximately 7.2% per year, resulting in a rate of decline of about 50% of abundance over the course of a decade due to unsustainable fishing pressure. The authors noted that this rate of decline is within the standards known of exploited populations of oceanic whitetip shark in other parts of its range (Santana *et al*. 2004). More recently, the Government of Brazil, in its justification for listing the oceanic whitetip as Vulnerable on its List of Species of Brazilian Fauna Threatened with Extinction (MMA Ordinances No. 444/2014 and No. 445/2014) estimated that the oceanic whitetip population has potentially declined by up to 79% (ICMBio 2014)[3]. However, given the lack of historical fisheries data or a stock assessment, these estimates are uncertain.

Farther south in Uruguay, abundance of oceanic whitetip shark is seemingly low and patchy. In 6 years of observer data from the Uruguayan longline fleet (1998-2003), in which approximately 660,000 hooks were deployed between latitudes 26° and 37° S, catches of oceanic whitetip shark were described as "occasional" with CPUE rates of only 0.006 individuals/1,000 hooks (Domingo 2004). Domingo (2004) noted that it is unknown whether the low abundance of oceanic whitetip sharks in Uruguayan longline fisheries is because the species has always occurred in low numbers in this region of the South Atlantic, or because the population has been affected significantly by fishing effort. It should be noted that sampling in this study took place in waters with sea surface temperatures ranging between 16° and 23° C, which are largely below the preferred temperature of the species. In a more recent analysis of observer data, Domingo *et al.,* (2007) found similar results as the earlier study. For example, observer data from the Uruguayan longline fleet operating in this region reported low CPUE values for oceanic whitetip from 2003 to 2006, with the highest CPUE recorded not exceeding 0.491 individuals/1,000 hooks. In total, only 63 oceanic whitetips were caught on 2,279,169 hooks and 63% were juveniles. All catches occurred in sets with sea surface temperatures ≥ 22.5° C (Domingo *et al*., 2007). Again, this data does not indicate whether a decline in the population has occurred; but, it does seem to reflect the species' low abundance in this area (Domingo *et al.,* 2007).

Indian Ocean

The status and abundance of shark species in the Indian Ocean is poorly known despite a long history of research and more than 60 years of commercial exploitation by large-scale tuna fisheries (Romanov *et al.,* 2010). De Young (2006) characterized the status of shark populations off the coasts of Egypt, India, Iran, Oman, Saudi Arabia, Sudan, United Arab Emirates, and Yemen as currently unknown. Further, the status of shark populations off the coasts of the Maldives, Kenya, Mauritius, Seychelles, South Africa, and United Republic of Tanzania is presumed to be fully over-exploited. Despite evidence for high bycatch levels of pelagic sharks

[3] http://www.icmbio.gov.br/portal/faunabrasileira/lista-de-especies/6526-especie-6526

in the Indian Ocean (Romanov 2002; Huang and Liu 2010), a lack of reliable data prohibits an assessment of historical changes in shark catch rate trends (Smale 2008). For oceanic whitetip sharks in particular, there is no quantitative stock assessment and only limited basic fishery indicators are available, making it difficult to determine abundance trends within this ocean basin. Therefore, the Indian Ocean Tuna Commission (IOTC) determined that the oceanic whitetip stock status in the Indian Ocean is currently uncertain (IOTC 2015a). However, historical research sampling data shows overall declines in both CPUE and mean weight of oceanic whitetip sharks (Romanov *et al.,* 2008); see Figure 29 below), and anecdotal reports suggest that oceanic whitetips have become rare throughout much of the Indian Ocean over the past 20 years (IOTC 2015a).

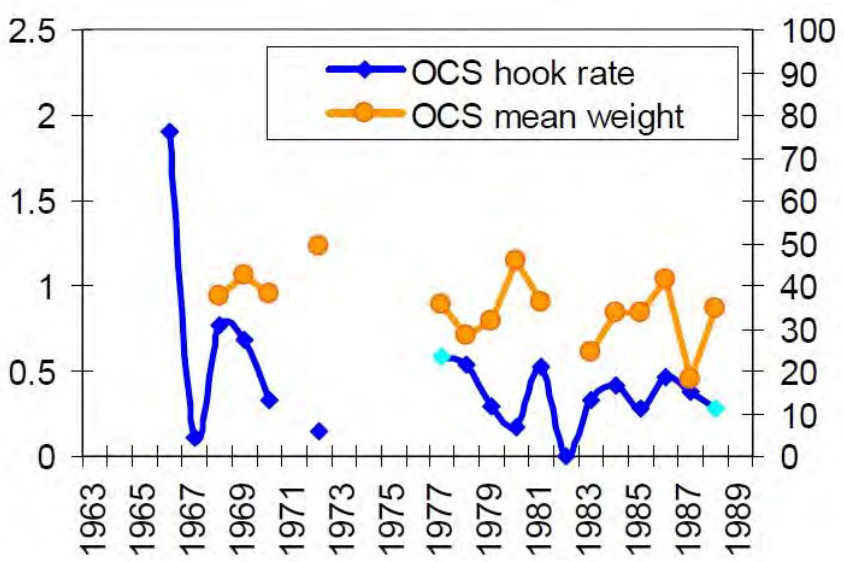


Figure 29 Historical nominal CPUE and mean weight of oceanic whitetip shark from 1963-1989 in the Indian Ocean. Left axis is CPUE; right axis is mean weight (Source: Romanov *et al.* 2008).

Additionally, some studies provide additional information on the decline of oceanic whitetip in the Indian Ocean. Data from an exploratory fishing survey for large pelagic species conducted off the eastern seaboard of the Maldives from 1987–88 indicated that oceanic whitetips represented 29% of the sharks caught by longline and 10% of the sharks caught by gillnet in all fishing zones (Anderson and Waheed 1990). In the center and north fishing zones, oceanic whitetip sharks contributed 19.9% of the total shark longline catch by numbers. During this survey, the average CPUE for all sharks was 48.7 sharks/1,000 hooks. Applying the percentage of oceanic whitetips in the catch to the total shark CPUE translates to an oceanic whitetip catch rate of approximately 1.41 individuals/100 hooks during the time period (FAO 2012). In comparison, Anderson *et al.,* (2011) conducted 4 missions to the island of Kulhudhuffushi (in the northern Haa Dhaalu atoll) from 2000-2004 to study the local shark fishery. The shark longline fishery in this region was conducted by small traditional dhonis that used an average of 141 hooks. Up until 2010, this was the most important shark fishing island in the country until the fishery closed because of a national ban on shark fishing. Anderson *et al*. (2011) estimated that the average CPUE of oceanic whitetip was 0.20 individuals per dhoni (or approximately 0.14 sharks/100 hooks), and estimated the species contributed only 3.5% of the shark landings. This is a stark contrast to the numbers reported from 1987-88, and represents a 90% decline in

abundance between 1987–88 and 2000–04. This level of decline would be consistent with the decrease in the proportion of oceanic whitetip in the catch (from 29% of longline shark catch in 1987-88 to just 3.5% of landings in 2000-04) and also with anecdotal information reporting a marked decrease in sightings of oceanic whitetip sharks off northern and central Maldives (Anderson *et al.,* 2011; FAO 2012). For example, the aforementioned offshore survey conducted in 1987-88 noted that oceanic whitetips frequently approached the vessel (Anderson and Waheed, 1990), while more recent offshore surveys by divers around fish aggregating devices (FADs) reported no sightings of oceanic whitetips off the north or center of the Maldives (Anderson *et al.,* 2011). Ultimately, Anderson *et al*. (2011) determined that the shark stocks that supported the shark fishery were sequentially overfished, with the decline in oceanic shark catches the result of high (and likely unsustainable) levels of fishing by overseas fisheries. The IOTC Working Party on Ecosystems and Bycatch (WPEB) noted the following on the aforementioned studies:

> "Data collected on shark abundance represents a consistent time series for the periods 1987–1988 and 2000–2004, collected with similar longline gear, and that the data was showing a declining trend in oceanic whitetip shark abundance, which is a potential indicator of overall stock depletion."

The WPEB further noted that it could be related to localized effects, although this was deemed unlikely as oceanic whitetip sharks are wide-ranging and abundance trends from long-term research conducted by the former Soviet Union between the 1960s and 1980s indicate a similar decline of oceanic whitetip sharks, and that "sightings of this species in Maldives and Réunion islands is now quite uncommon" (IOTC 2011a).

Other studies on the abundance trends of oceanic whitetip shark, including analyses of standardized CPUE indices from Japanese and Spanish longline fisheries indicate potential population declines ranging from 25-40%, although trends are conflicting. Standardized CPUE for oceanic whitetip shark has been estimated for the Japanese longline fleet operating in the Indian Ocean (Semba and Yokawa 2011; Yokawa and Semba 2012). In the first study, CPUE reached its peak in 2003 and then showed a gradual decline thereafter. (Figure 30 below; Semba and Yokawa (2011)). Prior to 2003, the authors attribute large fluctuations in oceanic whitetip CPUE to changes in reporting requirements as opposed to the actual population trend, as the initial years of the time series reflect the introduction phase of a new records system. The data showed low values in 2000 and 2001 (attributed to extremely low catches), and a gradual decreasing trend from 2003 to 2009. The authors interpreted the 40% decline in CPUE as an indication of a decrease in population abundance (FAO 2012; Semba and Yokawa 2011). In an update of the 2011 study, Yokawa and Semba (2012) used a modified data filtering method, and produced a rather similar and somewhat flattened trend when compared to the results of the 2011 study.

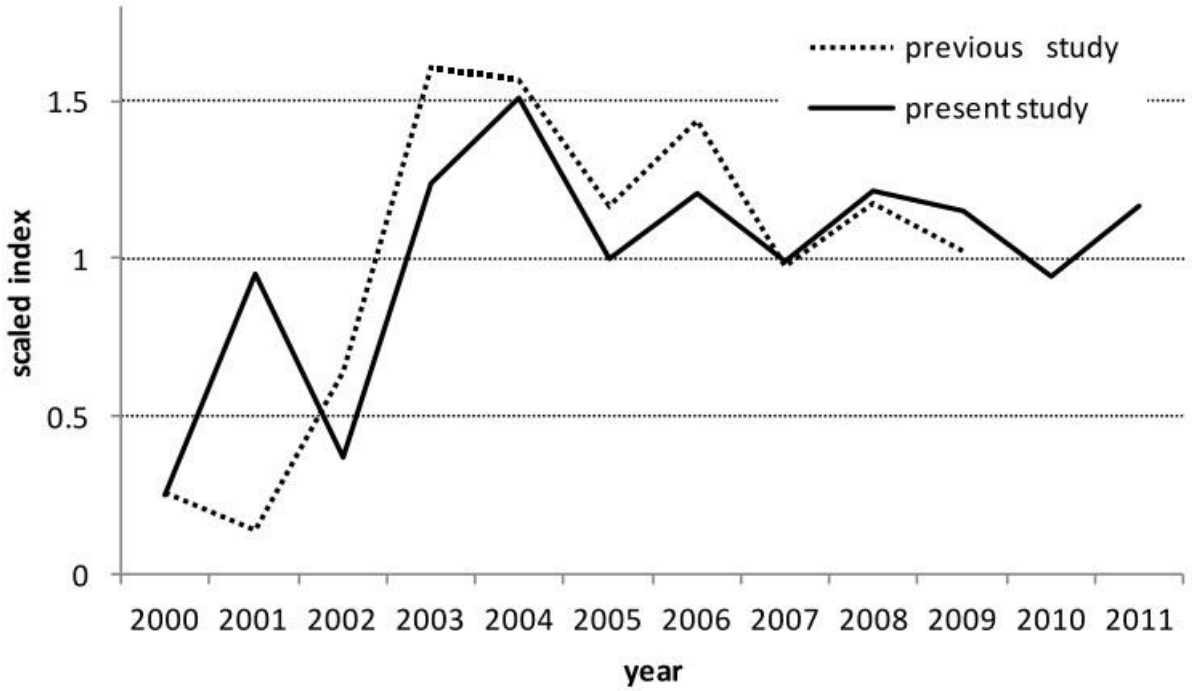


Figure 30 Trends of standardized CPUE of oceanic whitetip shark in the Japanese longline fleet operating in the Indian Ocean (Source: Yokawa and Semba 2012).

Ramos-Cartelle *et al*. (2012) used a General Linear Mixed Model to determine standardized CPUE rates of oceanic whitetip shark in the Spanish longline fishery from 1998-2011 based on 2,806 set records. Results showed large historical fluctuations and a general decreasing trend from 1998-2007, followed by an increase thereafter (Figure 31 below). Overall, the magnitude of decline in this study was estimated to be about 25-30% (Ramos-Cartelle *et al.,* 2012). However, the authors noted that this index may not be a reliable indicator of the species' stock abundance as a whole due to high variability of the standardized catch rates between consecutive years and scarce numbers of specimens in some years (Ramos-Cartelle *et al.,* 2012). However, the data does reaffirm the oceanic whitetip's relatively low prevalence in the surface longline commercial fishery targeting swordfish in waters with lower temperatures than those generally preferred by the species (García-Cortés *et al.,* 2012; Ramos-Cartelle *et al.,* 2012).

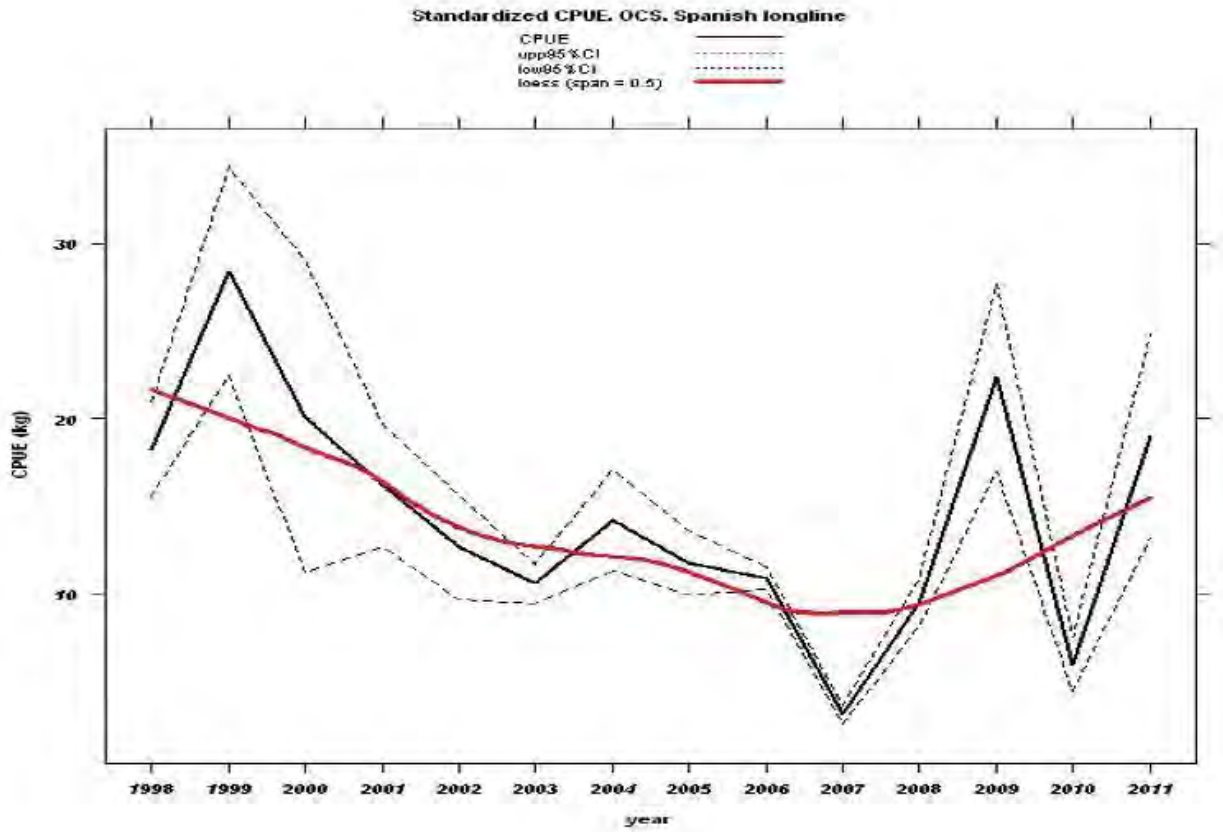


Figure 31 Estimated standardized catch rates of the Spanish longline fleet (kg dressed weight), corresponding 95% confidence limits (bootstrap percentile method) and loess fit (red line) of the oceanic whitetip shark in the Indian Ocean during the 1998-2011 period (Source: Ramos-Cartelle *et al.* 2012).

Finally, Tolotti *et al.,* (2015b) analyzed data from 3,339 purse seine sets conducted by the French tuna fleet in the Indian Ocean. The time series includes data from the mid-1990s (1995 and 1996) and from 2005-2014. Sets covered a large area of the Indian Ocean, from approximately 5°N to 20°S latitude and 70°E to 40°E longitude. Additional historical data from the Soviet Union (USSR) were also incorporated into the analyses in order to examine possible changes in population trends. Interactions between oceanic whitetip sharks and the tropical purse seine fisheries were analyzed in terms of occurrence per set, but did not account for the number of individuals caught per set. Results showed a marked change in the proportion of FAD sets with oceanic whitetips present, fluctuating around 20% in the mid-1980s and 1990s, and then dropping to less than 10% from 2005 onwards (Tolotti *et al*., 2015b; See Figure 32 below).

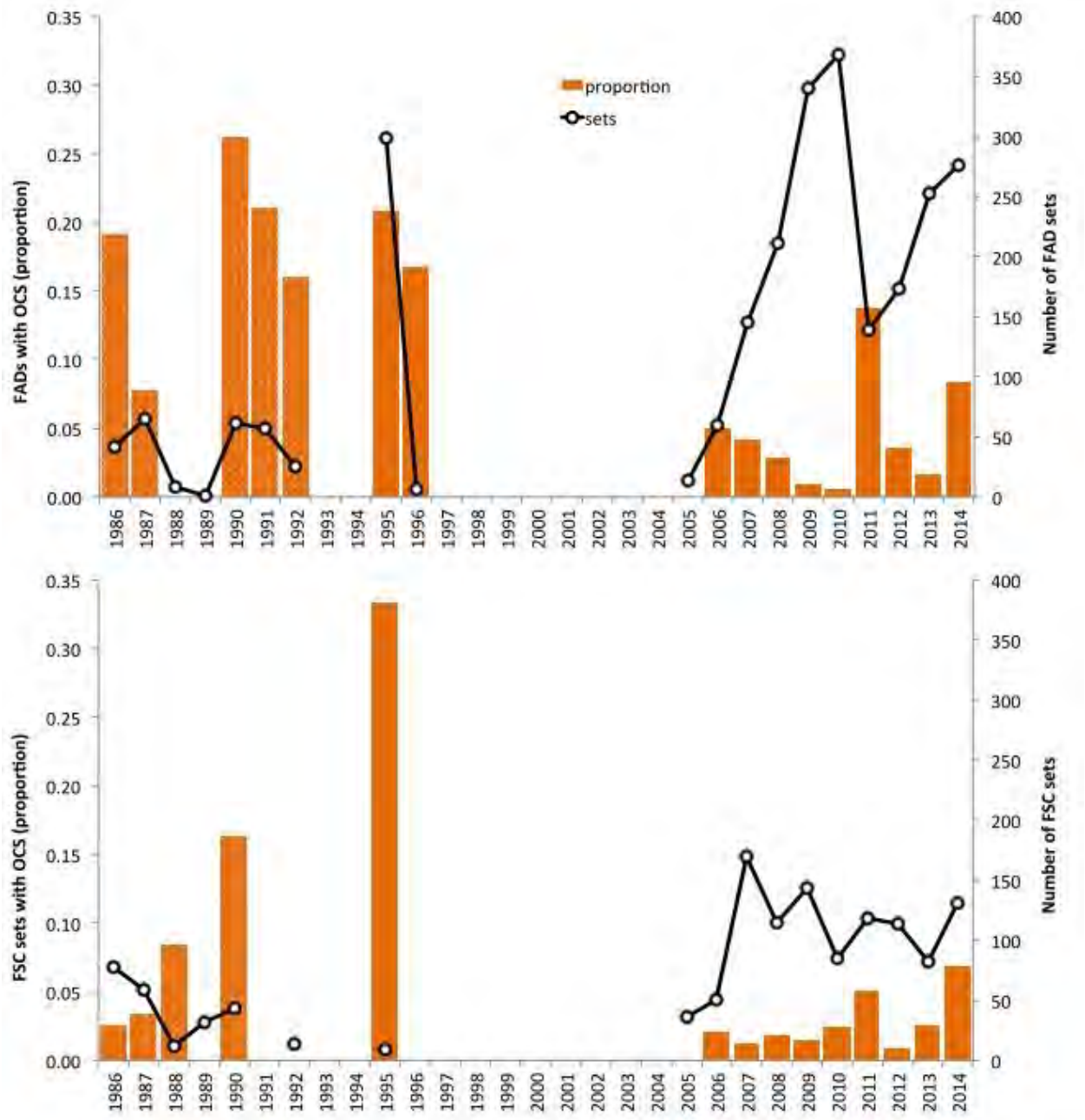


Figure 32 Proportion between sets with the presence of oceanic whitetip sharks (bars) and the total number of sets (points). Top panel shows the proportion on FAD sets and bottom panel on FSC. The shaded bars represent the historic database from USSR. Source: Tolotti *et al.* 2015b.

Considering that the number of FADs has greatly increased since the 1990s (Dagorn *et al.,* 2013; Maufroy *et al.,* 2015; Tolotti *et al.,* 2015b), the authors concluded that the percent change in the proportion of FADs with oceanic whitetip sharks by more than 50% could indicate a population decline (Tolotti *et al.,* 2015b). Alternatively, the authors considered that the decline of oceanic whitetip shark occurrence per FAD could be the result of a sharp increase on FAD densities combined with a small and stable population size. Although it is unclear which scenario is more plausible based on the available data, given the declines indicated in other studies throughout the

Indian Ocean, it seems more likely that the marked decline observed in Tolotti *et al.,* (2015b) is indicative of a declining abundance trend rather than a small, stable population. Overall, while it is likely that the oceanic whitetip shark has experienced some level of decline in the Indian Ocean, there is considerable uncertainty regarding current population abundance and the exact magnitude of decline in this region.

Regional Population Trends Summary

Overall, evidence (both quantitative and qualitative) suggests that while the oceanic whitetip shark was once considered to be one of the most abundant and commonly encountered pelagic shark species wherever it occurred, this oceanic species has likely undergone population abundance declines of varying magnitudes throughout its global range. Where more robust information is available, declines in oceanic whitetip shark abundance range from 86 to greater than 90% in some areas of the Pacific Ocean (with declines observed across the entire basin), and between 57-88% in the Atlantic and Gulf of Mexico. Although information from the Indian Ocean is highly uncertain and much less reliable, the best available information points to varying magnitudes of decline, with the species becoming rare across the basin over the last 20 years. The only population that currently shows a stable trend, based on standardized CPUE observer data, is the Northwest Atlantic. The trend of oceanic whitetip catches in the Hawaii-based pelagic longline fishery may have also potentially stabilized at a post-decline depressed state in recent years. In addition to CPUE trends, which can often be misleading and unreliable due to uncertainties in standardization, stock structure and other factors, other abundance indices such as trends in occurrence and composition of the species in catch data, as well as biological indicators (e.g., mean length or weight, etc.) also indicate significant and continuing declines of oceanic whitetip in a large portion of its range.

4. ESA SECTION 4(a)(1) FACTORS

The ESA requires NMFS to determine whether a species is endangered or threatened due to any one of the five factors specified in section 4(a)(1) of the ESA. The following provides information on each of these five factors as they relate to the current status of the oceanic whitetip shark.

4.1 (A) Present or Threatened Destruction, Modification or Curtailment of Habitat or Range

This section analyzes potential threats to oceanic whitetip shark habitat, including impacts from fishing and climate change.

Habitat in United States

In the U.S. EEZ, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires NMFS to identify and describe Essential Fish Habitat (EFH), minimize the adverse effects of fishing on EFH, and identify actions to encourage the conservation and enhancement of EFH. The MSA defines EFH as as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802(10)) and requires the identification of EFH in Fishery Management Plans (FMPs).

Atlantic

Essential fish habitat has been designated for the oceanic whitetip in localized areas in the Atlantic and Gulf of Mexico, as well as the U.S. Caribbean. Insufficient data is available to differentiate EFH between nenonates/juveniles and adults; therefore, the following description of EFH is for all life stages. Currently, designated EFH includes waters greater than 200 m in depth from offshore of the North Carolina/Virginia border to the Blake Plateau. Designated EFH in the Gulf of Mexico includes offshore habitats of the northern Gulf of Mexico at the Alabama/Florida border to offshore habitats of the western Gulf of Mexico south of eastern Texas. Additionally, the entire U.S. Caribbean (waters of Puerto Rico and the U.S. Virgin Islands) is considered to be EFH for the oceanic whitetip (see Figure 33 below; NMFS 2017). However, while we can confirm that the geographical areas occupied by the oceanic whitetip include U.S. waters, there is no information regarding habitat use of oceanic whitetip sharks in any of these areas (J. Carlson, personal communication, 2017), and nurseries and pupping grounds have not been identified (NMFS 2017; CITES 2013).

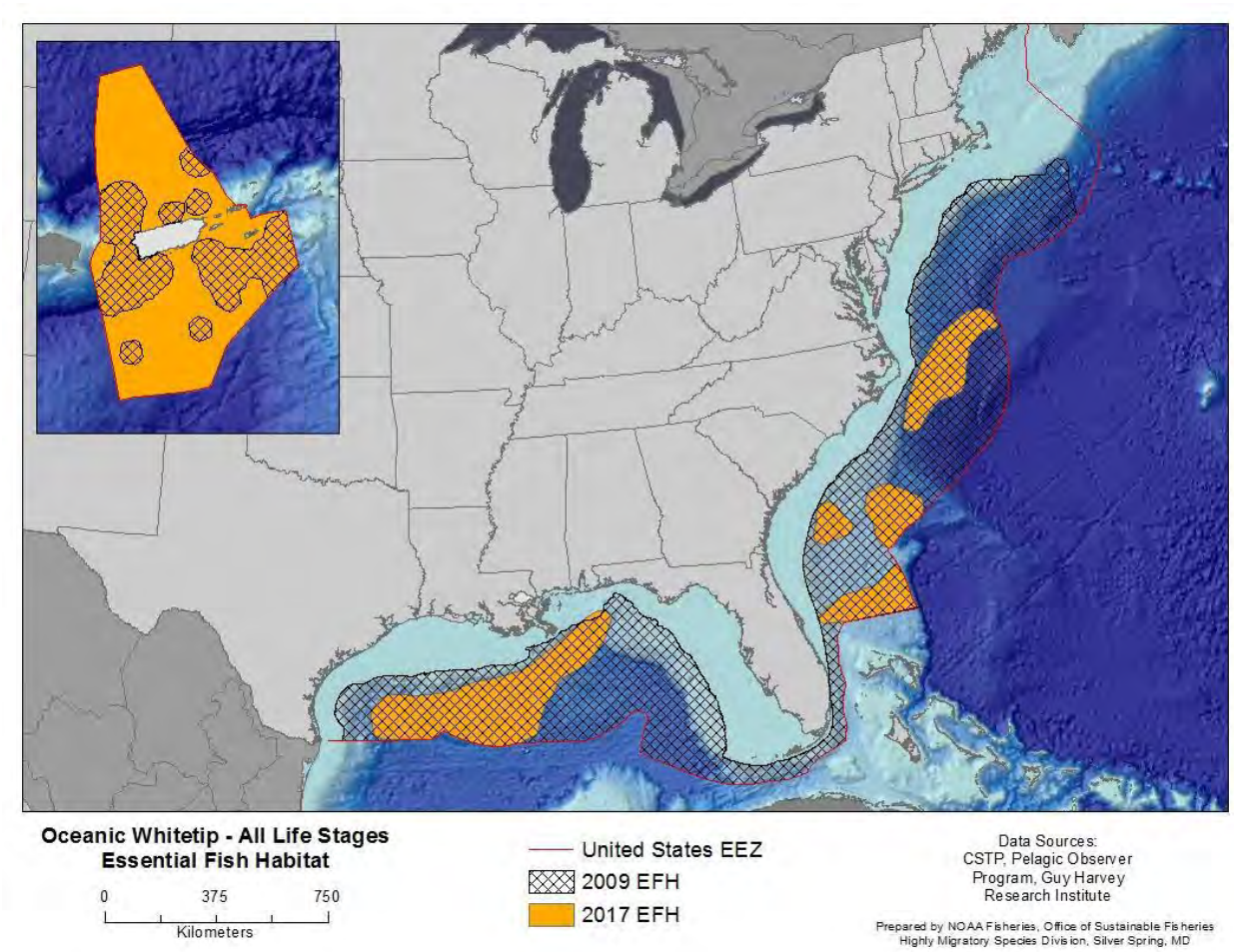


Figure 33 EFH for oceanic whitetip shark in the Northwest Atlantic (Source: NMFS (2009a).

Pacific

In the U.S. western Pacific, including Hawaii, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands, EFH for oceanic whitetip sharks is broadly defined as the water column down to a depth of 1,000 m (547 fm) from the shoreline to the outer limit of the EEZ (WPFMC 2009). Based on an examination of published literature and anecdotal evidence, NMFS

assessed the impact of fishing gears on highly migratory species (HMS) EFH and determined that there are few anticipated impacts from federally regulated and non-federally regulated gears to HMS EFH (which includes oceanic whitetip shark EFH) (NMFS 2006). Since EFH is defined for the oceanic whitetip as the water column or attributes to the water column, cumulative impacts from HMS and non-HMS fishing gears are anticipated to be minimal. However, a better understanding of the specific habitat types and characteristics that influence the abundance of these sharks within those habitats is needed in order to determine the effects of fishing activities on habitat suitability for oceanic whitetip sharks. In addition, EFH regulations also require that FMPs identify non-fishing related activities that may adversely affect EFH of managed species, either quantitatively or qualitatively, or both. These waters are or may be used by humans for a variety of purposes that often result in degradation of these and adjacent habitats, posing threats, either directly or indirectly, to the biota they support (NMFS 2006). These effects, either alone or in combination with effects from other activities within the ecosystem, may contribute to the decline of some species or degradation of the habitat; however, the cumulative anthropogenic effects on the species' continued existence are difficult to quantify. Currently, there is no evidence to suggest a range contraction based on habitat degradation for the oceanic whitetip shark.

Non-U.S. Habitat

Aside from impacts from overfishing, information on threats to oceanic whitetip shark habitat areas outside of the United States is not available.

Climate Change

Studies on the impacts of climate change specific to the oceanic whitetip have not been conducted. However, because oceanic whitetip shark habitat is comprised of open ocean environments occurring over broad geographic ranges, large-scale impacts such as global climate change that affect ocean temperatures, currents, and potentially food chain dynamics, may impact these species. As a proxy, below is a description of available climate change studies on other pelagic shark species that occur in the range of oceanic whitetip sharks. However, without any species-specific studies, climate change impacts to oceanic whitetip sharks are highly uncertain.

In a study to assess the vulnerability of sharks and rays on Australia's Great Barrier Reef (GBR) to climate change, Chin *et al.,* (2010) conducted an Integrated Risk Assessment for Climate Change. The assessment examined individual species but also lumped species together in ecological groups (such as freshwater and estuarine, coastal and inshore, reef, shelf, etc.) to determine which groups may be most vulnerable to climate change. Pelagic shark species (e.g., oceanic whitetip and blue sharks) were considered in the "pelagic" ecological group. The assessment took into account the *in situ* changes and effects that are predicted to occur over the next 100 years in the GBR and assessed each species' exposure, sensitivity, and adaptive capacity to a number of climate change factors. The resulting vulnerability rankings for each species were then collated to calculate the relative vulnerability of the ecological groups.

The climate change factors that were considered in the assessment included water and air temperature, ocean acidification, freshwater input, ocean circulation, sea level rise, severe weather, light, and ultraviolet radiation. Results from the assessment showed that freshwater/estuarine sharks and rays are at highest risk from climate change, with high exposure

to the climate change factors. The pelagic ecological group showed relatively low risk, with moderate to high exposure to only a couple of the climate change factors (e.g., oceanographic changes and rising temperatures could affect productivity, migration patterns, and phenology, as well as the physiochemical environment, respectively). Additionally, all of the species within the pelagic group (except the plankton-feeders) had low sensitivity and rigidity (i.e., assessments that considered species' rarity, habitat and trophic specificity, physical-chemical intolerance, immobility, and latitudinal range), which lowered their individual vulnerability to climate change factors.

In another study on potential effects of climate change to sharks, Hazen *et al.,* (2012) used data derived from an electronic tagging project (Tagging of Pacific Predators Project) and output from a climate change model to predict shifts in habitat and diversity in top marine predators in the Pacific out to the year 2100. Results of the study showed significant differences in habitat change among species groups, which resulted in species-specific "winners" and "losers." The shark guild as a whole had the greatest risk of pelagic habitat loss (Figure 34).

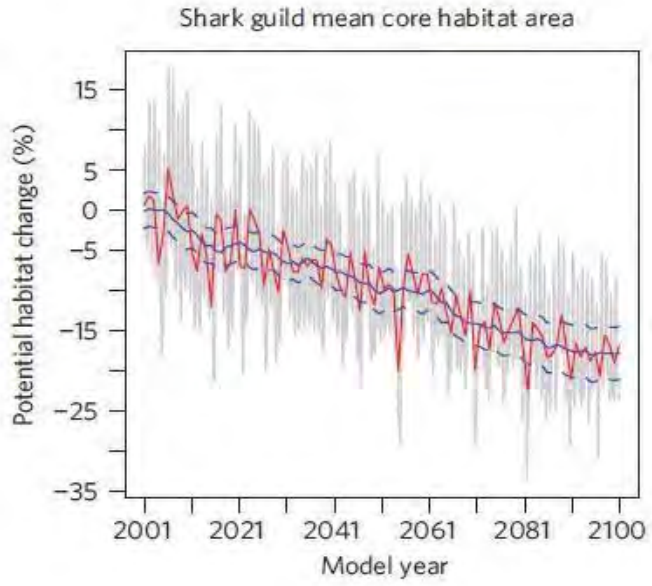


Figure 34 Core habitat area for sharks from the year 2000 to 2100 shown as monthly (grey), yearly (red) and 5-year filtered (blue) time series with 1 standard deviation marked by dashed lines (Source: Hazen *et al.* 2012).

Overall, the model predictions in Hazen *et al.,* (2012) and the vulnerability assessment in Chin *et al.,* (2010) represent only two very broad analyses of how climate change may affect pelagic sharks, and do not account for factors such as species interactions, food web dynamics, and fine-scale habitat use patterns that need to be considered to more comprehensively assess the effects of climate change on the pelagic ecosystem. Further, results of these studies are not specific to the oceanic whitetip shark. Finally, the complexity of ecosystem processes and interactions complicate the interpretation of modeled climate change predictions and the potential impacts on populations. Thus, the potential impacts from climate change on oceanic whitetip shark habitat are highly uncertain, but given their broad distribution in various habitat types, these species can move to areas that suit their biological and ecological needs. Therefore, while effects from climate change have the potential to pose a threat to sharks in general, including habitat changes such as changes in currents and ocean circulation and potential impacts to prey species, species-

specific impacts to oceanic whitetip sharks and their habitat are currently unknown, but likely minimal.

4.2 (B) Overutilization for Commercial, Recreational, Scientific or Educational Purposes

Threats to the oceanic whitetip shark related to overutilization stem from commercial fisheries, largely driven by demand of the international shark fin trade, bycatch-related mortality, and illegal, unreported, and unregulated (IUU) fishing. The oceanic whitetip shark is not generally targeted, but the species is regularly caught and taken as bycatch in numerous fisheries around the world. This species is commonly caught with pelagic longlines, purse seines, handlines, troll and occasionally pelagic and even bottom trawls (Compagno 1984). Although thought to be of low commercial value, oceanic whitetip shark meat is utilized fresh, smoked, and dried and salted for human consumption (Compagno 1984). Additionally, oceanic whitetip meat from longline bycatch has been marketed in Europe, North America and Asia (Rose 1996; Vannuccini 1999). Oceanic whitetip sharks are also used for hides, for fins (for shark fin soup), and for liver oil (extracted for vitamins) and fishmeal. In contrast to the low commercial value of the meat (Mundy-Taylor and Crook 2013), oceanic whitetip fins are highly prized in the international shark fin market and sell for USD $45 to USD $85 per kg (CITES 2013).

In addition to mortality caused by retention and finning in commercial fisheries, oceanic whitetip sharks likely experience some level of fishing mortality upon being discarded or released. While several studies throughout the oceanic whitetip shark's range indicate relatively high at-vessel survivorship rates in longline fisheries relative to other pelagic sharks (up to 88% in longline fisheries using circle hooks; Beerkircher *et al.,* (2002); Bromhead *et al.,* (2012); Fernandez-Carvalho *et al.,* (2015)), these numbers can vary among fleets and do not account for potential post-release mortality. These data suggest that oceanic whitetips could benefit from live release as mandated in the shark resolutions passed by most RFMOs (Camhi *et al.,* 2009) if they are fully implemented and enforced; however, this may not always be the case. See *Inadequacy of Existing Regulatory Mechanisms* section for more details. For the purposes of this status review, population dynamic characteristics, such as current population size, abundance trends by regions, and the effects of fisheries and the shark fin trade on the species were considered when evaluating whether the oceanic whitetip shark is currently experiencing overutilization throughout its global range. Much of the data come from localized study sites and over short time periods and thus is difficult to extrapolate to the global population. This section includes relevant information from the following geographic regions: Eastern Pacific, Western and Central Pacific, Northwest and Central Atlantic, South Atlantic, and Indian Ocean.

PACIFIC OCEAN

Eastern Pacific Ocean

In the Eastern Pacific, the oceanic whitetip shark is caught on a variety of gear, including longline and purse seine gear targeting tunas and swordfish. While the range of the oceanic whitetip in the Eastern Pacific is noted as extending as far north as southern California waters, based on the available data, the distribution of the species appears to be concentrated in areas farther south, and in more tropical waters. Observer data of the West-Coast based U.S. fisheries further confirms this finding, with oceanic whitetip sharks not observed in the catches. For

example, in the California/Oregon drift gillnet fishery, which targets swordfish and common thresher sharks and operates off the U.S. Pacific coast, observers recorded 0 oceanic whitetip sharks in 8,698 sets conducted over the past 25 years (from 1990-2015[4]).

Oceanic whitetip sharks are commonly caught as bycatch in the tropical tuna purse seine fishery. From 1993-2009, oceanic whitetip comprised approximately 9% of the total shark catch, and was the second most abundant shark in these catches behind the silky shark (Hall and Roman 2013). Fisheries information and catch data for the Eastern Pacific are available from the Inter-American Tropical Tuna Commission (IATTC), which is the RFMO responsible for the conservation and management of tuna and other marine resources in this region. To date, the IATTC has not conducted a stock assessment for the oceanic whitetip shark. The IATTC requires the collection of data on the primary shark species caught as bycatch in its fisheries. Since 1993, observers have recorded shark bycatch data onboard large purse seiners in the Eastern Pacific. However, much of this data is aggregated under the category of "sharks," especially data collected prior to 2005. In an effort to improve species identifications in these data, a one-year Shark Characteristics Sampling Program was conducted to quantify at-sea observer misidentification rates. Oceanic whitetip sharks represented approximately 20.8% of the species observed during this project (Roman-Verdesoto and Orozco-Zoller 2005). More recently, species-specific observer data have become publicly available via the IATTC observer database, upon which estimates of shark catches (tons/year) by species for all purse seines operating in the Eastern Pacific Ocean for all set types combined (floating object + unassociated + dolphin) are based (See Figure 35 below).

4 http://www.westcoast.fisheries.noaa.gov/fisheries/wc_observer_programs/sw_observer_program_info/data_summ_report_sw_observer_fish.html

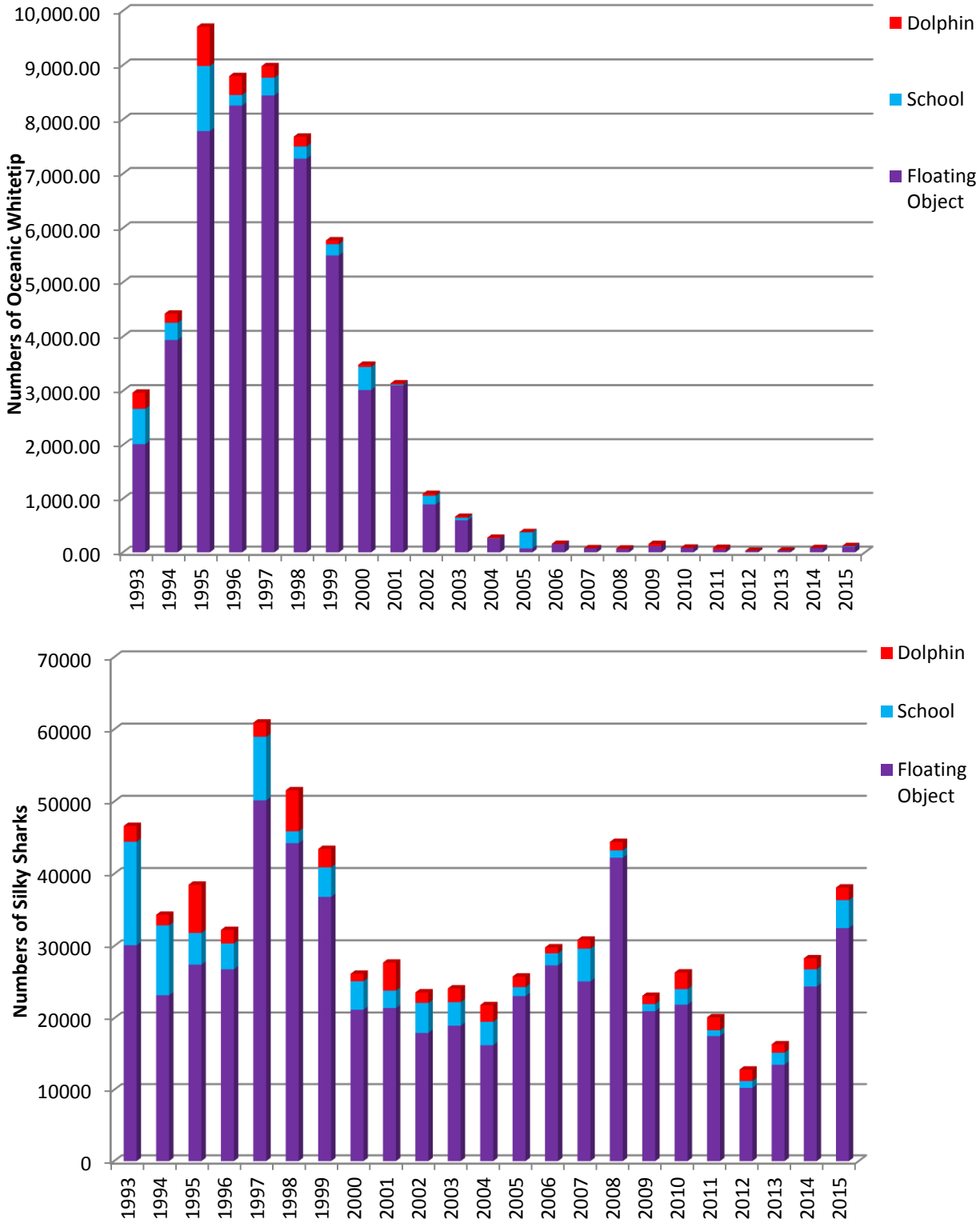


Figure 35 Annual estimated numbers of oceanic whitetip and silky sharks caught as bycatch in the tropical tuna purse seine fishery of the Eastern Pacific Ocean. *Note the differences in scales for the species. Source: IATTC Observer Database.

Floating object sets are responsible for 90% of oceanic whitetip shark catches. The species' capture probability in floating object purse seine sets has decreased over time from a high of 30% capture rate per set between 1994 and 1998, to less than 5% from 2004 to 2008 (Morgan 2014). Estimated catches of oceanic whitetip shark peaked in 1995, with approximately 9,709 individuals caught in all sets. Within 10 years, catches dropped dramatically to only 379 oceanic whitetip sharks caught, with catches continuing to decline thereafter, with only 120 individuals caught in 2015. This is in drastic contrast to catches of the closely related silky shark, which has remained relatively constant over the same time period. As noted previously in the *Regional Population Trends* section of this status review, declines in the nominal CPUE and frequency of occurrence of oceanic whitetip is compatible with a drop of 80–95% from the population levels in the late 1990s (Hall and Román 2013). Further, size trends in this fishery show that small oceanic whitetip sharks, which comprised 21.4% of the oceanic whitetips captured in 1993, have been virtually eliminated from the population, indicating the possibility of recruitment failure in the population (see Figure 36 below).

Capture of oceanic whitetip sharks by size interval in the Eastern Pacific Ocean, 1993–2008

	Number				Percent		
Year	Small	Medium	Large	Total	Small	Med	Large
1993	220	494	310	1024	21.4	48.3	30.3
1994	95	1130	1440	2665	3.5	42.4	54.1
1995	408	2984	2149	5541	7.4	53.9	38.8
1996	647	2765	2483	5895	11.0	46.9	42.1
1997	592	2258	2995	5845	10.1	38.6	51.2
1998	452	1862	2683	4997	9.1	37.3	53.7
1999	340	1213	2210	3764	9.0	32.2	58.7
2000	18	547	1426	1991	0.9	27.5	71.6
2001	80	729	1252	2662	3.9	35.4	60.7
2002	15	122	540	677	2.2	18.0	79.8
2003	0	105	266	371	0.0	28.4	71.6
2004	4	38	132	174	2.3	21.8	75.9
2005	1	23	30	54	1.9	42.6	55.6
2006	1	33	48	82	1.2	40.2	58.5
2007	1	18	23	42	2.4	42.9	54.8
2008	0	11	19	30	0.0	36.7	63.3

Figure 36 Capture of oceanic whitetip sharks by size interval in the Eastern Pacific Ocean from 1993-2008. Note: Small < 90 cm; medium 90-150 cm, large >150 cm. Source: Hall and Roman 2013.

During this same time period, there was an increase in both the total catch of tunas by purse seiners that employ drifting FADs and the number of FADs deployed (Eddy *et al.,* 2016; Hall and Román 2016). Over the past decade, the total number of FADs deployed per year has continued to increase steadily, from about 4,000 in 2005 to almost 15,000 in 2015, which is the highest record observed (Hall and Román 2016). The total number of sets has also continued increasing, with 2015 being the highest record observed.

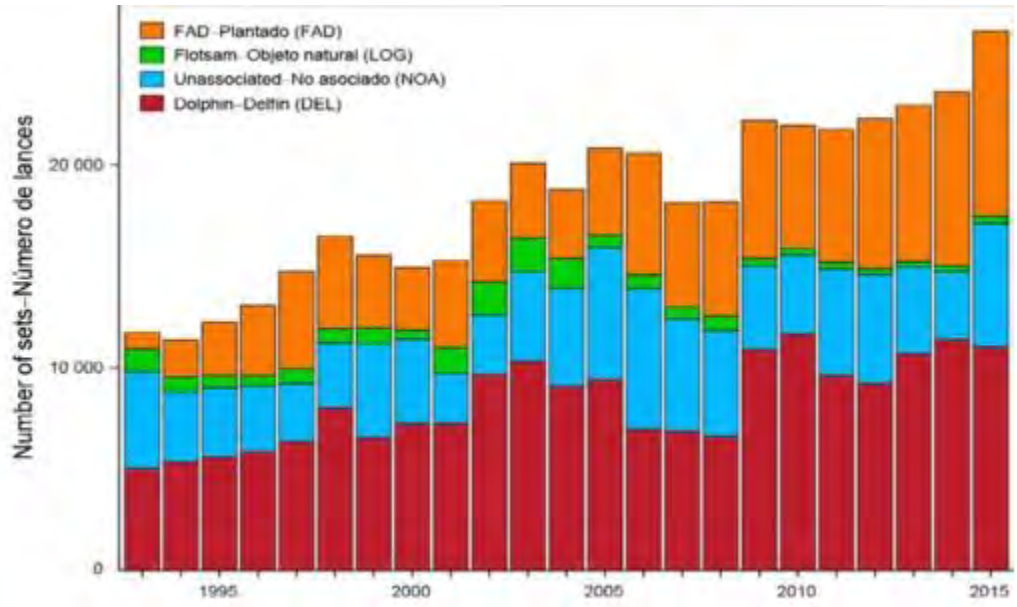


Figure 37 Number of sets, by type, in the Eastern Pacific Ocean. Source: Hall and Roman 2016.

Thus, given that fishing effort in the Eastern Pacific continues to increase, fishing pressure and associated mortality of oceanic whitetip sharks is expected to continue. Though mortality rates of oceanic whitetip in purse seine fisheries are not available, it is likely that oceanic whitetip sharks experience high mortality rates similar to congener *C. falciformis* (silky shark; >85% in Western and Central Pacific and Indian Ocean purse seine fisheries; Poisson *et al.,* (2014); Hutchinson *et al.,* (2015)) during and after interactions with purse seine fisheries. Although management measures are now in place that prohibit retention of oceanic whitetip shark in the Eastern Pacific Ocean (IATTC 2011), this will not likely be sufficient to prevent further population declines due to the likely high bycatch-related mortality rates in purse seine nets (including post-release mortality) (see *Inadequacy of Existing Regulatory Mechanisms* section for more details). Therefore, given the significant decline in catches and virtual disappearance of oceanic whitetip sharks from purse seine fishing grounds in the Eastern Pacific, it appears that these declines are likely the result of overutilization of the species.

Not only are oceanic whitetip sharks commonly encountered in purse seine fisheries, they are sometimes a significant component of the bycatch in longline fisheries and are likely taken in artisanal fisheries in several countries around the Eastern Pacific Ocean (IATTC 2007). While information regarding catch rates of oceanic whitetip shark in these fisheries is not readily available, some limited information is available from various countries that fish in these waters. For example, oceanic whitetip shark was identified as one of several principal species taken by Mexican fisheries targeting pelagic sharks (Sosa-Nishizaki *et al.,* 2008). Farther south in the Eastern Pacific, three countries (Costa Rica, Ecuador and Peru) contribute significantly to shark landings, and are important suppliers of shark fins for the Asian market. In a recent 61-year analysis of Peruvian shark fisheries, Gonzalez-Pestana *et al.,* (2014) reported the oceanic whitetip shark in the Peruvian fishery, but provided no additional information on the level of catch. The oceanic whitetip shark has also been recorded in the catches of the Ecuadorian artisanal fishery. In an analysis of landings from the five principal ports of the Ecuadorian artisanal fishery from 2008-2012, 37.2 mt of oceanic whitetip shark were recorded out of a total

43,492.6 mt of shark catches (Martinez-Ortiz *et al.,* 2015). In Costa Rica, only 10 oceanic whitetip sharks were reported by observers in the Costa Rican longline fishery from 1999 to 2010 (Dapp *et al.,* 2013). However, according to a recent report, landings data from the Costa Rican Fisheries Institute shows that 2,074 oceanic whitetip shark bodies were landed in 2011 alone in Puntarenas, Costa Rica (Arauz 2017). This provides some evidence that the oceanic whitetip shark is much more prevalent in Costa Rican longline fisheries than the observer data indicates; as such, this fishery may be contributing further to the overutilization of the species in the eastern Pacific.

Western and Central Pacific Ocean

The Western and Central Pacific Ocean supports the world's largest industrial tuna fishery. In recent years, several quantitative assessments have become available regarding the impact of this level of fishing on shark populations. Fisheries information and catch data for the Western and Central Pacific Ocean are available from the Western and Central Pacific Fisheries Commission (WCPFC[5]). The WCPFC is the RFMO that seeks the conservation and sustainable use of highly migratory fish stocks in the Western and Central Pacific Ocean. Like other regions, there is a historical lack of shark reporting on logbooks for most fleets in the Pacific, although this has improved in recent years with the implementation of Conservation Management Measures (CMM) that require catches of key shark species to be reported to the Commission. Under CMM 2009-04, members shall include catch information of key shark species in their annual reporting to the Commission, including oceanic whitetip shark. Currently, under CMM 2010-07 (which replaced CMM 2009-04 and was revised in 2014), reporting is only required south of 20°S until biological data shows this or another geographic limit to be appropriate[6]. Despite this requirement, recent catches of key shark species have not been provided to the WCPFC for a number of longline fleets, including Indonesia, which is the top shark fishing nation in the world (Dent and Clarke 2015).

Despite the lack of data, shark catches in this region can be estimated from limited observer data and it is clear that the majority of pelagic sharks are captured by longlines (Lawson 2011). Lawson (2011) describes the longline fishery in the Western and Central Pacific as "comprised of vessels that specifically target sharks, engage in 'mixed targeting' (in which vessels use methods that aim to catch shark and tuna species simultaneously), and target tuna and other non-shark species and take sharks solely as bycatch." Even when sharks are caught as bycatch, survival is often low due to the practice of finning or rough handling during gear retrieval. Although total shark catch in this region is highly uncertain due to caveats related to under-reporting and non-reporting of sharks, estimates form observer data indicate that total catches of sharks have averaged approximately 2 million sharks per year since the mid-1990s (Lawson 2011; Clarke *et al.,* 2012). Overall, with the exception of 2014, total effort in the longline fleet has increased from1995-2014 to the current effort level of approximately 800 million hooks annually; additionally, nearly half this effort occurs in the core tropical habitat area of the oceanic whitetip shark (i.e., regions 3 and 4 shown in Figure 40 below) (Rice *et al.,* 2015).

[5] http://www.wcpfc.int/wcpfc-data-catalogue-0

[6] http://www.wcpfc.int/doc/data-01/scientific-data-be-provided-commission-revised-wcpfc4-6-7-and-9

Oceanic whitetip sharks commonly interact with the longline fisheries throughout the Pacific, with at least 20 member nations of the WCPFC recording the species in their fisheries. In this region, where sharks represent 25% of the longline fishery catch, a study from 2007 based on observer data showed that the oceanic whitetip shark was the 5th most common species of shark caught as bycatch out of a total 49 species reported by observers, and represents approximately 3% of the total shark catch (Molony 2007). In addition to being caught indirectly as bycatch, observer records indicate that some targeting of oceanic whitetip shark has occurred historically in the waters near Papua New Guinea, and given the high value of oceanic whitetip fins and low level of observer coverage, it is likely that targeting has occurred in other areas as well (Rice and Harley 2012). From 2005-2012, estimates of longline observer coverage in Pacific Island countries' tropical EEZs (10°S – 15°N) and sub-tropical EEZs (10°S – 25°S) ranged only from 0 – 2.4% per year (Clarke 2013). Longline observer coverage data is also lacking for the distant-water fleets of Japan, South Korea, and Chinese Taipei, which comprise a significant proportion of longline effort in the Western and Central Pacific Ocean (SPC 2010). Since 2009, total observer coverage in the longline fishery remains below 2% (Clarke 2013) despite the requirement for a 5% coverage minimum. However, the WCPFC requirement for 5% observer coverage in the longline fishery (established in 2012) has resulted in increased submission of observer longline data in recent years (Williams *et al*. 2015).

The WCPFC also manages the active tuna purse seine fleet in this region, which has expanded significantly since the 1980s and experienced a sharp increase in recent years. Available data suggest oceanic whitetip sharks are frequently encountered by the purse seine fleets (though not as frequently as the longline fishery), with the oceanic whitetip being the 2nd most common species of shark caught as bycatch in purse seine fisheries in this region, and representing nearly 11% of the total shark catch (Molony 2007). Since 2009, the required observer coverage in the purse seine fleet has increased to 100% (Clarke 2013); however, it should be noted that although the required observer coverage level is 100%, the actual achieved level of observer coverage is much less (Williams *et al.,* 2015). Although the oceanic whitetip shark was historically the 2nd most commonly identified shark in associated sets, this species is now rarely observed (Rice *et al*. 2015).

Catches of oceanic whitetip shark have declined significantly in both longline and purse seine fisheries. Lawson (2011) conducted statistical analyses to estimate catches of key shark species in the Western Central Pacific Ocean. In this study, oceanic whitetip shark catches in Western and Central Pacific Ocean longline and purse seine fisheries were estimated based on SPC data for longline and purse seine fleets collected by observers onboard fishing vessels (Figures 38 and 39 below).

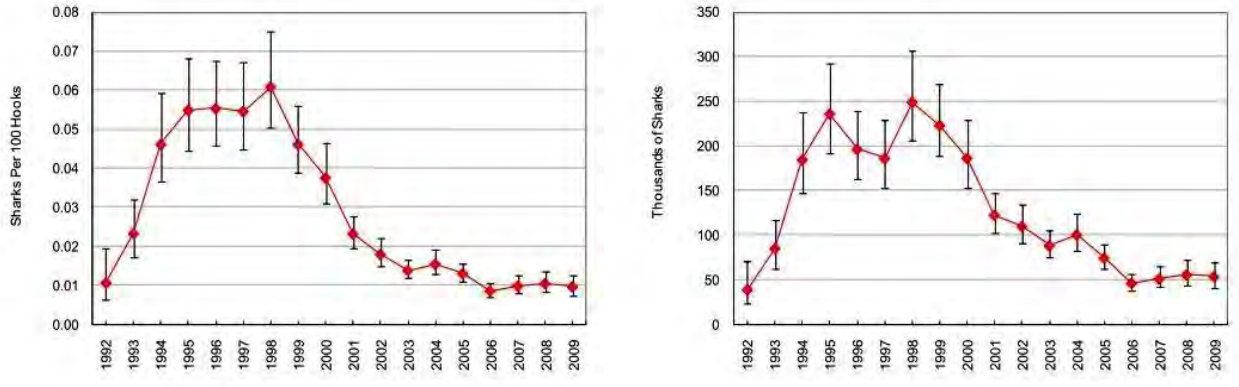


Figure 38 Estimates of longline catch rates (left) and catches (right) of oceanic whitetip sharks in the WCPFC Statistical Area east of 130°E. Source: Lawson 2011.

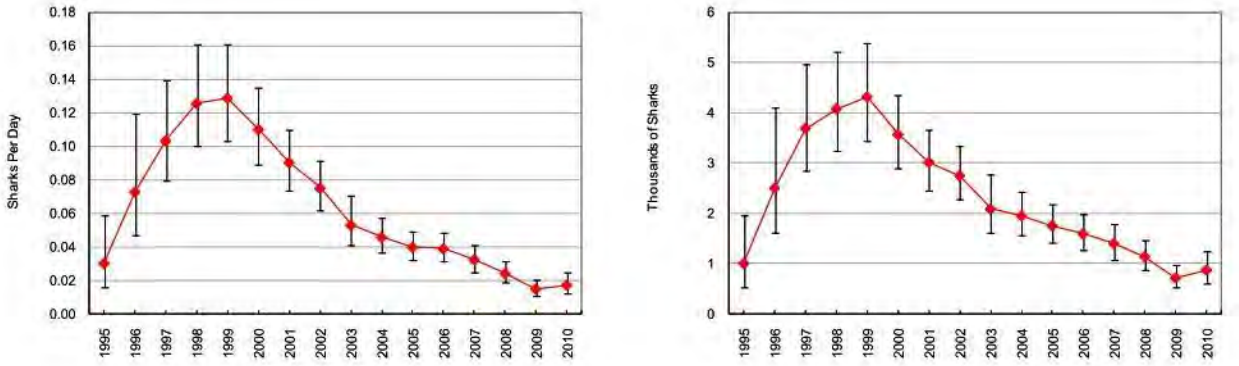


Figure 39 Estimates of purse seine catch rates (left) and catches (right) of oceanic whitetip sharks in the area from 20°S to 20°N and 130°E to 210°W. Source: Lawson 2011.

Oceanic whitetip sharks comprised 6.34% of longline shark catches and the trends in oceanic whitetip catch rates and catches by purse seiners are similar to those for longlines, and show declines from the late 1990s onwards (Lawson 2011). For example, estimated catches of oceanic whitetip shark in the WCPO longline fishery suggest that catches peaked in 1998 at ~249,000 individuals and declined to only ~53,000 individuals in 2009. However, Lawson (2011) notes that the accuracy of the estimates of catch rates shown in Figures 38 and 39 above may be affected by reporting errors early in the time series, and possibly by the targeting of sharks. It should also be noted that catches by the fleets of Indonesia and the Philippines were not included because neither observer nor effort data are available for these fleets. Further, Lawson (2011) notes the following operation changes in longline fishing that likely affected shark catch rates in the region:

- Japan longline fishing in the Australia Fishing Zone ceased in 1997.
- A trip limit for sharks was imposed in Australia in 2000.
- Shark finning was banned in Hawaii in 2000.
- The shallow set longline fishery in Hawaii was closed from 2001 to 2004.
- The use of wire traces generally has declined since 2004.
- Wire traces were banned in Australia in 2005.

Additionally, and as discussed previously, observer coverage in the Western and Central Pacific has been highly variable, ranging from negligible to moderate. Large areas in the WCPFC Statistical Area (including to the west of 130°E, the northwest and the southeast) have not been covered by observer data, which complicates catches and catch rate estimates of sharks and other non-target species. Nonetheless, longline catch estimates of oceanic whitetip sharks in the WCPFC Statistical Area east of 130°E indicate removals have been variable, with estimates fluctuating widely from ~39,000 to ~249,000 individuals, and an overall average of ~127,000 individuals from 1992-2009 (Lawson 2011). Purse seine fishery catch estimates of oceanic whitetip sharks in the WCPFC Statistical Area from 20°S to 20°N and 130°E to 210° averaged 2,267 individuals from 1995-2010 (Lawson 2011). As noted previously (and shown in Figures 38 and 39 above), both fisheries show significant declining trends in catches of oceanic whitetip shark.

Clarke *et al.,* (2011b) conducted a separate analysis of shark data from the North Pacific provided by Japan, including two comprehensive datasets: the North Pacific longline operational data from research training vessel (RTV) surveys (1992-2009; n = 32,053 sets) and commercial longline logbook (LLL) records (1993-2009; n = 1,215,299 sets). In total, 258,824 sharks were recorded in the RTV dataset of which 9,591 individuals (2-4%) were oceanic whitetip sharks (75% were blue sharks). In the LLL dataset, nearly 9.8 million sharks were recorded, with oceanic whitetip sharks comprising less than 1% of the total (Clarke *et al.,* 2011b). As oceanic whitetip sharks are found more frequently in Region 4 than in Regions 1 and 2 (see Figure 40 below), the catch rates for Region 4 are likely the most reliable. Catch rate trends from both filtered and unfiltered RTV datasets show a decline of approximately 75% from 1994-2004 (~0.4 oceanic whitetips sharks per 1,000 hooks in 1994 to ~0.1 sharks per 1,000 hooks in 2004). In contrast, filtered LLL catch rates do not show a clear trend with catch rates near zero in most years and peaks of ~0.1-0.2 oceanic whitetips per 1,000 hooks in some years (Clarke *et al*., 2011b). Overall, catches of this species were most frequently observed in the central North Pacific south of 20^{o} N latitude, but the authors note that this species also occurs in more northerly locations. Oceanic whitetips were rarely recorded after 2005, which may be indicative of a substantial decline in abundance because of overutilization. Catch rates based on RTV data showed substantial declines both north and south of 20^{o} N latitude (Regions 2 and 4) and there was some evidence for a trend of decreasing size of both males and females in recent years (Clarke *et al.,* 2011b).

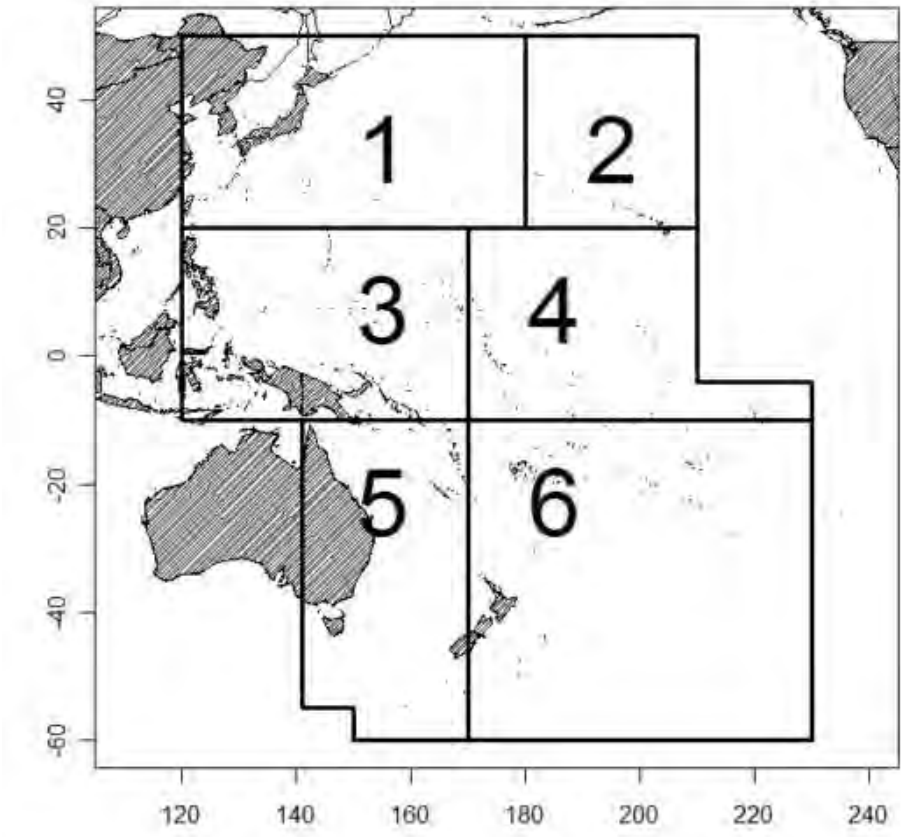


Figure 40 Regional boundaries based on analysis of coverage patterns in the RTV and LLL data sets. Source: Clarke *et al.* 2011b.

Clarke *et al.,* (2011a) conducted an indicator-based analysis to determine the stock status of key shark species in the Western and Central Pacific Ocean by examining data from the SPC–Oceanic Fisheries Programme for sharks taken in longline and purse seine fisheries. However, the authors listed several caveats related to the datasets used in this indicator-based analysis. For example, longline logsheet data only cover ≤35% of the fishery, with major gaps in coverage for certain areas. Non-reporting, under-reporting, and/or lack of species-specific reporting also hinders the data. Further, low levels of observer data coverage (i.e., typically <1%) are not representative of the entire WCPO longline fishery as a whole;

Given the major limitations of logsheet data, the indicator analyses relied primarily on observer data. These data formed the basis for an assessment of a number of shark status indicators in four main classes: range based on fishery interactions, catch composition, catch rates and biological indicators of fishing pressure (e.g., median size, sex ratio). Based on fishery interaction maps (see Figure 41 below; Clarke *et al*., 2011a), the oceanic whitetip shark is found throughout WCPO between 30º N and S latitude, and, as noted previously, is also commonly encountered in the purse seine fishery, particularly in areas just south of the equator.

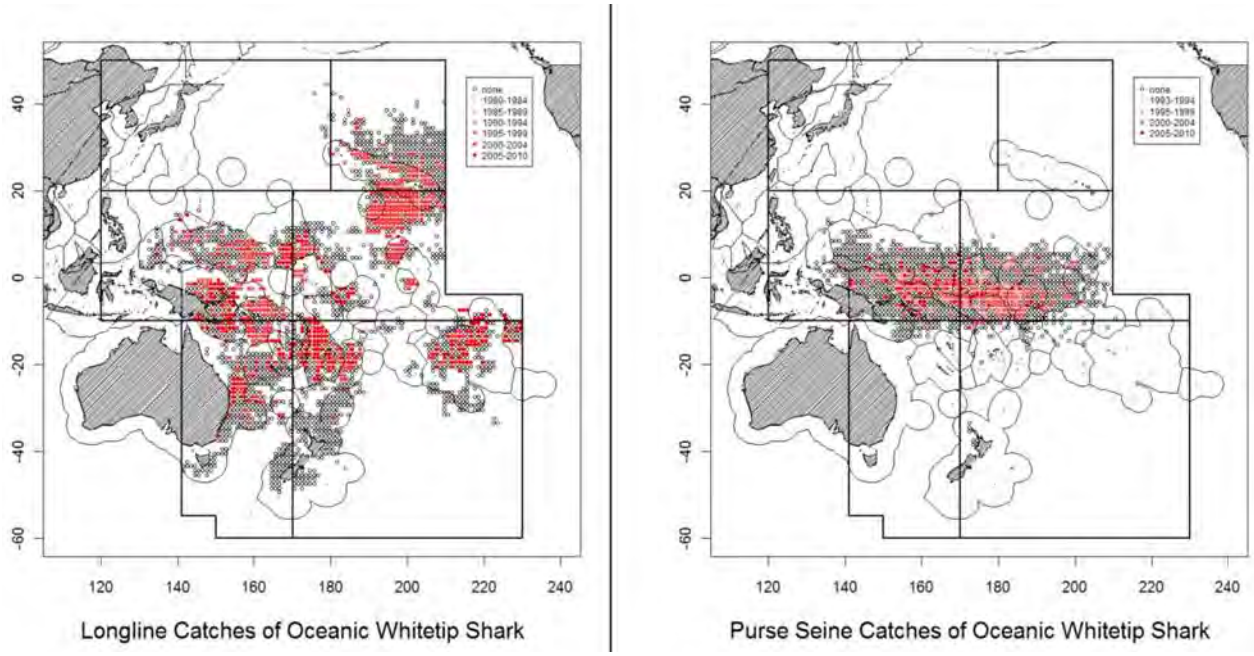


Figure 41 Fishery interaction maps for oceanic whitetip sharks based on observer records from the WCPO longline (1980-2010) and purse seine fisheries (1993-2010). Colored circles represent positive catches (points are shaded by year with more recent catches in the darkest shades) and empty circles represent zero catch. Source: Clarke *et al.* 2011a.

Based on nominal and standardized catch rates for longline and purse seine fisheries, records of oceanic whitetip sharks in both fisheries have become increasingly rare over time. In fact, standardized catch rates for longline observer data shows a clear, steep decline in abundance. Median size showed a declining trend for both sexes in both fisheries and in all regions until samples became too rare for analysis. These trends were significant in the core tropical habitat

areas (Clarke *et al*., 2011a; see Figure 42 below).

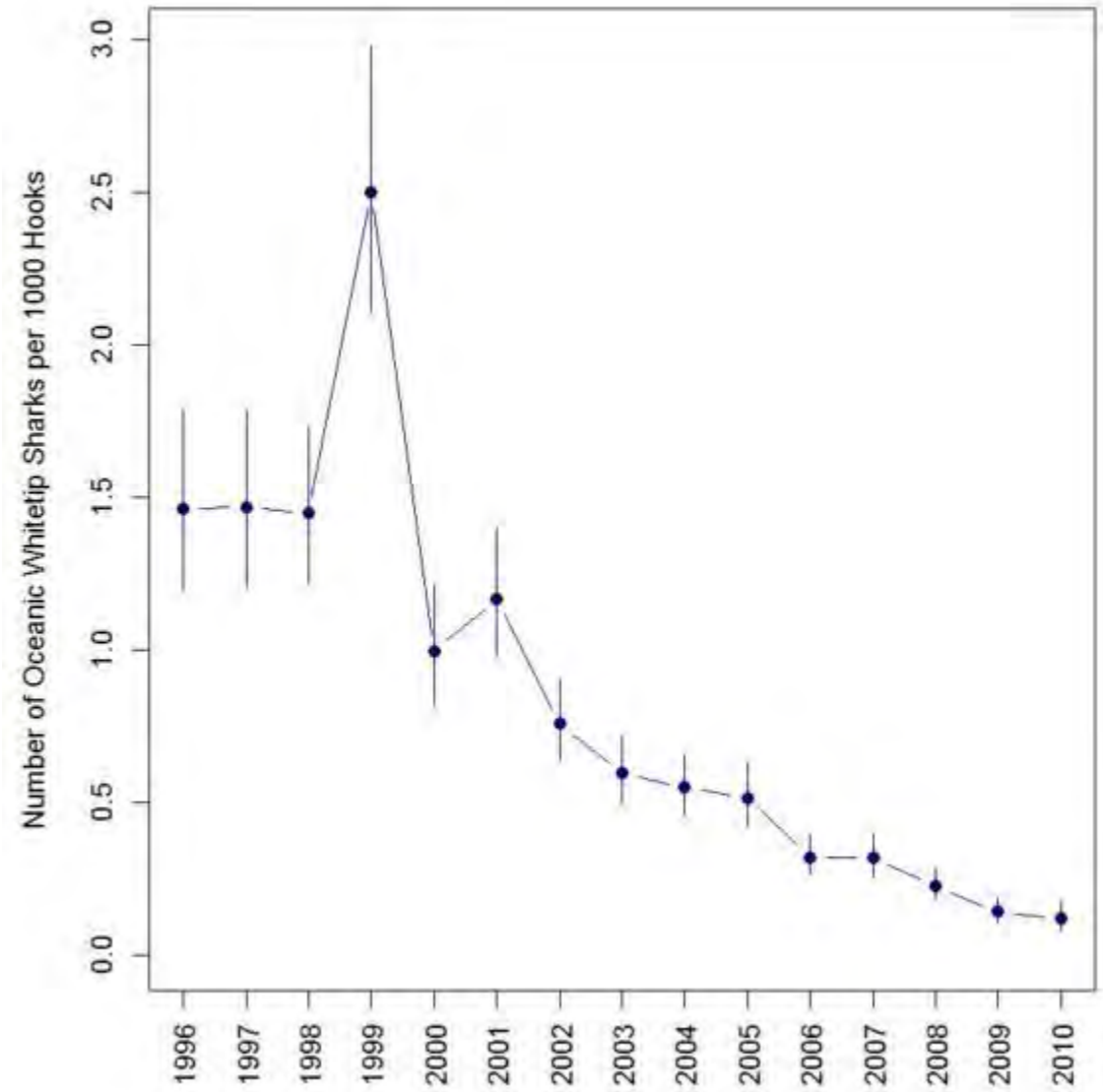


Figure 42 Catch rates for oceanic whitetip sharks in the WCPO standardized using a quasi-Poisson formulation of a generalized linear model. Source: Clarke *et al.*, (2011a).

In fact, annual values in recent years have decreased to one-tenth of those observed in 1996-1998 with minimal uncertainty in the estimates (Clarke *et al.,* 2012). Similar patterns are suggested by nominal catch rates in the purse seine fishery and standardized purse seine catch rates in Lawson (2011); refer back to Figure 39 above).

Finally, the previously discussed stock assessment of oceanic whitetip shark in the Western and Central Pacific (which used the same data as discussed previously in Clarke *et al.,* (2011a) and Clarke *et al*. 2012) analyzed fisheries data from 1995-2009, and determined that the greatest impact on the species is attributed to bycatch from the longline fishery, with less significant impacts from target longline activities and purse-seining (Rice and Harley 2012). From 1995 to 2009, rates of fishing mortality increased consistently, which was driven mainly by increased effort in the longline fleet over the same time period, and remained substantially above the

maximum sustainable yield (MSY) (i.e., the point at which there would be an equilibrium) for the species (Rice and Harley 2012). In fact, the stock assessment concluded that fishing mortality on oceanic whitetip sharks in the Western and Central Pacific has increased to levels 6.5 times what is sustainable, thus concluding that overfishing is still occurring. Given that fishing pressure began well before the start of this time series, the authors of the stock assessment noted that it was not assumed that the oceanic whitetip population was at an unfished state of equilibrium at the start of the model (i.e., 1995). Thus, the reported declines (i.e., 86% since 1995) do not reflect total historical population declines for the species in this region. Further, this study does not include removals of oceanic whitetip sharks from Indonesia and the Philippines, which are two major shark catching nations in this region. As previously discussed, a recent study concluded that oceanic whitetip not only continue to decline throughout the tropical waters of the Western and Central Pacific Ocean, but even if the population doubled since the stock assessment, it would still be considered overfished (Rice *et al.,* 2015).

Due to continued and increasing fishing pressure in the Western and Central Pacific, size trends for oceanic whitetip have also declined, which is indicative of overutilization of the species. For example, declining median size trends were observed in all regions and sexes in both longline and purse seine fisheries until samples became too scarce for analysis in the study. These size trends were significant for females in the longline fishery (in Regions 3 and 4), and for the purse seine fishery (in Region 3), which represents the species' core tropical habitat areas (Clarke *et al.,* 2011a). This is particularly concerning due to the potential correlation between maternal length and litter size, which has been documented in the Atlantic and Indian Oceans (Bass *et al.,* 1973; Lessa *et al.,* 1999; Bonfil *et al.,* 2008; Varghese *et al.,* 2016). While Rice *et al*. (2015) more recently report that trends in oceanic whitetip median length are stable, the majority of sharks observed are immature. Likewise, since 2000, 100% of oceanic whitetips sampled in the purse seine fisheries have been immature (Clarke *et al.,* 2012).

In the U.S. Pacific, the oceanic whitetip shark was historically a common bycatch species in the Hawaii-based pelagic longline (PLL) fishery and comprised approximately 3% of the total shark catch from 1995-2006 (Brodziak *et al.,* 2013). This fishery began around 1917, and underwent significant expansion in the late 1980s to become the largest fishery in the state (Boggs and Ito 1993). This fishery currently targets tunas and billfishes and is managed under the auspices of the Western Pacific Fishery Management Council (WPFMC). Of all fisheries managed under the Fishery Ecosystem Plan (FEP) for Pelagic Fisheries of the Western Pacific Region Ecosystem Plan, the Hawaii-based longline fishery is the largest, accounting for the majority of Hawaii's commercial pelagic landings, with 26 million lbs (~12 million kg) resulting in revenue exceeding $92 million in 2012 (WPFMC 2012). An observer program for the Hawaii-based PLL was initiated in 1994, with an observer coverage rate ranging between 3% and 10% from 1994-2000, and increased to a minimum of 20% in 2001. The deep-set fishery targeting tuna is currently observed at a minimum of 20% and the shallow-set fishery targeting swordfish has 100% observer coverage. The Hawaii-based pelagic longline fishery is a limited entry fishery with a maximum of 164 permits available. Current participation is about 125 vessels which target a range of pelagic species.

Catch data compiled from the Hawaii-based logbook annual summary reports also show a declining trend for oceanic whitetip sharks since 2000, with an uptick in the last year (oceanic

whitetip sharks were not tallied separately in fisheries logbooks prior to 2000; see Figure 43 below).

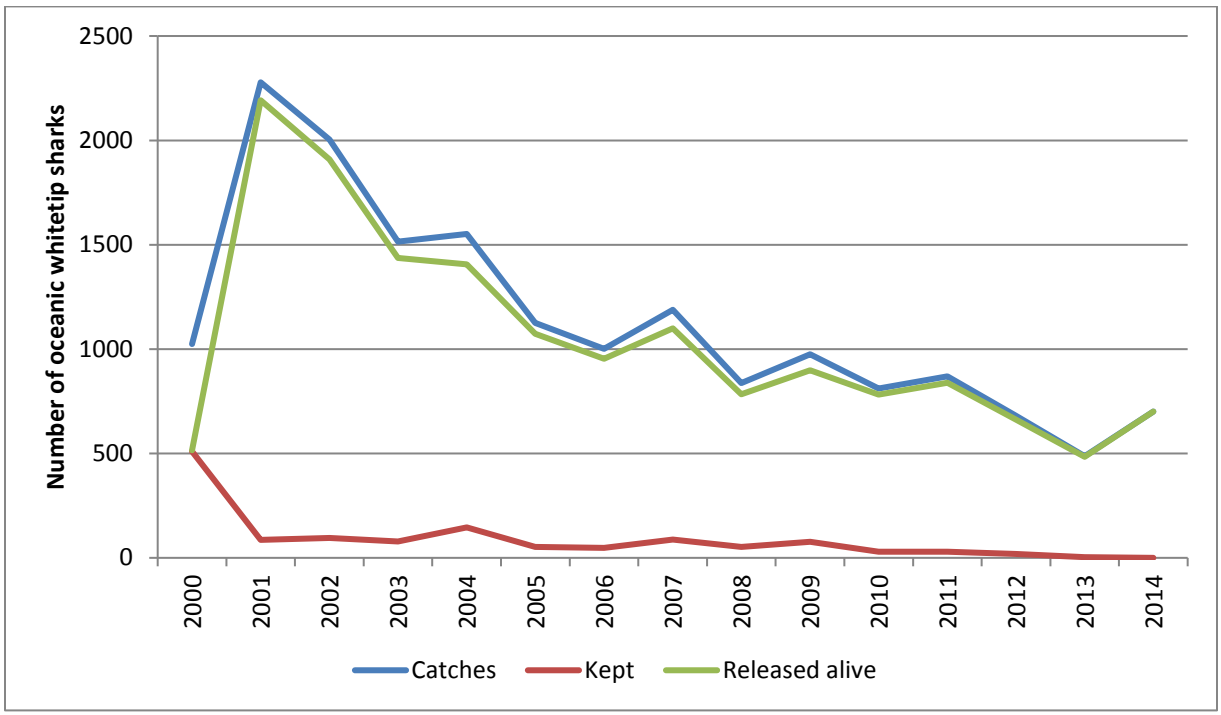


Figure 43 Summary of Pacific Islands Fishery Science Center (PIFSC) fishery logbook reports of oceanic whitetip catches from 2000-2014. Source: NMFS PIFSC[7].

Annual bycatch of approximately 58,402lbs (26.5 mt) and 38,640.lbs (17.5 mt) of oceanic whitetip were estimated for the Hawaii-based deep-set and shallow-set longline fisheries, respectively, based on data from 2005 (NMFS 2011a). Overall, oceanic whitetip sharks were generally not landed or rarely landed in the Pacific Islands region. In the updated report (NMFS 2013), total annual bycatch estimates included 47,553 lbs (21.6 mt) of oceanic whitetip, based on data from 2010. Thus, it appears that overall bycatch estimates have decreased for oceanic whitetip sharks in 2010 compared to 2005, which also coincides with the declines in relative abundance over this same time period. Brodziak *et al*. (2013) concluded that the relative abundance of oceanic whitetip (discussed previously in the *Regional Abundance Trends* section) declined within a few years of the expansion of the longline fishery, which suggests these fisheries are contributing to the commercial overutilization of oceanic whitetip within this portion of its range. It should be noted that the majority of oceanic whitetip sharks are now released alive in this fishery, with the number of individuals kept on a declining trend. Based on fishery logbook data, a total of 701 oceanic whitetip sharks were caught in 2014 and 100% were released. In addition, the U.S. National Bycatch Report First Edition Update 2[8] estimated weight of species caught by the Hawaii-based commercial longline fisheries. These data show that from 2011 to 2013, the shallow-set fishery released an estimated 91-96% of all oceanic whitetip sharks caught alive. During the same time period, the deep-set fishery released an estimated 78-82% of all oceanic whitetip sharks caught alive. However, it is unknown how many of these

[7] http://www.pifsc.noaa.gov/fmb/reports.php
[8] https://www.st.nmfs.noaa.gov/observer-home/first-edition-update-2

sharks survived after being released. Nonetheless, this particular fishery may be less of a threat to the oceanic whitetip shark in the foreseeable future.

Oceanic whitetip sharks are also caught as bycatch in the American Samoa longline fishery. The American Samoa longline fishery targets albacore tuna and is managed under the Pacific Pelagic FEP. This fishery has had an observer program since 2006, with coverage ranging between 6-8% from 2006-2009, and between 19-33% since 2010. Based on logbook longline summary reports from American Samoa, unstandardized (i.e., nominal) CPUE and catches of oceanic whitetip sharks have trended downward until about 2009, at which point the trend appears to have potentially stabilized (Figure 44). It should be noted that this data is based on nominal catches recorded in fisheries logbooks and may not be reliable.

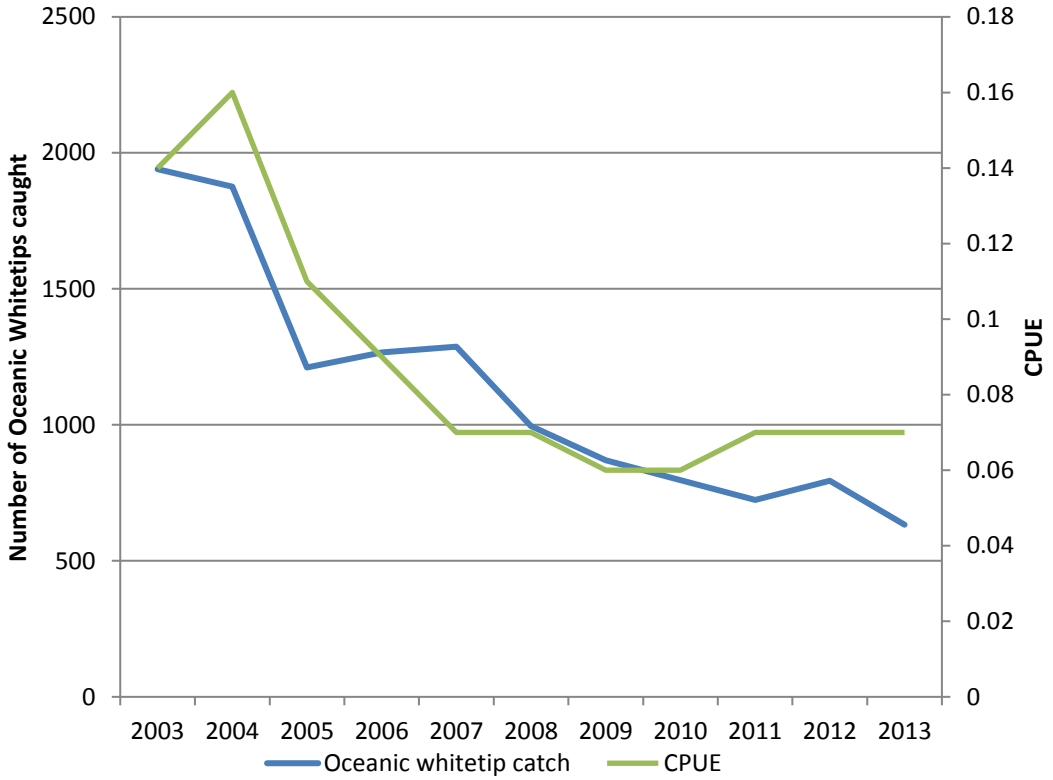


Figure 44 Summary report of unstandardized fishing effort and catch statistics for U.S. longline vessels landing in American Samoa from 2003-2013, compiled from PIFSC Annual Summary Reports as derived from NMFS Western Pacific Daily Longline Fishing Log records. Source: PIFSC American Samoa Longline fishery logbook summary reports[9].

While landings of sharks in general have declined in American Samoa, this trend is largely attributed to regulations pertaining to shark finning (e.g., the Shark Finning Prohibition Act) (NMFS 2011c).

Australia

Several studies have been conducted to assess the ecological risk of species in various fisheries throughout Australia. While oceanic whitetip sharks are known from Australian waters and are

[9] http://www.pifsc.noaa.gov/fmb/reports/american_samoa/longline_logbook_summary.php

known bycatch in two major fisheries (the Eastern and Western Tuna and Billfish fisheries), they have only been assessed in the Eastern Tuna and Billfish fishery (ETBF). The oceanic whitetip shark is listed as a bycatch species in the ETBF, which operates from the eastern part of the Australian Fishing Zone (AFZ) from the tip of Cape York (142º31'49"E) to the South Australian/Victorian border (141ºE). It includes Commonwealth waters off Queensland, New South Wales, Victoria and Tasmania out to the 200 nmi limit of the AFZ and includes waters around Norfolk Island. The ETBF consists of three main fishing methods (longlining, poling and minor line), of which the most common method is pelagic longlining. A 2009 Shark Assessment Report shows that oceanic whitetip is a prominent species in the Eastern ETBF, with estimated discard rates of up to 77% (Bensley *et al.,* 2010), although no other information was provided. In 2007, an Ecological Risk Assessment (ERA) was conducted for oceanic whitetip in the ETBF. In the ERA, average annual logbook catch of oceanic whitetip was 17,199 kg (17.2 mt) from 2001-2004. The ERA used typical productivity and sensitivity attributes to derive an overall vulnerability score and risk category to overfishing. In this study, oceanic whitetip received a vulnerability score of 2.95 (range for all scores = 1.41 to 4.24) and an overall medium risk ranking to overfishing (Webb *et al.,* 2007). For reference, a medium risk ranking means that overfishing is occurring but the population can be sustainable. In general, catches of oceanic whitetip sharks in Australia have seen a decline from over 25 t in 2002 to less than 5 t in 2012 (Figure 45 below).

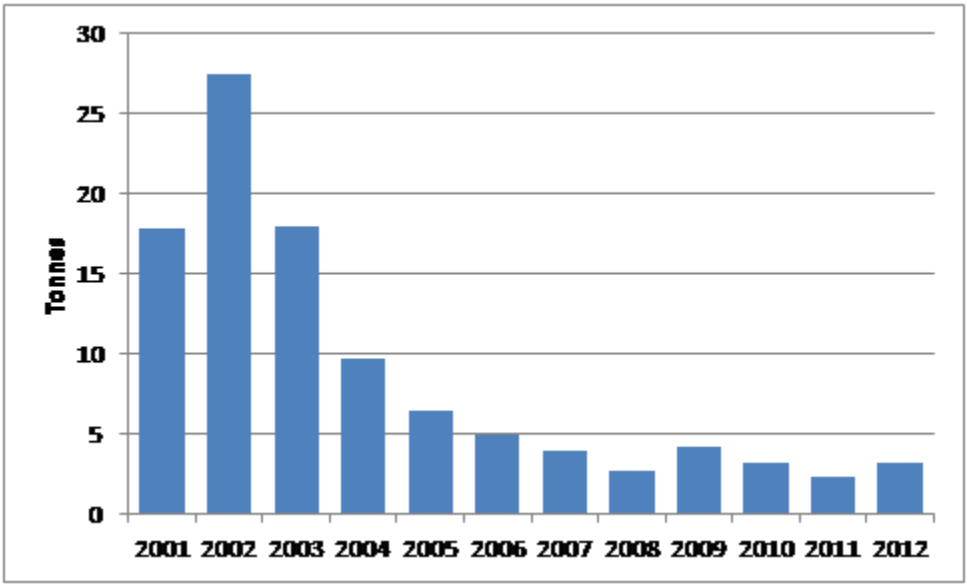


Figure 45 Annual catches (t) of oceanic whitetip shark in Australia from 2001 to 2012. Source: Koopman and Knuckey 2014.

However, this decline in catch has been largely attributed to the implementation of stricter management and regulations (e.g., ban on wire traces, trip/trigger limits, ban on shark finning, carriage of line cutters) and a decrease in effort in both the ETBF and the Western Tuna and Billfish Fishery (WTBF) (Koopman and Knuckey 2014). In accordance with conservation and management measures agreed by the WCPFC and IOTC, retention of oceanic whitetip shark is prohibited in the Commonwealth ETBF and WTBF, the two fisheries most likely to encounter the oceanic whitetip shark (Australia Department of the Environment 2014). Although small numbers of oceanic whitetip shark are possibly caught in state managed fisheries operating far offshore, the total Australian catch of oceanic whitetip shark is estimated to be less than 5 t per

year (Koopman and Knuckey 2014). There is also reported take in IUU fishing in Australian waters, with the oceanic whitetip comprising an estimated 5.9% (in numbers, 3.6% in biomass) of the catch by foreign IUU operations (Simpfendorfer 2014). The estimated take by Indonesian based IUU operators in 2006 was about 700 t, and has declined since. As such, current catches in IUU fisheries are probably minimal in Australian waters (Simpfendorfer 2014).

New Zealand

Oceanic whitetip sharks are rarely caught in fisheries operating in New Zealand waters. In a government study aimed at documenting and describing oceanic whitetip shark interactions with commercial fisheries, only 19 observer and two commercial fishery records were located (one of which occurred in both datasets) from 2008-2014. All records came from surface longlines set in the Kermadec Fisheries Management Area (FMA) or off the northeastern coast of the North Island (Francis and Lyon 2014). Catches of oceanic whitetip shark around the North occurred in warmer months of the year whereas catches in the Kermadec FMA occurred primarily in cooler months. Most (84%) of the observed sharks were alive when hauled to the vessel; approximately half were processed in some way with the remainder being discarded. Although few of the observed sharks were sexed or measured, there was an equal number of males and females, with fork lengths ranging between 158 and 190 cm. Given the low commercial reporting rate (only 1 out of 19 observed sharks are actually reported) and the low observer coverage of domestic surface longliners (< 9% up to 2009-2010), Francis and Lyon (2014) estimate that the actual interaction of the surface longline fisheries with oceanic whitetips is substantially underestimated. Nevertheless, the study concluded that oceanic whitetips are not frequently caught in New Zealand, and are therefore not regarded as a high priority species for research or management (Francis and Lyon 2014).

Pacific Island Countries and Territories

Approximately 25% and 45% of longline and purse seine catches, respectively, that occur in the WCPFC Convention Area are taken in the Pacific Islands Countries and Territories (PICT). Observer data for longline fisheries in the PICTs reveal that the 12 highest risk shark species, including oceanic whitetip, comprise less than 15% of the observed shark catch (Lack and Meere 2009). According to a 2009 Regional Shark Assessment, oceanic whitetip sharks have been observed in longline and purse seine fisheries within PICT waters, with oceanic whitetip comprising 6% of the total shark catch in both fisheries (Lack and Meere 2009). In the Pacific Islands Regional Plan of Action for sharks, the oceanic whitetip shark consistently ranked in the top ten shark species identified by observers in PICT longline fisheries, including the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, New Caledonia, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu (Lack and Meere 2009). At the time of the assessment, oceanic whitetip sharks experienced various finning and discard rates throughout PICT waters, ranging from 51% and 68% in the tropical shallow and deep longline fisheries, respectively, to 76% in the tropical albacore fishery (Lack and Meere 2009). It should be noted that this study is several years old and may not represent the current situation.

In the Republic of the Marshall Islands (RMI), average annual catches of sharks are estimated to be between 1,583 and 2,274 mt. The oceanic whitetip is one of only five species that comprises 80% of the total annual shark catch in the RMI. In an analysis of aggregated observer data from RMI and Chinese fleets from 2005-2009, Bromhead *et al.,* (2012) report a CPUE rate (fish/1000 hooks) for oceanic whitetip of 0.2904 in RMI longline fisheries. In these fisheries, oceanic

whitetip exhibits a relatively high at-vessel survival rate of approximately 70% (n = 917). However, 97.4% of oceanic whitetips caught in these fisheries were finned and discarded. The RMI prohibited all shark take in late 2011; therefore, the Bromhead *et al.,* (2012) study may not be representative of the current situation.

Oceanic whitetip sharks are also caught as bycatch in the Fijian longline fishery. According to data provided by the Fiji Department of Fisheries, which includes longline sets targeting both tunas and sharks, for the period 2011–2012, 17 oceanic whitetips were captured and discarded after finning (Piovano and Gilman 2016). In 2013, 62 oceanic whitetips were captured, of which 13% were retained, 60% were discarded after finning, 8% were discarded dead and 19% were released alive. Of the 30 oceanic whitetip sharks captured in 2014, 7% were retained, 3% were discarded after finning, 27% were discarded dead and 63% released alive (Piovano and Gilman 2016). This indicates that Fiji did not immediately implement the WCPFC no-retention rule for oceanic whitetip.

Taiwan

Taiwan's fleet has the 4th largest shark catch in the world, with a declared 6 million sharks caught annually, accounting for almost 6% of the global figures. However, these numbers could be greatly underestimated (Liu *et al*. 2013). Although the oceanic whitetip shark is considered to be one of the dominant shark species in Taiwanese landings, it only comprises an average of 0.38% of the sharks landed. Between 1996 and 2006, annual Taiwanese shark landings (coastal, offshore, and pelagic combined) averaged between 39,000 and 55,000 mt. A genetic barcoding study was conducted in 2013 on shark meats from various Taiwan fish markets to determine which species may be vulnerable to high rates of utilization. Amongst the 548 tissue samples collected and sequenced, approximately 80% of the species composition was dominated by four species (*A.pelagicus*, *C. falciformis*, *Isurus oxyrinchus*, and *P. glauca*) indicating that these species might be heavily consumed in Taiwan. Oceanic whitetip sharks were also identified in the shark meat samples, although they comprised a very small percentage of the samples at 0.016% (Liu *et al.,* 2013).

Western and Central Pacific Summary

Based on the best available historical and current information, it appears that the once ubiquitous oceanic whitetip shark has experienced significant and ongoing declines in the Western and Central Pacific Ocean because of unsustainable fishing mortality in both longline and purse seine fisheries operating in the species' core tropical habitat area. Numerous lines of evidence, including a recent stock assessment report and other analyses of species-specific fisheries data, indicate that oceanic whitetip shark abundance has declined across the region, with declines in excess of 90% in some areas, and declining trends in overall biomass and size indices as well. Similar results between analyses of observer data from the Western and Central Pacific SPC observer data and the observer data from the Hawaii-based pelagic longline fishery suggest that the population decline of oceanic whitetip in this portion of its range is not just a localized trend, but rather a Pacific-wide phenomenon. The significant declining trends observed in all available abundance indices (*e.g.,* standardized CPUE, biomass and median size) of oceanic whitetips as a result of fishing mortality in both longline and purse seine fisheries indicate that overutilization of the species is likely occurring throughout the Western and Central Pacific. Given the impacts to the species from significant fishing pressure in this portion of the species' range, with the majority of effort concentrated in the species' core tropical habitat area, and the species'

relatively low-moderate productivity, it is likely that the oceanic whitetip shark is experiencing overutilization in this portion of its range.

ATLANTIC OCEAN

Northwest and Western Central Atlantic and Gulf of Mexico

Like the Pacific, the oceanic whitetip shark was once described as the most common pelagic shark throughout the warm-temperate and tropical waters in the Atlantic and beyond the continental shelf in the Gulf of Mexico. The species is caught incidentally as bycatch by a number of fisheries, including the U.S. pelagic longline (PLL) fishery, Cuban longline fishery, Mexican longline, and has been recently recorded in the oceanic industrial longline fishery in the Colombian Caribbean (CITES 2013). An ERA was conducted in 2008 by the ICCAT Standing Committee on Research and Statistics (SCRS) for shark and ray species typically taken in Atlantic pelagic longline fisheries. This ERA categorized the relative risk of overexploitation of the 11 major species of pelagic sharks, including oceanic whitetip sharks, and derived an overall vulnerability ranking for each of the species, defined as "a measure of the extent to which the impact of a fishery on a species will exceed its biological ability to renew itself." The oceanic whitetip shark ranked 5th most susceptible to pelagic fisheries among 11 other Atlantic Ocean species (Cortés 2008a; Cortés *et al.,* 2010). In an update and expansion of the SCRS ERA, the oceanic whitetip shark was found to be a moderately productive species that shows varying levels of susceptibility to the combined pelagic longline fisheries in the Atlantic Ocean, and ranked 8th most vulnerable out of 20 stocks of pelagic sharks (Cortés *et al.,* 2012). In contrast, another recent study determined that oceanic whitetip sharks have relatively low vulnerability to Atlantic fisheries. Gallagher *et al.,* (2014) found the oceanic whitetip shark to be one of the least vulnerable species to longline bycatch mortality, as a result of the species' "combined relatively high fecundity and productivity, moderate age of maturity ranking, and high mean survival rate when caught" (i.e., 77.3%; Gallagher *et al*. 2014). However, it should be noted that the age at maturity used in this study was based on a combination of estimates from the Atlantic and Pacific (i.e., 5.5 years) and was prior to the new estimate from the Pacific of 8.8-8.9 years. Additionally, the high rate of mean survival noted in Gallagher *et al* (2014) refers to the immediate at-haulback mortality and does not account for unknown post-release mortality rates. Thus, the relative vulnerability of oceanic whitetip shark to Atlantic longline fisheries is somewhat unclear. While the oceanic whitetip shark's life history does not make it as vulnerable as other shark species, the species' susceptibility to capture in longline fisheries is likely the main reason for its increased vulnerability overall.

In the United States, oceanic whitetips were caught historically as bycatch in PLL fisheries targeting tuna and swordfish in this region. Although an estimated 8,526 individuals were recorded as captured in U.S. fisheries logbooks from 1992 to 2000 (Baum *et al.,* 2003), pelagic longlining for Atlantic Highly Migratory Species (HMS) began on the East Coast of the U.S. and Atlantic Canada in the early 1960s, with this gear primarily used to target swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin fish, albacore tuna, and to a lesser degree, sharks. The U.S. PLL fishery has been historically comprised of five relatively distinct segments with various fishing practices and strategies. These segments are: 1) the Gulf of Mexico yellowfin tuna fishery; 2) the South Atlantic-Florida east coast to Cape Hatteras swordfish fishery; 3) the Mid-Atlantic and New England swordfish and bigeye tuna fishery; 4) the U.S. distant water swordfish fishery; and 5) the Caribbean Islands

tuna and swordfish fishery (NMFS 2008). There are many PLL gear and area restrictions and the fishery is strictly monitored.

Relative to target species, oceanic whitetip sharks are caught infrequently and only incidentally on PLL vessels fishing for tuna and tuna-like species. Landings and dead discards of sharks by U.S. PLL fishers in the Atlantic are monitored every year and reported to the International Commission for the Conservation of Atlantic Tunas (ICCAT). Overall, very few oceanic whitetip sharks have been landed by the commercial fishery, except for two peaks of about 1,250 and 1,800 fish in 1983 and 1998, respectively. Otherwise, total catches never exceeded 450 fish (NMFS 2009b). From 1992-2000, elasmobranchs represented 15% of the total catch in numbers by the PLL fishery, with oceanic whitetip comprising 2.8% of the shark bycatch (Beerkircher *et al.,* 2002). Observer data from the NMFS Pelagic Observer Program recorded 912 oceanic whitetip sharks caught on U.S. PLL gear between 1992 and 2015. The following table (Table 2) shows Atlantic domestic commercial landings of oceanic whitetip sharks, which were compiled from the most recent stock assessment documents.

Table 2 Commercial landings of Atlantic oceanic whitetip sharks (lbs, dressed weight) from 2003-2013. Source: (NMFS 2012; 2014; 2017)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2,559	1,082	713	354	787	1,899	933	769	2,435	258	62	22	0

*Consistent with ICCAT Recommendation 10-07, retention of oceanic whitetip was prohibited for U.S. Atlantic fishermen with pelagic longline gear onboard as of 2011.

Commercial landings of oceanic whitetip sharks in the U.S. Atlantic have been variable, but averaged approximately 1,077.4 lbs (488.7 kg; 0.4887 mt) per year from 2003-2013. Although oceanic whitetip sharks have been prohibited in fisheries with pelagic longline gear onboard since 2011, they can still be caught as bycatch, caught with other gears, and are occasionally landed. However, since the ICCAT retention prohibition was implemented in 2011, estimated commercial landings of oceanic whitetip declined from 1.1 mt in 2011 to only 0.03 mt in 2013 (NMFS 2012; 2014). In 2013, NMFS reported a total of 33 oceanic whitetip interactions to ICCAT, with 88% released alive. Oceanic whitetips are also infrequently caught in buoy gear for swordfish; however, these interactions are relatively minimal, with 11 individuals caught from 2009-2015 (NMFS 2017).

In addition to information from the United States, international fisheries information and catch data for the Atlantic are available from ICCAT. The ICCAT is the RFMO responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and adjacent seas. Reported catches of oceanic whitetip sharks from ICCAT vessels in the Atlantic are shown below in Figures 46 and 47 (Figure 46 is the same as Figure 47 minus data from Brazil to show the differing scales). Oceanic whitetip sharks are taken in the ICCAT convention area by longlines, purse seine nets, gillnets, trawls, and handlines; however, the large majority of the catch from 1990-2014 was caught by longline gear.

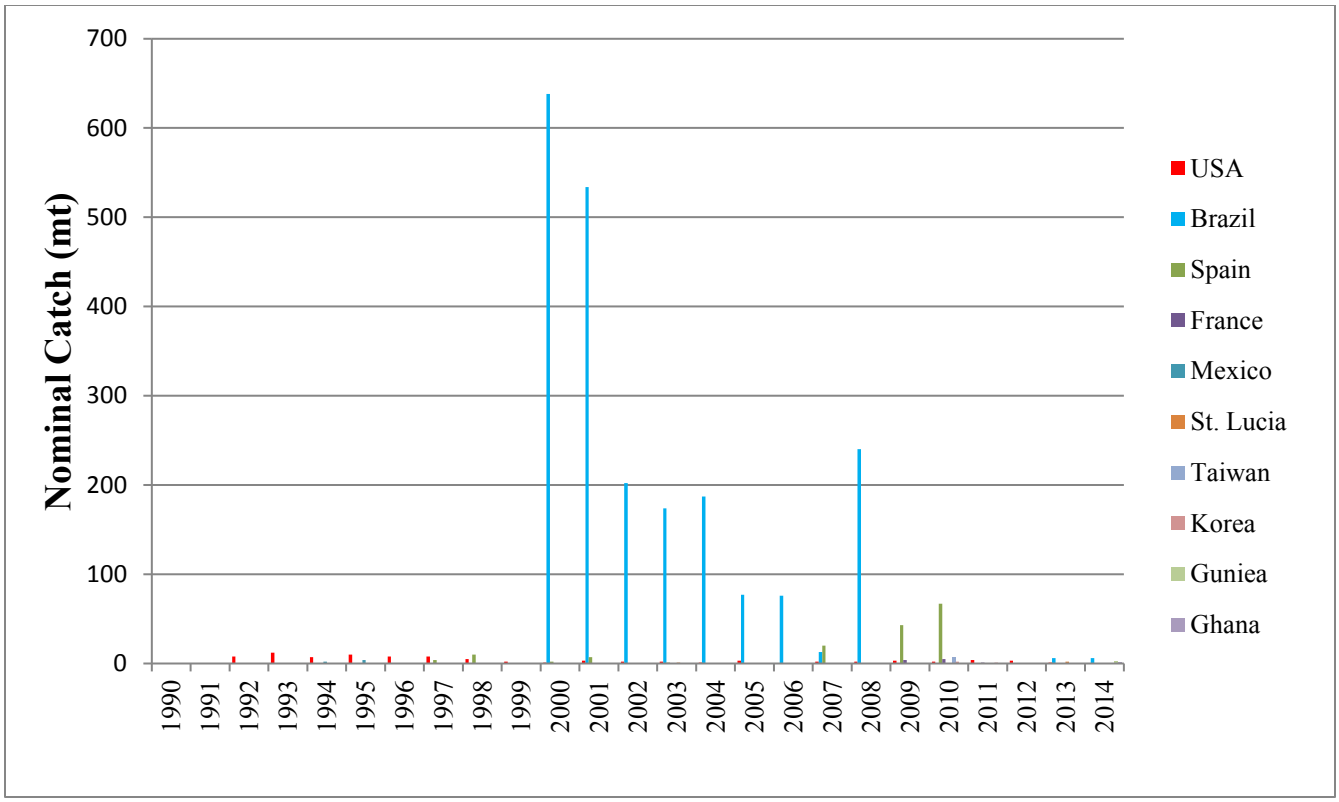


Figure 46 Nominal catches (mt) of oceanic whitetip reported to ICCAT by CPC vessel flag from 1990-2014. Source: ICCAT nominal catch information: Task I web-based application; accessed January 28, 2016.

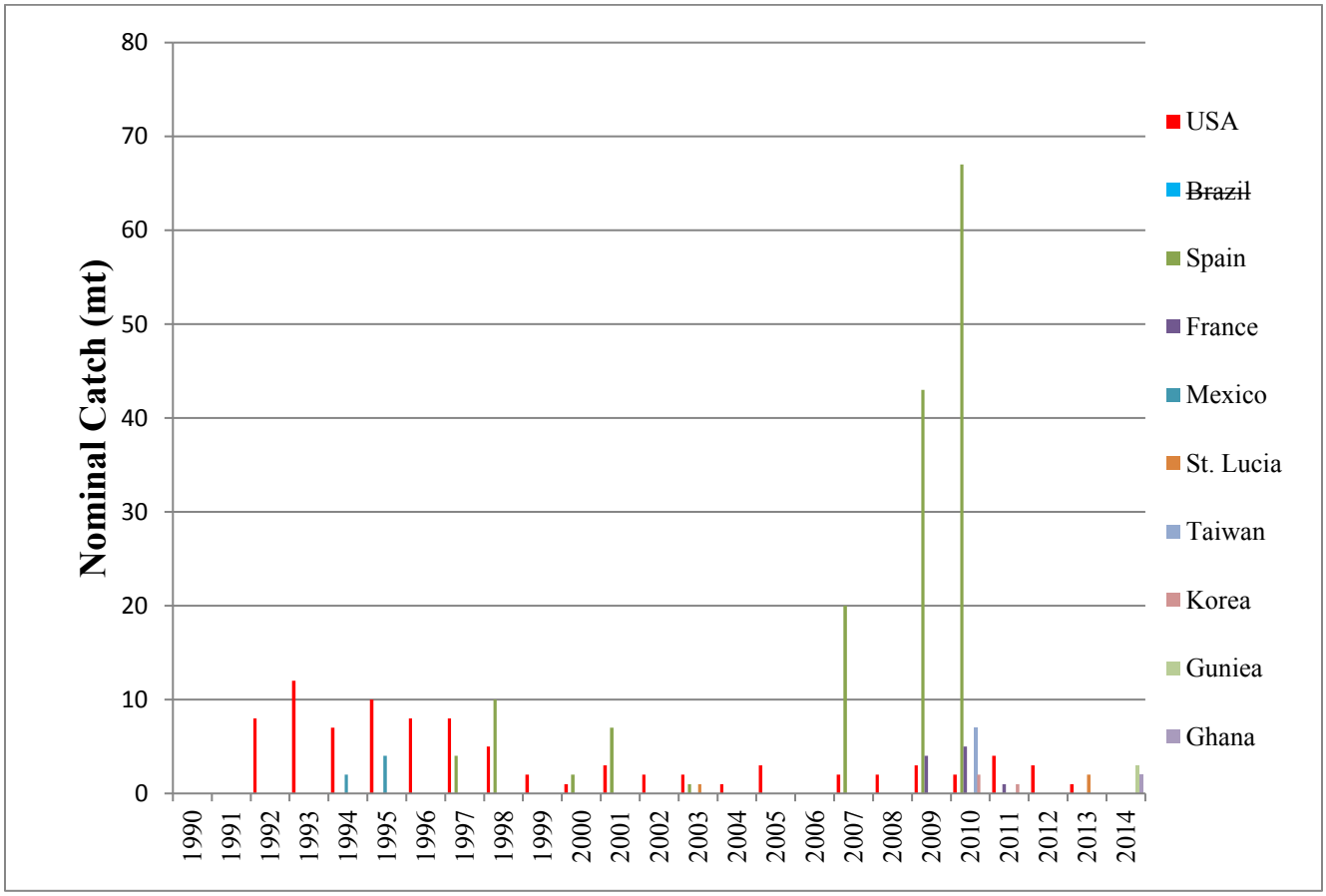


Figure 47 Nominal catches (mt) of oceanic whitetip reported to ICCAT by CPC vessel flag (except Brazil) from 1990-2014. Source: ICCAT nominal catch information: Task I web-based application; accessed January 28, 2016.

In total, approximately 2,430 mt of oceanic whitetip catches were reported to ICCAT from 1990-2014, with approximately 89% of the total catch (n = 2,153 mt) caught by the Brazilian fleet. While catches reported to ICCAT by some countries (e.g., Spain) declined after the implementation of Recommendation 10-07 (which prohibits the retention of oceanic whitetip shark in ICCAT fisheries), significant declines in Brazil's catches occurred prior to Recommendation 10-07 (see South Atlantic section below for more details), and the species is still caught as bycatch. In fact, ICCAT vessels reported catching a total of 29 mt of oceanic whitetip for years 2011-2014, which is after the prohibition was implemented. Only 3 countries reported catching oceanic whitetip sharks in 2014 (Brazil, Guinea and Ghana).

Cuba

Although shark fishing in Cuba most likely commenced at the beginning of the 20th Century, the first official records were not made until 1959 (Cuba NPOA-Sharks 2015). A historical time series on shark production in Cuban waters from 1959–2014 shows a period of growth between 1959 and 1981, with peak production occurring in 1981 of 2,644t (CUBA NPOA-Sharks 2015). In general, shark fishing reached its maximum levels during the first half of the 1980s, with average production of 2,482t from 1980-1985, after which catches showed an unstable but consistently declining trend to a minimal level of 869t in 1993. After another peak of 1,918t

produced in 1997, production once again declined to 546t and 541t in 2004 and 2005, respectively. Finally, following a peak of 900t in 2008, production contracted to 469.5t and 487.5t in 2012 and 2013, respectively, and slightly increased in 2014 to 533.6t (Cuba NPOA-Sharks 2015).

According to data from the 1960s, the oceanic whitetip once represented the highest percentage of shark catches in northwestern Cuba by weight (25.4%; Guitart 1975 cited in Cuba Department of Fisheries, 2016). As previously noted, shark catches in Cuba increased until 1981 and have been variable since. Since 1985, a substantial decline was observed in some species, including oceanic whitetip. Variations in fishing effort and changes in the fishery make it difficult to assess the current status of sharks in Cuba, but since 1981 there has been a tendency towards decline (Claro *et al.,* 2001). More recently, Cuba's Department of Fisheries, Fisheries Research Center, determined that the percentage of landings of oceanic whitetip shark relative to that of other shark species has declined from 1963 to 2011 in the northwestern region of Cuba. In a study conducted on the private commercial fishing base of Cojimar during the winter (October-March) between 2008 and 2010, a single oceanic whitetip shark was observed in the samples, which represented 2% of the shark landings with drift longline at night (Cuba Department of Fisheries 2016). In another study on the same base, oceanic whitetip shark landings accounted for 5% of landings of sharks with drift longline with two sampled individuals from October 2010 to May 2011. However, Aguilar *et al.,* (2014) states that a direct comparison between the two time periods can't be made with respect to the relative order of abundance. In the historical reports, relative abundance is given by weight (kg) of landings whereas more recent monitoring results refer to number of individuals. Aguilar *et al*. (2014) also concluded that it is difficult to make a comparative analysis of the shark fishery in these two periods, because the economic crisis in Cuba has had an impact on fishing activity that cannot be adequately measured, and thus it is unknown whether and to what extent fishing effort has declined over time. For these reasons, the available information at this time does not allow for a definitive determination as to why shark catches are currently lower than what was historically reported (Aguilar *et al*. 2014).

In contrast, Valdés *et al.,* (2016) show a stable abundance trend for the oceanic whitetip shark in Cuban fishery landings along the northwestern coast from 2010 to 2016. The authors noted that their findings are consistent with Guitart (1975) who, as previously noted, reported the oceanic whitetip shark as the most abundant species in Northwest Cuba landings in the 1960s. However, the authors noted that the fishery-dependent results are preliminary and should be interpreted with caution. Nonetheless, when sharks are caught in the fishery, they are never discarded but rather utilized for either human consumption or bait. Additionally, in all the aforementioned studies, the majority of oceanic whitetip sharks caught have been juveniles. Valdez *et al*. (2016) concluded that: "the prevalence of small, immature individuals suggests the possibility of an important nursery area for this species in the Northwestern Atlantic region. Because these animals are small and of less value to the fishermen, they are typically using the juvenile *C. longimanus* as bait while at sea, a practice which may be in conflict with sustainable fisheries management and conservation objectives." Given the foregoing information, it is unclear whether the oceanic whitetip shark has declined significantly in Cuban waters; however, the ongoing retention and utilization of immature individuals as bait is concerning and may be contributing to overutilization of the species.

Northwest and Central Atlantic Summary

As previously discussed in the *Regional Population Trends* section of this status review, abundance trend estimates derived from standardized catch rate indices of the U.S. PLL fishery suggest that the oceanic whitetip shark has undergone significant historical declines in abundance in the Northwest Atlantic, likely due to of fishing mortality. Logbook data indicates that the oceanic whitetip population declined sharply from 1986-2000 by approximately 70% in the Northwest and Central Atlantic, and up to 88% in the Gulf of Mexico; however, the claim of such drastic declines was criticized for a lack of understanding of logbook data (Burgess *et al.,* 2005b; Burgess *et al.,* 2005a), and a less pronounced trend (i.e., 9%) in observer data was found, indicating uncertainty in the magnitude of decline of the Atlantic oceanic whitetip population. Given that observer data are generally considered a more reliable indicator of population abundance trends for bycatch species such as sharks, oceanic whitetip abundance may have stabilized in the Northwest Atlantic since 2000 and in the Gulf of Mexico and Caribbean since the late 1990s. Despite historical abundance declines, recent data from the U.S. PLL fishery indicate that landings of oceanic whitetip shark have declined over time and are currently low, particularly since regulations were implemented that prohibit retention of the species in ICCAT associated fisheries in 2011. Whether overutilization is occurring in other fisheries of the Northwest Atlantic (e.g., Cuba) is uncertain at this time, though the reported practice of using small immature individuals as bait is concerning. Given the oceanic whitetip shark appears to have a relatively high at-vessel survivorship rate in Northwest Atlantic longline fisheries, recent management measures, including the retention prohibition by the United States and ICCAT, may confer conservation benefits to the population in this area to some degree. However, given that post-release mortality rates for oceanic whitetip are still unknown, we recognize that the efficacy of these prohibitions is still largely unclear and overutilization may still be a threat to the species.

South Atlantic

Fishing effort has been high in the southern Atlantic Ocean, intensifying after the 1990s (Camhi *et al.,* 2008). However, most of the information on the effect of fishing on large pelagic sharks comes from the North Atlantic Ocean, while data analyses from the South Atlantic Ocean are patchy and typically pertain only to the most abundant species (Barreto *et al.,* 2015). The oceanic whitetip shark is caught as bycatch in a number of fisheries in the South Atlantic region, including Brazilian, Uruguayan, Taiwanese, Japanese, Venezuelan, Spanish and Portuguese longline fisheries; however, the largest oceanic whitetip catching country in this region is Brazil.

As previously discussed in this report, oceanic whitetips were historically reported as the second-most abundant shark, outnumbered only by blue shark, in research surveys from northeastern Brazil between 1992 and 1997 (Lessa *et al*., 1999; FAO 2012). In fact, those research surveys showed that oceanic whitetip shark comprised nearly 30% of total elasmobranch catches (Lessa *et al*. 1999) and averaged a CPUE rate of 2.18 individuals per 1,000 hooks (Domingo *et al.,* 2007). However, recent information indicates that the oceanic whitetip may be experiencing overutilization in this part of its range because of unsustainable fishing mortality. The oceanic whitetip has commercial importance in Brazil mainly due to its fins. As described by Tolotti *et al*. (2013), the Brazilian foreign chartered tuna longline fleet operates in a wide area of the equatorial and southwestern Atlantic Ocean and utilizes two distinct fishing strategies referred to as the "Japanese" strategy (JAP; targets tuna down to >200 m) and "Spanish" strategy (SPA; targets swordfish down to 100 m). Oceanic whitetip CPUE is higher with the SPA strategy than the JAP strategy due to shallower hook depth; in fact, the depth range of the gear used in the SPA fishing strategy corresponds exactly to the oceanic whitetip's preferred vertical distribution

(Tolotti *et al.,* 2013). Additionally, from 1999-2011, the area with the highest effort concentration was bound by the 5°N and the 15°S parallels and by the 040°W and 035°W meridians. Thus, despite the wide distribution of fishing sets, the area of highest effort is clearly concentrated in the equatorial region of northeastern Brazil, which also happens to overlap with the areas of highest habitat utilization by oceanic whitetip sharks. This is evidenced by tagging data from Tolotti *et al.,* (2015a), which indicate that this region off Northeast Brazil is an area where oceanic whitetip shark may have some degree of philopatry (i.e., site fidelity), as well as observer data collected from 14,860 longline sets (21,156,374 hooks), carried out by the Brazilian foreign chartered tuna longline fleet from 2004 to 2010. Thus, it appears that the Brazilian longline fishery area of operation completely overlaps the preferred vertical and horizontal habitat of oceanic whitetip sharks in this region (see Figures 48 and 49 below).

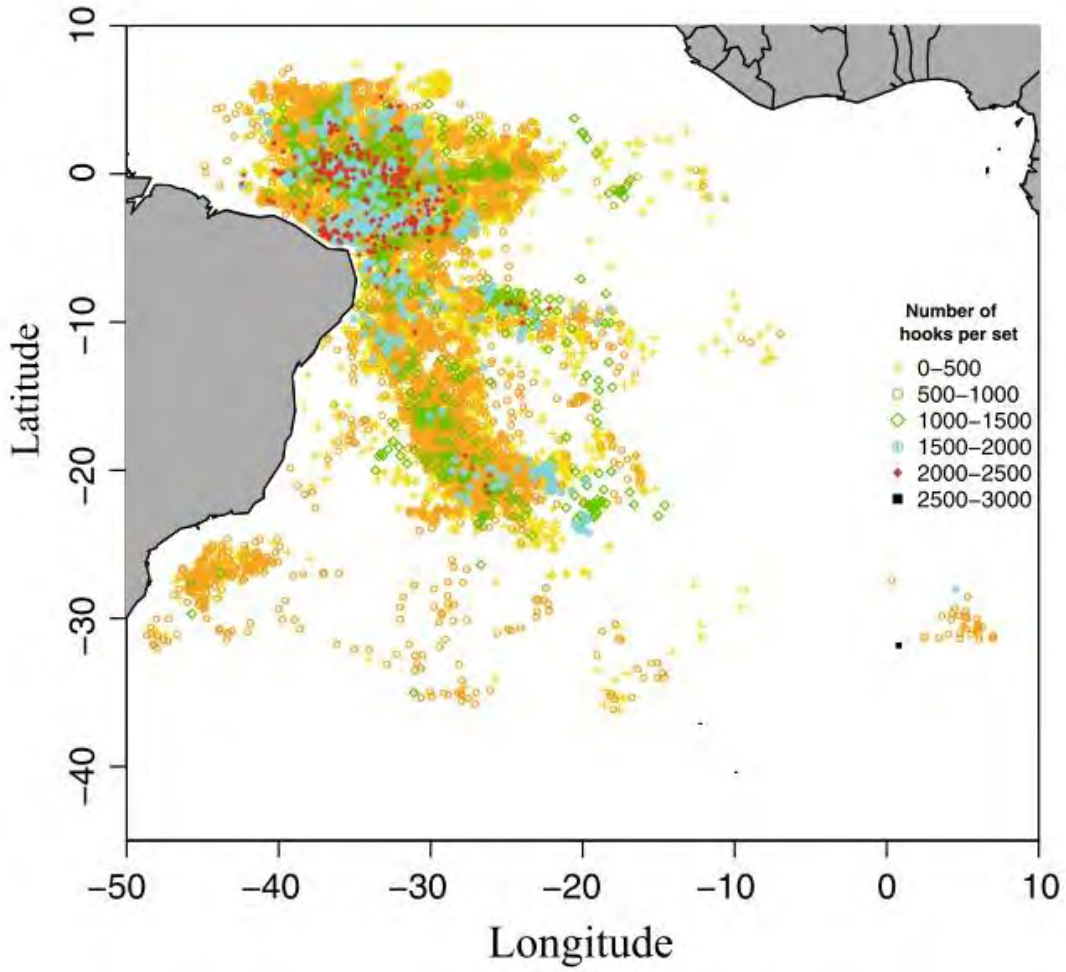


Figure 48 Distribution of fishing effort (number of hooks per set) by the Brazilian chartered tuna longline fleet in the Atlantic Ocean, from 2004 to 2010. Source: Frédou *et al.* 2015.

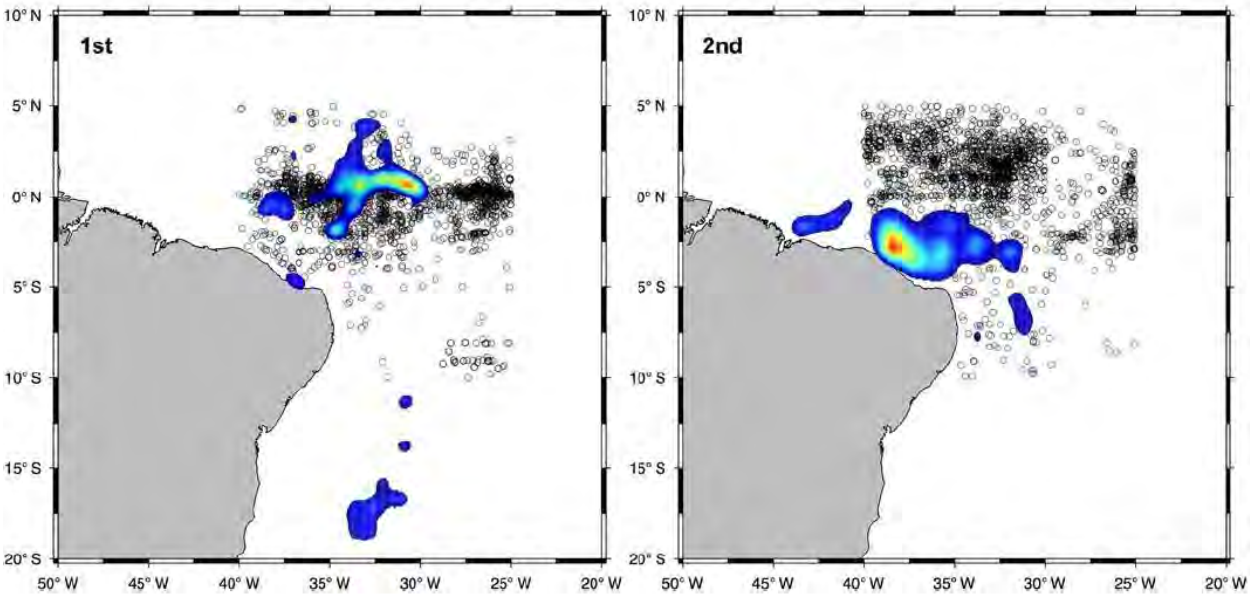


Figure 49 Kernel density estimation of post-processed tracks showing the areas of high utilization by oceanic whitetip sharks tagged in the western Atlantic Ocean between 2010 and 2012. The left panel represents the 1st quarter of the year and the right represents the 2nd. Small circles are fishing set locations from foreign tuna longline vessels chartered by Brazil operating from 2004 to 2010. Source: Tolotti *et al.* 2015a.

Further, many studies show a substantially high percentage of juveniles in the catches from this region (Coelho *et al.,* 2009; Tambourgi *et al.,* 2013; Tolotti *et al.,* 2013; Frédou *et al.,* 2015), which suggests the presence of nursery habitat. For example, the oceanic whitetip was among the most abundant shark species captured during research cruises from November 2000 to September 2002 along the North coast of Brazil, comprising 3% of the total catch in weight (including tunas, billfishes and other sharks); however, more than half of the oceanic whitetip sharks landed were under the size of maturity for this region (Asano-Filho *et al.,* 2004). Likewise, juveniles (<180-190 cm TL) represented 57.1% of the sample in Northeast Brazil (Santana *et al.,* 2004) and 47% of species landings on the North Coast (Asano-Filho *et al*. 2004). A large number of newborns were also sampled in the Southeast region of Brazil (Amorim 1992), further suggesting the existence of nursery grounds in the region. Similarly, Tambourgi *et al*. (2013) found that 80.5% of females were immature and 72.4% of males were immature in the Brazilian pelagic longline fishery between December 2003 and December 2010. Thus, in this region, areas of high fishing effort likely overlap significantly with oceanic whitetip nursery habitat, suggesting that these areas are at a direct risk from the industrial longline fishery (Frédou *et al.,* 2015).

It also appears that the percentage of immature sharks has increased in recent years compared to surveys conducted in the 1990s (See Figures 50 and 51 below).

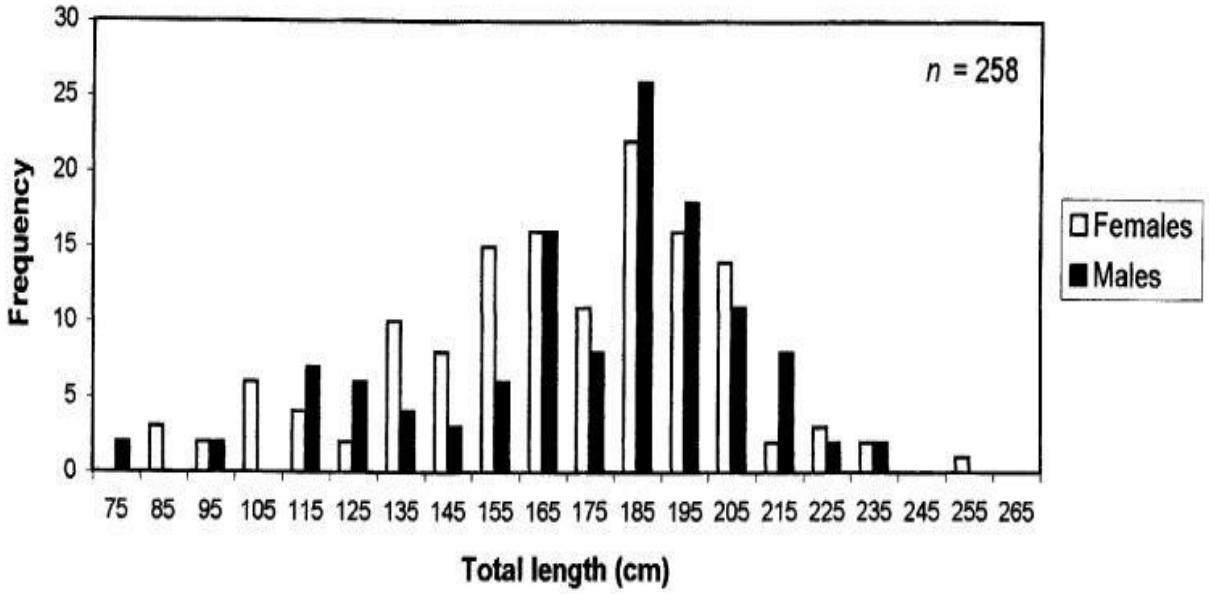


Figure 50 Length-frequency distribution for male and female whitetip shark, *C. longimanus*, caught off northeastern Brazil between 1992 and 1997. Source: Lessa *et al.* 1999.

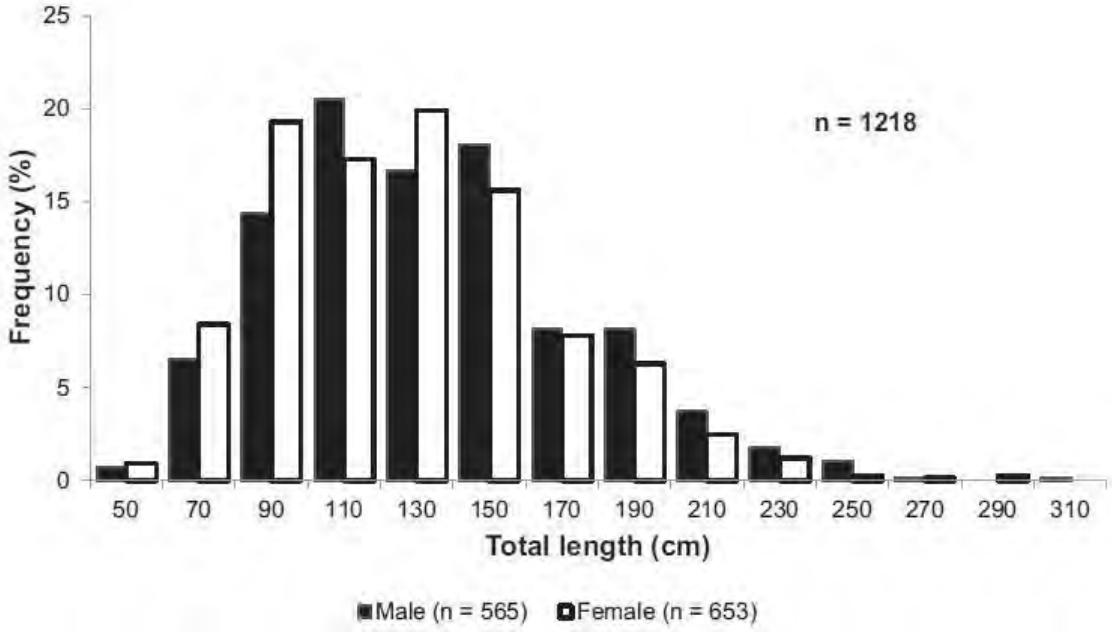


Figure 51 Length–frequency distribution of oceanic whitetip shark, *C. longimanus*, caught in the southwestern equatorial Atlantic Ocean between 2005 and 2009. Source: Tolotti *et al.* 2013.

It should be noted that Figure 50 from Tolotti *et al*. 2013 represents a much larger area of the southwestern and equatorial Atlantic and has a much larger sample size than the results shown in Figure 51 from Lessa *et al*. 1999. However, the two study areas do overlap and provide some indication that the size composition of oceanic whitetip sharks in the southwestern Atlantic is

potentially shifting downwards. More recently, Frédou *et al.,* (2015) analyzed catch and effort data of 14,860 longline sets from the Brazilian chartered tuna longline fleet, between 2004 and 2010 and found that oceanic whitetip sharks in the equatorial and southern Atlantic were comprised of the smallest individuals throughout the fishing ground, with 78% measuring <180 cm and most likely juveniles. Coelho *et al.,* (2009) suggested that the high percentage of small individuals in the southwestern equatorial Atlantic (also found in Tolotti *et al*. 2013 and Tambourgi *et al*. 2013), might indicate size segregation in the Atlantic Ocean. Alternatively, Lessa *et al*. (1999) hypothesized that the large proportion of juveniles might be a result of ongoing fishing pressure on the entire population.

As discussed previously in the *Regional Population Trends* section, a demographic analysis of oceanic whitetip sharks off Brazil estimated that fishing mortality of oceanic whitetip is 14 times higher than required for maintaining equilibrium, resulting in an annual decline of 7.2% (Santana *et al.,* 2004). This rate of decline results in a reduction of about 50% of abundance in the course of approximately a decade, which is within the standards known of exploited oceanic whitetip populations in other regions (Santana *et al.,* 2004). The authors concluded that conservation and management are necessary for the species because the high value of initial mortality is accentuated by an excess of fishing effort, such that that these factors contribute to the population reduction of oceanic whitetip shark in northeastern Brazil (Santana *et al*., 2004). Catches of oceanic whitetip in the Brazilian tuna longline fishery have also shown a continuous decline, decreasing from about 640t in 2000 to 80t in 2005 (Hazin *et al.,* 2007). According to the ICCAT nominal catch database, landings of oceanic whitetip shark by Brazilian vessels continued to decline to 0 mt reported from 2009-2012 and 6 mt in 2013 and 2014 (refer back to Figure 46 above). This decline in reported landings also coincides with the previously discussed demographic analysis that reported a 50% population decline in Brazil. Thus, the decline in landings reported to ICCAT by Brazil prior to 2010 may be indicative of a population decline, though this is highly uncertain given the sensitivity of the species to changes in fisheries strategies. Although there was a shift in some fishing effort of the Brazilian chartered foreign longline fleet to more temperate waters in 2006 (Frédou *et al.,* 2015), which may account for some decline in reported catches of the species, other species-specific information (as previously discussed above) suggests the species is still experiencing significant fishing pressure in areas of its preferred habitat where the species exhibits a high degree of site fidelity (Tolotti *et al.,* 2015a).

Although robust CPUE data are not available for the species, making it difficult to evaluate whether the decline in catches resulted from decreased abundance or from changes in catchability (e.g., fishing strategies) (Hazin *et al.,* 2007), it is clear that the majority of fishing effort in Brazil is concentrated in the same areas of highest habitat utilization by oceanic whitetip sharks (Tolotti *et al.,* 2015a), including potential nursery areas. Thus, it is likely that the intensive fishing pressure of oceanic whitetip across its preferred vertical and horizontal habitat areas in Brazilian waters is negatively impacting oceanic whitetip sharks at all life stages. Given the demographic analysis discussed previously indicating a 50% population decline in these waters as a result of unsustainable rates of fishing mortality, combined with the species' relatively low-moderate productivity, it is likely that the oceanic whitetip is experiencing overutilization in this portion of its range.

As discussed previously in the *Regional Population Trends* section, elsewhere across the southern and equatorial Atlantic, the oceanic whitetip shark exhibits extremely low CPUE values and comprises a very small percentage of catches in various fisheries. For example, farther north in the Venezuelan pelagic longline fishery, the oceanic whitetip shark is caught as bycatch in low numbers. Based on observer data from 1994-2000, only 28 individuals were caught, representing 1.5% of the total shark catch. On average, the size of individuals caught was 125.0 cm FL (Arocha *et al.,* 2002), which is well below the size of maturity estimated for this region (i.e., 180-190 cm).

Similarly, observer data from the Uruguayan longline fleet operating farther south in this region reported low CPUE values for oceanic whitetip from 2003 to 2006, with the highest CPUE recorded not exceeding 0.491 individuals/1,000 hooks. In total, only 63 oceanic whitetips were caught on 2,279,169 hooks and 63% were juveniles (see Figure 52 below; Domingo *et al*. 2007). Based on the catches and relative abundance, three zones were determined for the oceanic whitetip, including: Zone 1: Western South Atlantic and southern Brazil; 2: International waters on the Chain of Montes Vitoria- Trindade near the Bank Davis; Zone 3: Northeast Atlantic in the Gulf of Guinea. Average length and CPUE values were analyzed for *C. longimanus* in these areas. The lowest values of average size were observed in Zone 2, which is also where the highest values of CPUE were observed (followed by zone 3 and 1, respectively). CPUE values decrease with increasing median size. The differences in median sizes, from 145 cm FL in Zone 1 (temperate SW) to <100 cm FL in other more tropical and sub-tropical areas could support the idea of spatial patterns and size distribution of the species; alternatively, this could also be a result of differing levels of historical fishing pressure in these regions. For example, while Domingo *et al*. (2007) recorded a CPUE of 0.098 in Zone 3 and only 10 individuals caught in 3 years, Castro and Mejuto (1995) reported a CPUE of 0.26 in this same area 10 years prior in 1993, with 63 oceanic whitetips caught in only 4 months. Though these data do not indicate whether a decline in the oceanic whitetip population has occurred, they clearly show that this species is currently not abundant in these areas (FAO 2012). However, it is possible that the species has always been uncommon in this area of the South Atlantic, especially given the preference of this species to remain in warm, tropical waters.

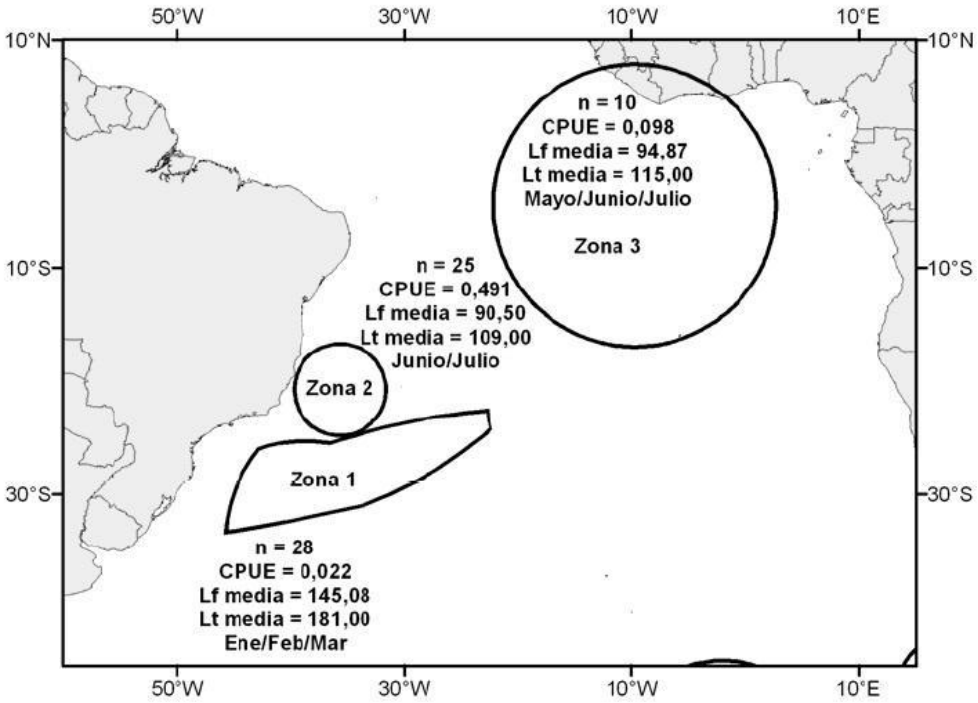


Figure 52 Areas (Zones 1-3), number (n), CPUEs, Lf and Lt media (average lengths) and times of observed oceanic whitetip sharks by the Uruguay National Observer Program from 2003-2006. Source: Domingo *et al.* 2007.

Oceanic whitetip sharks are also caught as bycatch in Taiwanese longline fisheries operating in the South Atlantic. According to Taiwanese observer data, from 1999-2003 oceanic whitetip was the least caught shark species from 5°N-15°S, with only 3 individuals caught, comprising 0.1% in number and 0.1% in weight of total shark catches. However, oceanic whitetip was not found from 15°S-40°S, which are more southern and temperate waters (Joung *et al.,* 2005). Species-specific CPUE for oceanic whitetip was extremely low at 0.003 (n/1,000 hooks) from 5°N-15°S and 0.002 for the entire South Atlantic; however, trends over time are not currently available from this fishery.

A recent study covering a wide area of the Atlantic in both hemispheres from 2008-2011 indicated that the oceanic whitetip shark bycatch in pelagic longline fisheries comprises less than 1% of the total elasmobranch catches (Coelho *et al.,* 2012). This study analyzed observer data from the Portuguese longline fishery targeting swordfish in the Atlantic Ocean, including areas of the temperate NE, tropical NE, equatorial, and southern Atlantic Ocean (see Figure 53 below). Between August 2008 and December 2011, the oceanic whitetip shark comprised only 0.01% of the total elasmobranch catch (n = 281) and exhibited an at-vessel mortality rate of 34.2% (Coelho *et al.,* 2012).

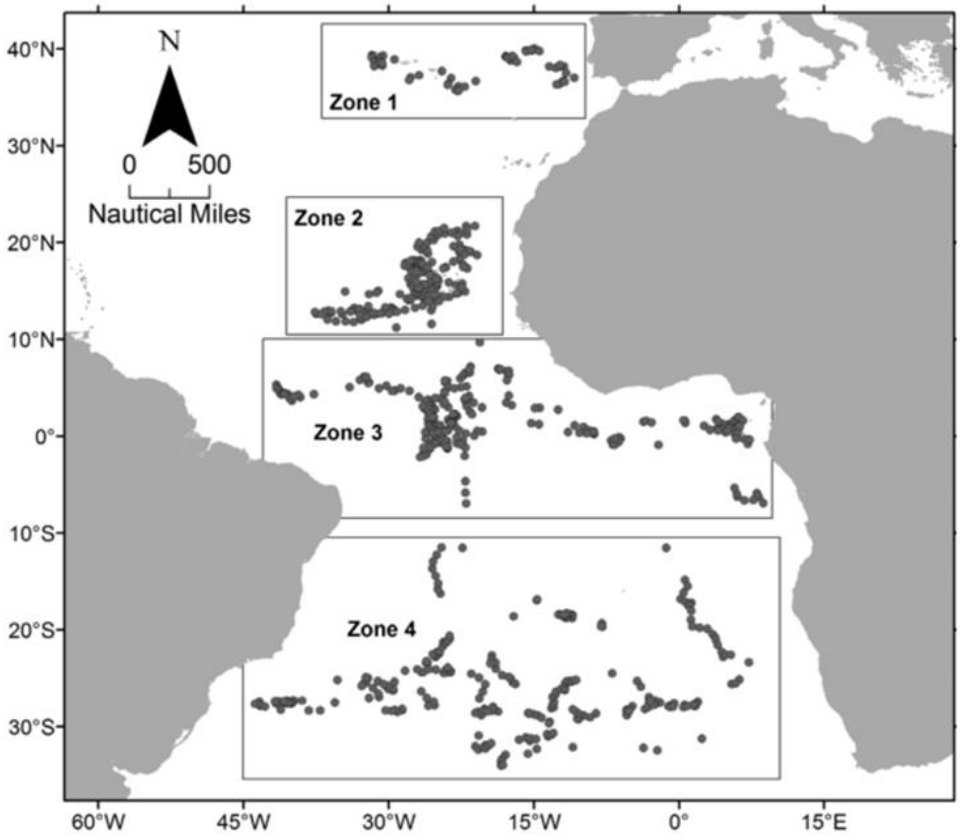


Figure 53 Locations of observed Portuguese longline operations in the Atlantic Ocean from 2008 to 2011. Source: Coelho *et al.* 2012.

Over the same time period (2008-2011), a total of 202 experimental pelagic longline sets were carried out in the Tropical Northeast Atlantic Ocean (corresponding to Zone 2 in Figure 53 above). Fernandez-Carvalho *et al.,* (2015) noted that this area has become a major fishing ground for the European pelagic longline fleets (i.e. Spanish and Portuguese) in recent years. The study compared mortality rates between hook and bait type to determine potential bycatch mitigation methods. Over the course of the study, 152 oceanic whitetip sharks were caught, with higher catch rates observed with the use of circle Gt hooks. The species presented relatively low at-vessel mortality rates (11-28%) compared to other shark species, which ranged from a low of 4-8% for the crocodile shark and a high 61-64% for the smooth hammerhead shark (Fernandez-Carvalho *et al*., 2015).

In the southeastern Atlantic, a study on the impact of longline fisheries in the Benguela Current Large Marine Ecosystem (defined as west of 20º E, north of 35º S and south of 5º S) reported observer data from the South African longline fishery. This study found that oceanic whitetip was only a minor component of the shark bycatch from 2000-2005 (n = 125), and comprised only 1.2% of the shark bycatch composition (Petersen *et al.,* 2007). However, this is not surprising given the species' preference for more tropical waters.

Finally, in a study that synthesized information on shark catch rates (based on 871,177 sharks caught on 86,492 longline sets) for the major species caught by multiple fleets in the South

Atlantic between 1979 and 2011, generalized linear models were used to standardize catch rates and identify trends in three identified fishing phases: a first phase (1979–1997), characterized by a few fleets mainly fishing for tunas; a second phase (1998–2007), where many fleets were fishing for tunas, swordfishes and sharks; and a third phase (2008–2011), where fewer fleets were fishing for multiple species and restrictive measures were being implemented (Barreto *et al.,* 2015). In total, 3,288 oceanic whitetip sharks were reported during the time period. Overall results indicate that most shark populations in the South Atlantic are currently depleted, but can recover where fishing effort is reduced accordingly (Barreto *et al*., 2015). More specifically, results indicate that catch rates for most of the species analyzed, including oceanic whitetip, have declined precipitously from considerable fishing pressure and absence regulatory measures to control fishing effort, particularly in phase B. These declines coincided with significant increases in fishing effort, inadequate regulations to deal with issues such as shark bycatch, finning and directed fishing for sharks by some fleets. Considering the percentage rate of change between the last year of phase A in relation to the last year of the phase B, the authors determined that that with exception of *P. glauca* and *A. superciliosus*, catch rates of all species, including oceanic whitetip, have declined by more than 85% (Barreto *et al.,* 2015). In Phase C (2008-2011), when the presence of onboard observers became mandatory, catch rates of oceanic whitetip declined by 14%, but overall conclusions regarding the status of oceanic whitetip were inconclusive. Figure 54 below shows trends in standardized catch rates for oceanic whitetip for each of the three phases.

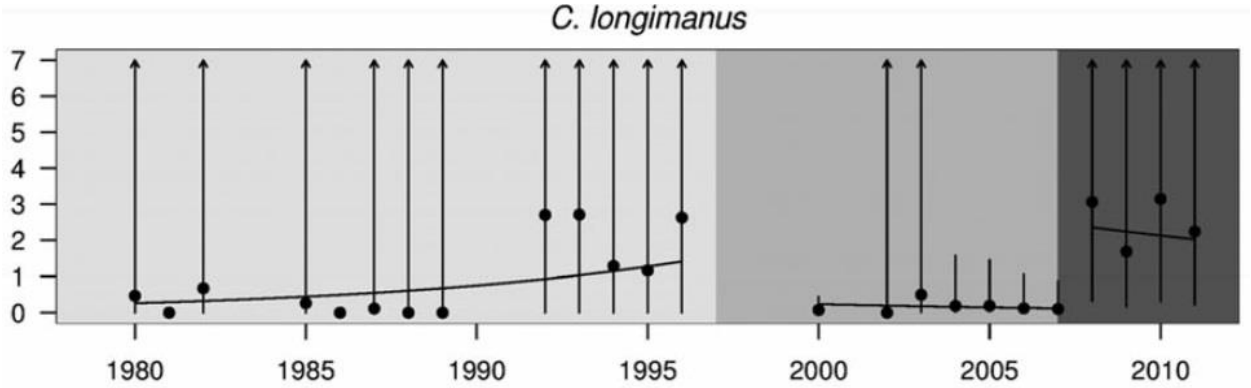


Figure 54 Trends in standardized catch rates of oceanic whitetip sharks (estimated from generalized linear models with a zero truncated negative binomial distribution) in 3 fishing phases (shadings); solid lines, overall trends with year as continuous variable; dots, individual year estimates with year as factor; vertical lines, 95% CI; arrows, CIs larger than the y-axis scale in a particular year. Source: Barreto *et al.* 2015.

Reviewers had some serious concerns regarding the methodologies of the Barreto *et al*. (2015) study, and pointed out several caveats and limitations, including the use of year as a continuous variable and the stripping out of all zero catches. Confidence intervals are extremely high and overlapped in most cases, raising the possibility that the trends may be "noise" rather than truly tracking abundance. Given these caveats and limitations, the ERA team exhibited lower confidence in the results of this study.

South Atlantic Summary

Overall, while quantitative studies regarding catch trends of oceanic whitetip sharks are limited, oceanic whitetip sharks, while once one of the most abundant shark species encountered in longline fisheries in the southern and equatorial Atlantic, are now seemingly rare with low,

patchy abundance across the region, and the majority of catches are comprised of immature individuals. Given that both average CPUE and commercial landings of oceanic whitetip shark have likely declined in recent decades, combined with the species' low-moderate productivity, it is likely that overutilization of oceanic whitetip sharks is occurring in the South Atlantic. This is likely a result of the fact that high levels of fishing effort overlap significantly with the preferred vertical and horizontal habitat of the species in this region. Of particular concern is the overlap of fishing effort with potential nurseries and areas where the species shows a high degree of site fidelity. However, without any robust standardized fisheries data to account for various factors that may affect the catch rate of oceanic whitetip, the species' current abundance and trends in this region are uncertain.

Indian Ocean

Despite evidence for high bycatch levels of pelagic sharks in the Indian Ocean (Romanov 2002, Huang and Liu 2010), there is a paucity of reliable data to facilitate assessing historical changes in shark catch rate trends (Smale 2008). In an analysis of long-term trends from research and fisheries data collected in the Indian Ocean from 1961-2009, the oceanic whitetip was recorded in catches from each time series (e.g., 1961-1970; 1971-1980; 1981-1989; 2002-2009) (Romanov *et al.,* 2010). According to the IOTC, the RFMO that manages tuna and tuna-like species in the Indian Ocean and adjacent waters, catches of oceanic whitetip shark are ranked as "High," meaning the accumulated catches from 1950–2010 make up 5% or more of the total catches of sharks recorded (Herrera and Pierre 2011). In fact, a recent study estimated that the oceanic whitetip shark comprises 11% of the total estimated shark catch in the Indian Ocean (Murua *et al.,* 2013a). It is also considered to be the 5th most vulnerable shark species caught in longline fisheries in the region (out of 16 species assessed), and the most vulnerable shark species caught in purse seine gear, due to its high susceptibility (Murua *et al.,* 2012; IOTC 2015a).

The oceanic whitetip is reported as bycatch in all three major fisheries operating in the Indian Ocean; the species is considered "frequent" in both longline and purse seine fisheries, and "very frequent" in the gillnet fishery (Murua *et al.,* 2013b), with gillnet fisheries reporting the highest nominal catches of sharks in 2014, and making up nearly 40% of catches (Ardill *et al.,* 2011; IOTC 2015a). Large numbers of fishing vessels that use gillnets in the Indian Ocean have been identified, with 1,000 estimated for Iran and 2,000 estimated for Sri Lanka; however, due to their small sizes and artisanal status (despite often fishing very far from their countries), the total annual numbers of fishing vessels utilizing gillnets in the Indian Ocean remain largely unknown. Additionally, fishing zones of the gillnet fishery also remain widely or completely unknown, with no logbooks or observers present on these vessels (Fontenau 2011). With an estimated 3,000 vessels that are theoretically supposed to deploy nets of 2.5 miles in length, 6,000 miles of nets may be deployed on a daily basis (Fontenau 2011; Figure 55 below).

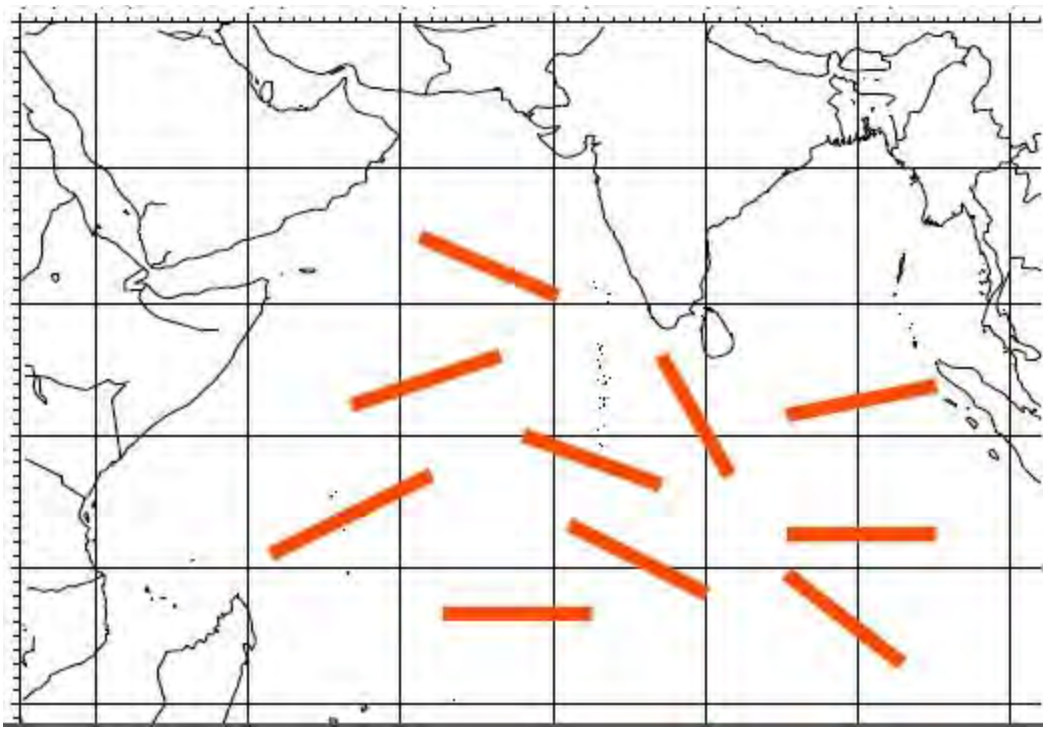


Figure 55 Schematic conceptual view of the total length of drifting nets that may be deployed daily by a fleet of 3,000 vessels using 2.5 miles long nets. Source: Fontenau 2011.

The main fleets catching oceanic whitetip in the Indian Ocean from 2011-2014 include: Indonesia, Sri Lanka, I.R. Iran, EU (Spain), China, Madagascar, and Seychelles. Fisheries catch data for the Indian Ocean are available from the IOTC, which requires CPCs to annually report oceanic whitetip catch data (See IOTC Resolutions 05/05, 10/07, 10/12, 12/09, 13/06). However, prior to the adoption of resolution 05/05 by the IOTC, there was no requirement for sharks to be recorded at the species level in logbooks. As such, it was not until 2008 that some very sporadic statistics become available on shark catch, mostly representing retained catch and not accounting for discards (Ardill *et al.,* 2011). Additionally, the IOTC acknowledges that despite reporting requirements, catches of sharks are usually not reported. In fact, reporting by species is very uncommon for gillnet fleets, where the majority of catches are reported in aggregate (IOTC 2015a). Further, when catch statistics are provided, they may not represent the total catches of the species, but those simply retained on board, with weights that likely refer to processed specimens (IOTC 2011b). Therefore, the current reported catches are thought to be incomplete and largely underestimated. In fact, a recent study estimated possible oceanic whitetip shark catches for fleets/countries based on the ratio of shark catch to target species, and highlighted a potentially significant underestimation of oceanic whitetip shark in the IOTC database. Murua *et al.,* (2013a) concluded that the estimated catch of oceanic whitetip shark is approximately 20 times higher than declared/reported and contained in the IOTC database. In fact, once the requirement to record and report oceanic whitetip incidental catches and discards to the IOTC was implemented in 2013, estimated catches skyrocketed from an annual average of 347 mt from 2007-2011 to 5,413 mt and 5,383 mt in 2013 and 2014, respectively (see Figures 56 and 57 below).

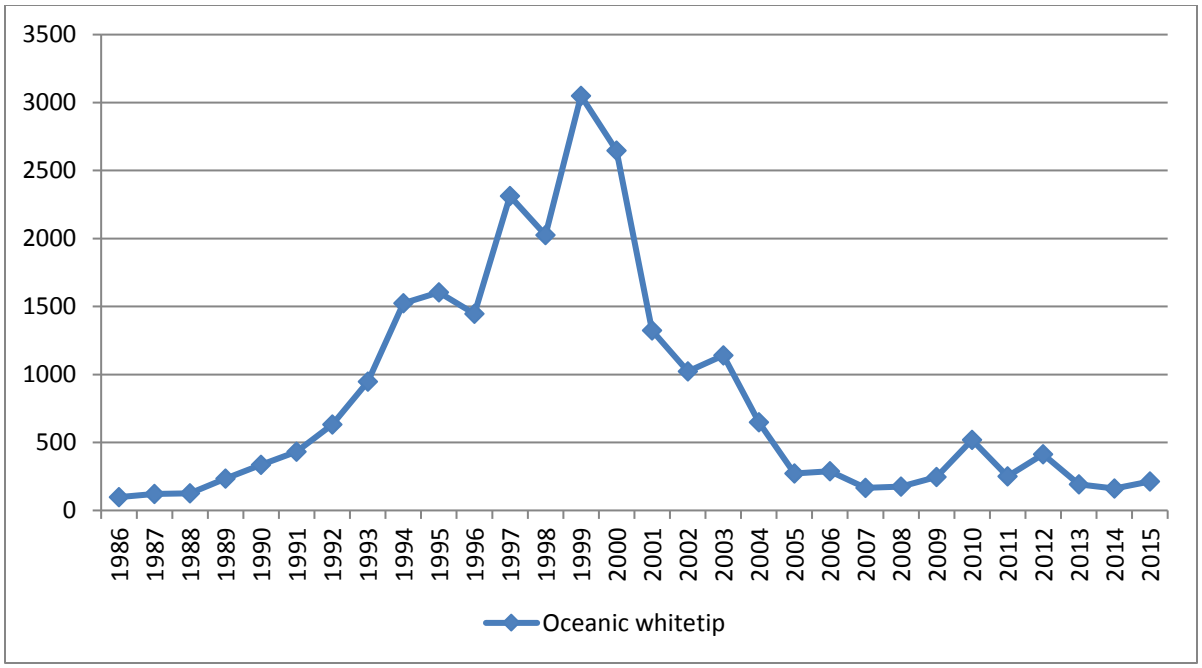


Figure 56 Total catches (mt) (all gears) of oceanic whitetip as reported to the IOTC from 1986-2009. Source: Murua *et al.* 2013(b) and IOTC nominal catch database.

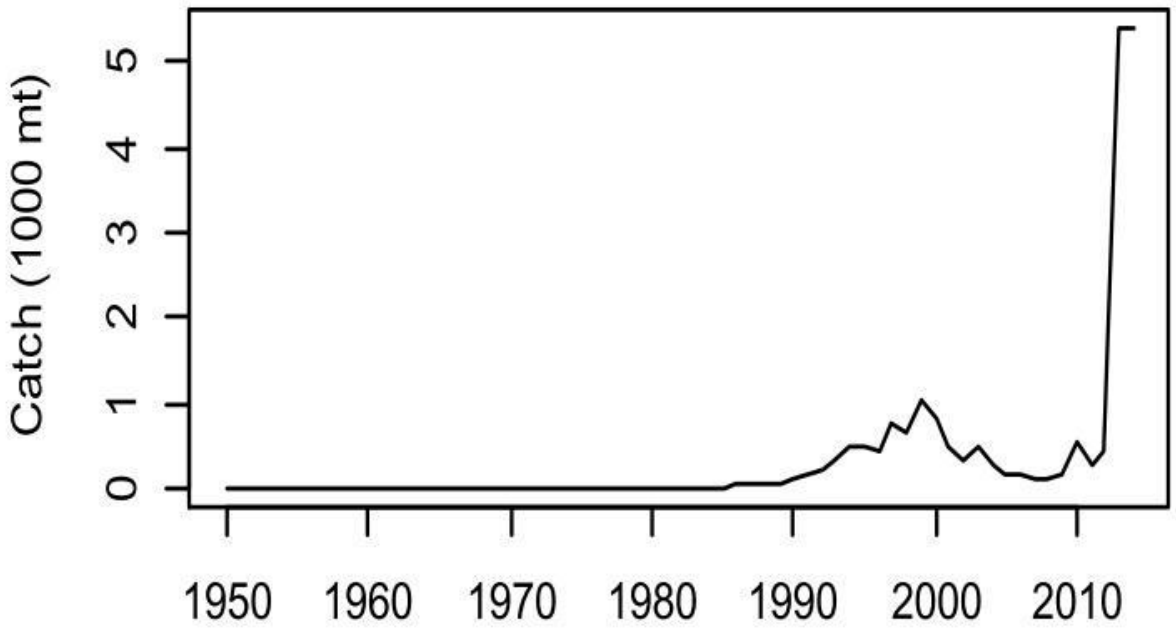


Figure 57 Total nominal catches of oceanic whitetip for all fleets operating in the Indian Ocean (1950-2014). Source: IOTC (2015b).

Only 6 countries reported catches of oceanic whitetip in 2014: Tanzania, Sri Lanka, Maldives, Islamic Republic of Iran, India and Seychelles. The reporting of catches of oceanic whitetip

sharks (shown in Figure 57 above) shows an unusual trend dominated by the Sri Lankan combination longline-gillnet fisheries with the addition of proportionately very large catches by India in the last years (2013-2014) (IOTC 2015b). Overall, prior to the unusual trend in 2013 and 2014,the trend in catch shows a substantial increase throughout the 1990s, which likely corresponds with the rise in the shark fin trade (Clarke *et al.,* 2007), a peak at 3,050 mt in 1999, followed by a sharp and continued decline in the 2000s. The IOTC's Working Group on Ecosystems and Bycatch stated that at current catch levels (i.e., average of 347 mt prior to 2013) the Indian Ocean stock of oceanic whitetip was at considerable risk. Given the high level of fishing pressure on oceanic whitetip in the Indian Ocean, and the species' low-moderate productivity, it is therefore likely that the substantially high catches of oceanic whitetip sharks in the Indian Ocean (5,000+ mt estimated for 2013 and 2014) are in excess of what is sustainable and may be contributing to overutilization of the species in the Indian Ocean. Additionally, oceanic whitetip sharks appear to have higher mortality rates on longlines in the Indian Ocean (e.g., 58% mortality in longline fisheries that fish for swordfish (IOTC 2015a) compared to mortality rates observed in other portions of its range (e.g., ~23% in NW Atlantic (Beerkricher *et al*. 2002; Gallagher *et al*. 2014); 11-28% in the South Atlantic (Fernandez-Carvalho *et al*. 2015); 30% in RMI (Bromhead *et al*. 2012)). It should also be noted that these rates only account for at-vessel mortality and do not account for post-release mortality. Information regarding some of the main countries that catch oceanic whitetip shark in the Indian Ocean is provided below where available.

Indonesia

Indonesia is the largest shark-catching country in the world, with an estimated total elasmobranch catch of 110,000 t in 2007 (Camhi *et al.,* 2009). According to a recent study by Dent and Clarke (2015), total captures of chondrichthyan fishes from 2000–2011 averaged 106,034 t. This level of catch has likely caused declines in abundance for many species. For example, research cruise data show that catch rates of elasmobranchs in the Java Sea declined by at least one order of magnitude between 1976 and 1997. Results strongly indicate that many shark and ray species in Indonesia are overfished (Blaber *et al.,* 2009).

The population status of oceanic whitetip shark in Indonesia is unknown because fishers rarely land this species. A 2001-2006 survey conducted in waters south of Java, Lombok and Bali found that few oceanic whitetip sharks were landed either as bycatch of tuna fisheries or as target catch of shark longline fisheries in Lombok (Dermawan *et al*., 2013). The authors noted that specimens landed are mostly juveniles with few adults recorded in this part of Indonesia. Adults are commonly caught in east Indonesia, from Lombok in West Nusa Tenggara to the Leti Islands in Southeast Maluku. The size of sharks can be estimated from the size of its fins, and the shark fins found at fin collectors in east Indonesia indicate that most of the oceanic whitetips landed by fishers in this region are adults. Although all parts of this shark species are utilized in Indonesia, the fins are most sought after due to their high economic value (Dermawan *et al.,* 2013).

In 2014, a study was conducted using DNA barcoding of 582 shark fins collected from numerous traditional fish markets and shark-fin exporters across Indonesia from mid-2012 to mid-2014, including Aceh, Jakarta, West Java, Central Java, East Java, Bali, West Kalimantan, South Sulawesi, North Sulawesi, Maluku, and West Papua. Additional samples were collected from shark fin export warehouses in Cilacap (Central Java) and Tanjung Luar (West Nusa Tenggara). In this study, Sembiring *et al.,* (2015) discovered a fishery that targets particularly vulnerable

shark species, including oceanic whitetip sharks. Oceanic whitetip sharks comprised a small portion of the tested fins, representing 1.72%. Additionally, in an analysis of Indonesian longline scientific observer data in the Indian Ocean from 2005-2013, oceanic whitetip sharks represented 1.66% of the total catch (Novianto *et al.,* 2014). In October 2015, Indonesian authorities seized about 3,000 shark fins belonging to oceanic whitetip sharks that were reportedly caught in waters around Java Island. The fins, which were about to be flown to Hong Kong, were seized at the international airport that serves the capital Jakarta (South China Morning Post 2015[10]). The oceanic whitetip is a protected species in Indonesia and banned from export. Thus, based on the genetic results of shark fins from numerous fish markets throughout Indonesia and the evidence of illegal trade of oceanic whitetip fins, it is evident that oceanic whitetip sharks are commonly caught as bycatch and are potentially targeted for fins in this portion of its range.

India

India is the second largest shark producing nation in the world. In one study, survey vessels collected data on the CPUE of sharks in the longline tuna fishery in various regions of the Indian EEZ from 1984-2006 (three vessels operated along the west coast of India, two vessels operated in the east coast and one vessel in the Andaman and Nicobar waters). During the survey, a total of 3.092 million hooks were deployed, with sharks representing 45-50% of the catch, equaling approximately 588.9 t (John and Varghese 2009). A sharp decline in CPUE from all three regions was observed, with the most concerning scenario on the east and west coasts, where the average hooking rate recorded during the last five years was less than 0.1%. The oceanic whitetip represented 0.6% and 4.7% of the catch from the East Coast (Arabian Sea) and Andaman and Nicobar waters, respectively. In the Andaman and Nicobar region, where catch of oceanic whitetip is most prevalent, total shark CPUE declined sharply by approximately 81% from 1992-1997. On the East Coast, total shark CPUE also declined significantly by approximately 89% from 1984-2005. More recently from 2004-2010, Varghese *et al.,* (2015) report that oceanic whitetip shark comprised only 0.23% of the total shark catch and had an extremely low hooking rate (number of sharks caught per 100 hooks) of 0.001 in Andaman and Nicobar waters, which is significantly lower than what John and Varghese (2009) reported for years 1984-2006. Overall, Varghese *et al*. (2015) shows that the index of relative abundance of sharks was considerably lower than earlier studies, indicating a decline in abundance over the years. While the lack of standardized CPUE trend information for oceanic whitetip in these studies makes it difficult to evaluate the potential changes in abundance for this species in this region, based on the best available information, it is likely that oceanic whitetip has experienced some level of population decline in this region as a result of fishing mortality. Additionally, it is important to note that India has objected to the IOTC Resolution prohibiting the retention of oceanic whitetip sharks (since 2013), and thus this Resolution is not binding for India. Therefore, oceanic whitetip sharks may still be retained in Indian fisheries.

Sri Lanka

Although sharks were dominant in the historical large pelagic fish landings in Sri Lanka, their current production is low, with catches mostly a result of bycatch. From 1950 to 1974, more than 45% of the total large pelagic fish production was attributed to sharks (Hasarangi *et al.,* 2012). As of 2014, however, the estimated contribution of sharks to the total large pelagic fish

[10] http://www.scmp.com/news/asia/southeast-asia/article/1864948/indonesia-seizes-3000-shark-fins-destined-hong-kong

production by weight currently remains at 2% (Jayathilaka and Maldeniya 2015). Previous attempts to estimate the potential sustainable yield in Sri Lankan waters suggested harvest rates of all species of 250,000 t year^{-1}, with around 170,000 t for pelagic species. Reconstructed catches from O'Meara *et al*. (2011) indicate that this sustainable level was likely exceeded as far back as 1974. In this study, O'Meara *et al.,* (2011) highlighted the lack of proper accounting for total fisheries catches and concluded that without a realistic estimate of removals, pelagic fisheries are likely mismanaged and potentially overexploited (O'Meara *et al*. 2011). Among the shark landings in Sri Lanka, silky shark (*C.falciformis*) is the dominant species followed by thresher shark (*Alopias* spp.), blue shark *(P. glauca*) and oceanic whitetip shark (*C.longimanus*), respectively. The oceanic whitetip shark has commercial importance in Sri Lanka, and comprised approximately 5% of the total shark catch in 2014 (down from 6.1% in 2011; Jayathilaka and Maldeniya 2015). From 1996-2004, landings of oceanic whitetip peaked in 1999 at approximately 3,000 mt and show a declining trend thereafter (Hasarangi *et al.,* 2012). More recent information suggests that oceanic whitetip shark landings have seemingly declined continuously from a peak of 3,000 mt in 1999 to less than 300 mt in 2014. It is important to note that the significant decline in shark production can be attributed to regulatory mechanisms only in the last two years. Most recently, Sri Lanka reported only 88 mt of oceanic whitetip shark to IOTC in 2015. Thus, the decline in oceanic whitetip catches occurred prior to the implementation of any regulatory measures, and may therefore be indicative of declining catches due to population decline in Sri Lankan waters.

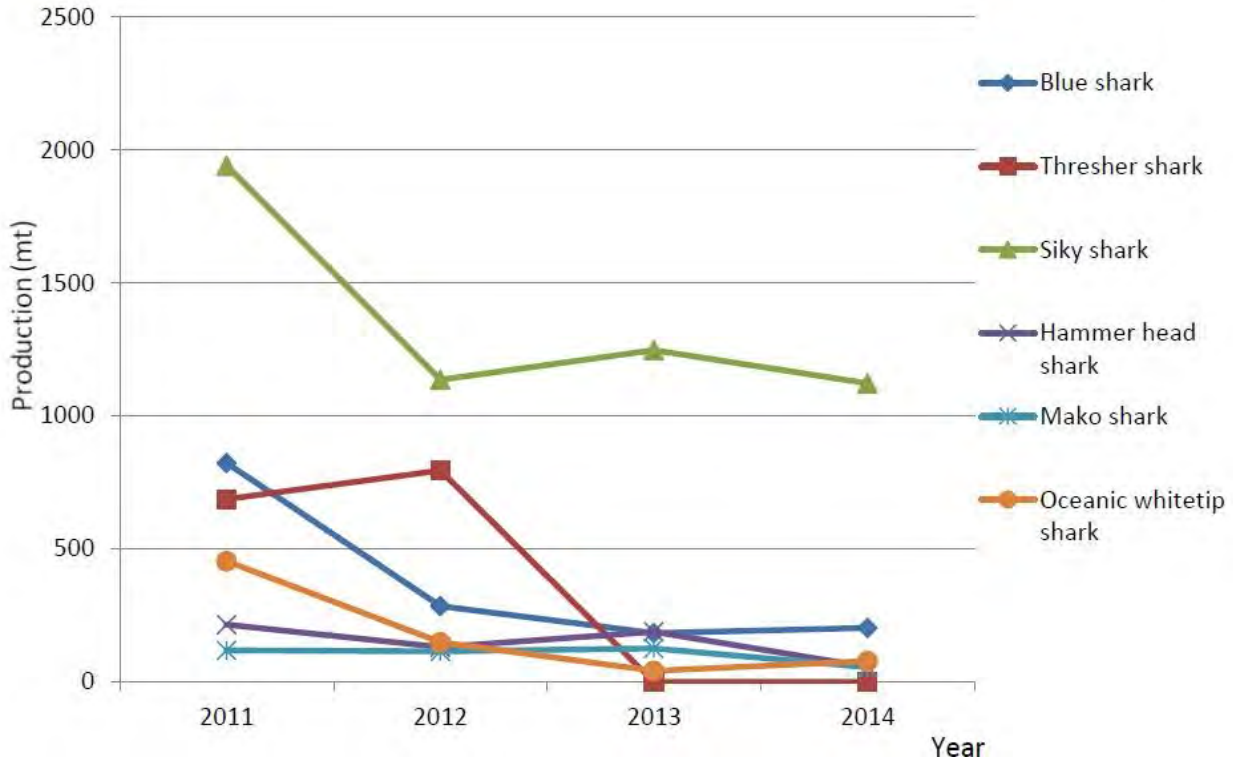


Figure 58 Sri Lanka shark landings by major species 2011-2014. Source: Jayathilaka and Maldeniya 2015.

Taiwan

Oceanic whitetip sharks have also been recorded as bycatch in the Taiwanese longline fishery operating in the Indian Ocean. Estimates of discards and incidental catch are difficult to obtain

due to a lack of discard data reporting in captains' logbooks and because the Taiwanese fleet rarely identifies the various shark species (Huang and Liu 2010; Moreno and Herrera 2013). Observer data collected from 77 trips on Taiwanese large-scale longline fishing vessels in the Indian Ocean from June 2004 to March 2008 were used to estimate the extent of bycatch. The oceanic whitetip shark was recorded in the yellowfin, bigeye and albacore tuna fisheries (Huang and Liu 2010). In total, only 77 individuals were recorded during the study period, despite most fishing effort taking place in tropical latitudes between 10°N and 10°S, where the species would likely be most prevalent (see Figure 59 below). During the study, the average discard rate for sharks was 54.2% (Huang and Liu 2010).

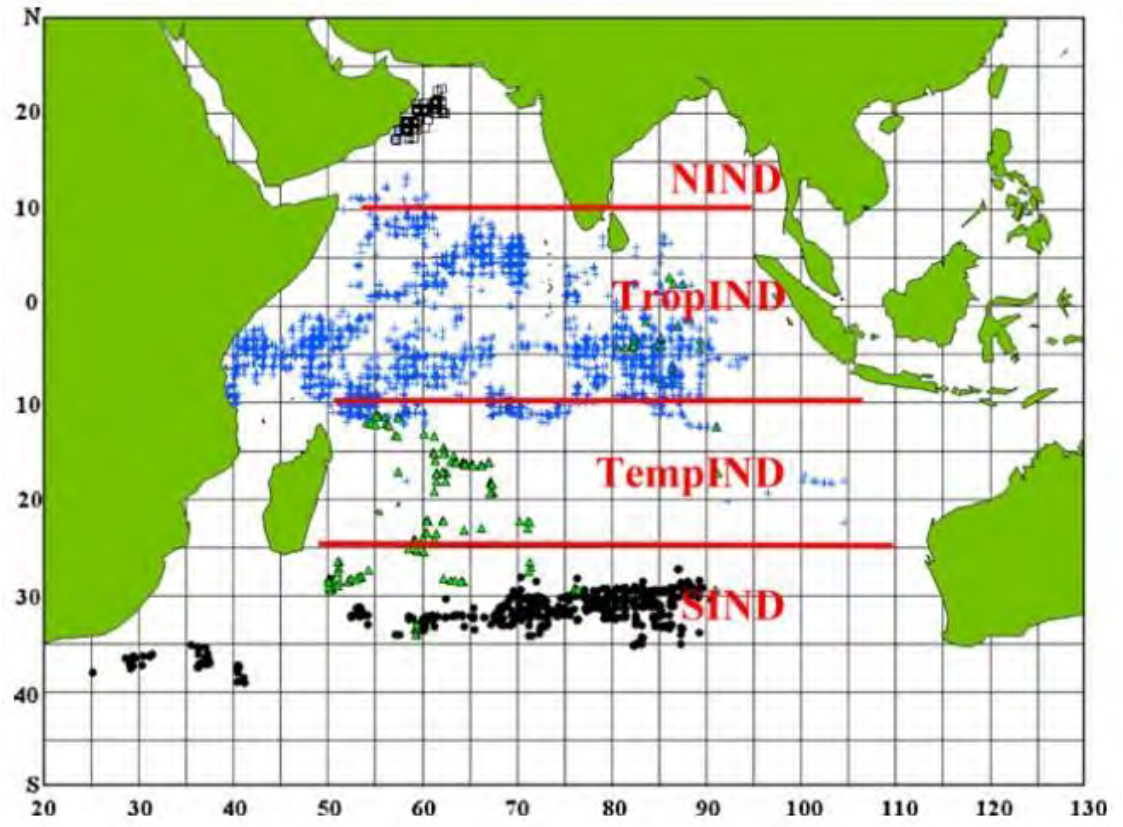


Figure 59 Areas and observed effort distributions of the Taiwanese longline fishery in the Indian Ocean. Black squares, yellowfin tuna fleet; blue crosses, bigeye fleet; green triangles, albacore fleet; black circles, bluefin tuna fleet. Source: Huang and Liu 2010.

African semi-industrial fleet

The African semi-industrial fleet (including Madagascar, Mauritus, Reunion, and Seychelles) is opportunistic and fishes exclusively in the Western Indian Ocean. Seychelles started its fishing operations in 1983 and Reunion in 1991 with one vessel each. The fleet reached a peak of 62 vessels in 2007 and 2012. In 2012, Reunion had 41, Madagascar had 8, Mauritius had 5 and Seychelles had 4 vessels. It was not until 2010 that this fleet reported shark catches down to the species level. Based on reported catches, catches per vessel is low (~1 mt per vessel per year), with the oceanic whitetip shark comprising approximately 52% of the catch (Moreno and Herrera M. (IOTC Secretariat) 2013).

Indian Ocean Summary

Overall, it appears that the oceanic whitetip shark is likely heavily utilized in the Indian Ocean basin due to direct and indirect fishing pressure. The species is highly valued for its fins in this region, comprises an estimated 11% of the total shark catch (Murua *et al*. 2013), and is impacted by all three major fisheries in the region, including longlines, gillnets, and purse seine fisheries. As discussed previously in the *Regional Population Trends* section of this status review, and based on the limited data available, it appears that the Indian Ocean oceanic whitetip shark population has likely experienced varying magnitudes of decline as a result of intense historical and ongoing fishing mortality driven by bycatch-related mortality and economic demand for the fin trade. While there is considerable uncertainty regarding the current status of oceanic whitetip sharks in the Indian Ocean, given the high level of fishing effort in this region and high catches of the species, combined with the species' relatively high mortality on longlines in this region and low-moderate productivity, it is likely that overutilization of oceanic whitetip shark is occurring in the Indian Ocean.

Shark Trade

A demand for shark products has existed since the early 1900s, including liver oil, hides, fins, meat, teeth and jaws. Since the 1980s, much of the demand for shark products focused on fins due to the increasing demand for shark fin soup (Biery and Pauly 2012). Traditionally consumed in Hong Kong, Singapore, Macao, Taiwan, China, and other countries with large ethnic Chinese populations, shark fins are one of the most valuable food items in the world (Fong and Anderson 2000). According to official FAO statistics, the average declared value of total world shark fin imports from 2011–2014 was estimated at USD377.9 million per year from 2000 to 2011, with an average annual volume imported of 16,815 tonnes (Dent and Clarke 2015). From 2000–2011 annual average figures for imported shark meat were 107,145 tonnes, worth a total of USD 239.9 million; while in 2011 alone, the reported figures for total global imports of shark meat were USD379.8 million and 121,641 tonnes for value and volume, respectively (Dent and Clarke 2015). Dent and Clarke (2015) emphasized that: "the significant difference between the unit values of trade in both commodity categories reflects the much higher value of shark fins, which retail as some of the most expensive seafood items in the world." Historically, this disparity in value has sometimes led fishers to remove fins from captured sharks before discarding the less valuable remainder in order to maximize the value of the contents of their limited hold space (Dent and Clarke 2015).

Shark finning makes monitoring catch levels difficult because shark carcasses are not available to be counted or weighed, and these figures are challenging to estimate based solely on the quantity of fins landed. The resulting lack of accurate catch data makes effective shark fishery management on an international scale troublesome, because international fishing pressure on sharks may not be well understood and is therefore commonly underestimated (Jacquet *et al.,* 2008). Clarke *et al.,* (2006b) used the shark fin trade data to estimate the total number of sharks traded worldwide, and found that between 26 and 73 million individual sharks are traded annually in the market (median = 38 million/year), with a median biomass estimate of 1.70 million t/year (range: 1.21 - 2.29 million t/year). This biomass estimate is almost three times higher than the maximum calculated using FAO global shark capture production statistics (0.60 million t/year). In a similar vein, a recent study by Jacquet *et al*. (2008) found that Ecuadorian landings of sharks have also been grossly underestimated compared to what is reported to the FAO. For the period of 1991-2004, reconstructed estimates from government reports and grey literature were 3.6 times greater than what was reported to the FAO. Further, because some

countries, such as Spain, do not report shark fins as a separate commodity in the FAO database, but lump them into general "shark" categories, the FAO shark fin export data may not be a good indicator of the global trade in shark fins. These studies indicate that the FAO database, the only source for current international catch statistics, may be drastically under-representing global shark catches. However, this issue is changing as the World Customs Organization now requires countries to create fin-specific commodity codes (Dent and Clarke 2015), though this does not necessarily remedy the under-reporting of sharks that are caught.

Demand from international shark fin trade is the main economic force driving the retention and subsequent finning of oceanic whitetip sharks taken as bycatch, as their large, morphologically distinct fins command high prices on the international market of US $45–85/kg (CITES 2013). Thus, the oceanic whitetip shark is considered a "preferred" species for its fins and make up part of the "first choice" category in the China, Hong Kong SAR fin market (Vannuccini 1999). In order to determine the species composition of the shark fin trade, Clarke *et al.,* (2006a) analyzed 1999-2001 Hong Kong trade auction data in conjunction with species-specific fin weights and genetic information to estimate the annual number of globally traded shark fins. Using this approach, the authors discovered that oceanic whitetip sharks are sold under their own category "*Liu Qiu*" and represent approximately 1.8% of the Hong Kong shark fin market. This level of oceanic whitetip shark fins in the trade translates to an estimated total annual catches of oceanic whitetip of approximately 200,000–1,200,000 individuals (median ~700,000) or ~9,000–48,000 tonnes (median ~21,000 t) (Clarke *et al.,* 2006b). In 2003, a peak year for fin imports to Hong Kong, Clarke (2008) estimated that 80-210,000 oceanic whitetip sharks were sourced from the Atlantic Ocean alone to supply the Hong Kong fin market.

In more recent years, genetic testing conducted in various fish markets provides additional confirmation of the species-specific utilization of oceanic whitetip shark in the shark fin trade. Genetic sampling was conducted on shark fins collected from several fish markets throughout Indonesia that identified oceanic whitetip shark fins as present, and comprised approximately 1.72% of the fins tested (Sembiring *et al.,* 2015). In a genetic barcoding study of shark fins from markets in Taiwan, the oceanic whitetip was 1 of 20 species identified and comprised 0.38% of collected fin samples (Liu *et al.,* 2013). In another genetic barcoding study of fins from United Arab Emirates, oceanic whitetip shark comprised 0.45% of fins tested (Jabado *et al.,* 2015). Although it is uncertain whether these studies are representative of the entire market within each respective country, results of these genetic tests confirm the continued presence of oceanic whitetip shark fins in various markets throughout its range.

From 2000 to 2011, China, Hong Kong Special Administrative Region (SAR) maintained its position as the world's largest trader of shark fins, controlling the majority of global trade (Dent and Clarke 2015). During this time, China, Hong Kong SAR recorded average annual shark fin imports of 10,490 t, worth $302 million and represents about 80% of the global total in value terms (62% of total volume). According to Dent and Clarke (2015), China, Hong Kong SAR reported imports of 3,319 t ($154.9 million) of "dried, unprocessed" fins, 188 tonnes ($1.9 million) of "frozen, unprocessed" fins, and 14 tonnes ($840,000) of dried, processed fins in 2012. In the same year, China, Hong Kong SAR reported a total of 4,959 t of high-valued "frozen shark meat" imports, worth $64.3 million. The majority of these imports originated in Spain or Singapore (Dent and Clarke 2015). Overall, the trade in shark fins through China, Hong Kong SAR, which has served as reliable gauge of the global trade for many years, rose by 10%

in 2011 but fell by 22% in 2012. Dent and Clarke (2015) identified a number of factors that may have contributed to the downturn in the trade of fins through China, Hong Kong SAR, including:

- increased domestic chondrichthyan production by the Chinese fleet;
- new regulations in China government officials' expenditures;
- consumer backlash against artificial shark fin products;
- increased monitoring and regulation of finning;
- a change in trade dynamics related to China's entry into the World Trade Organization in 2001 and subsequent trade agreements with China, Hong Kong SAR;
- other trade bans and curbs; and
- a growing conservation awareness.

A number of indicators also suggest that the decline in the shark fin trade through China, Hong Kong SAR and China will continue. The shark fin trade as a whole has declined slightly since 2003 (see Figure 60 below), and is contrary to expectations of an increase in demand with the continued growth of the Chinese economy (Eriksson and Clarke 2015). The pattern of trade decline closely mirrors the pattern in chondrichthyan capture production; this suggests a strong linkage between the quantity harvested and the quantity traded (Eriksson and Clarke 2015). However, a government-led backlash against "conspicuous consumption" of shark fins in China, combined with increasing momentum of global conservation movements, appears to have had some impact on the trade (Eriksson and Clarke 2015).

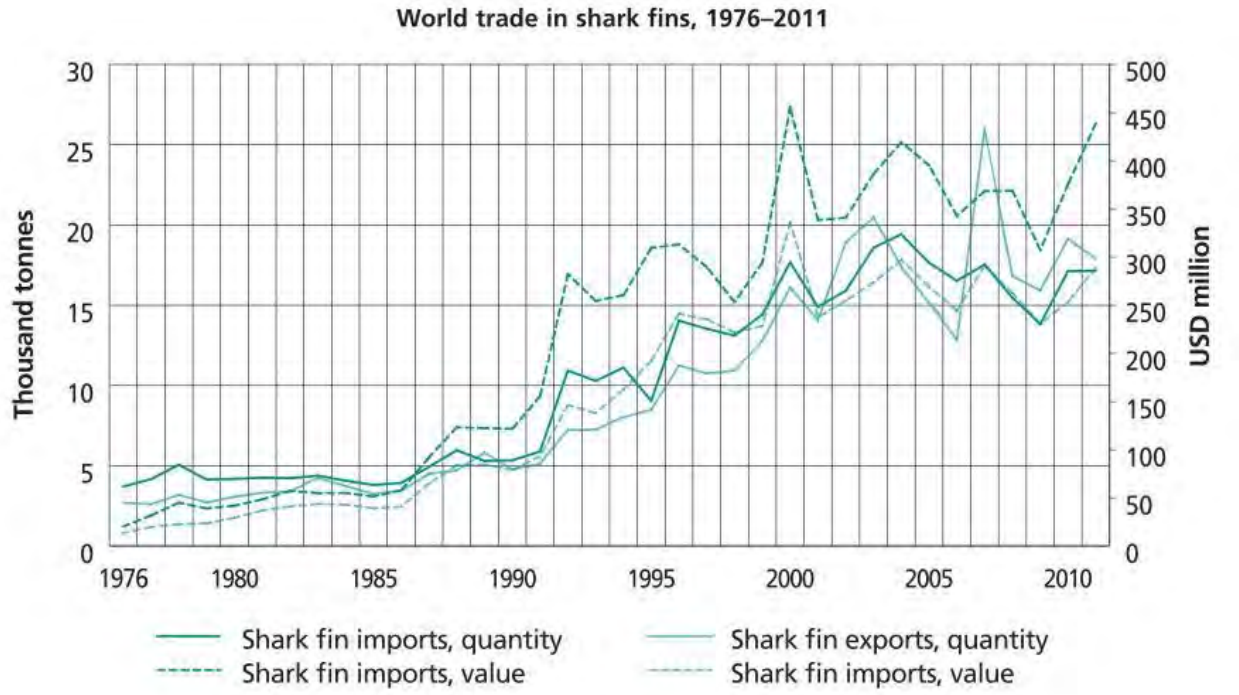


Figure 60 The trend in the global trade in shark fins from 1976 to 2011. Source: Dent and Clarke 2015.

Global data from FAO's Fishery Commodities and Trade Database also reflects a recent decrease in shark fin exports. The export of all shark products has substantially increased since the early 1990s, but appears to have leveled off in the last few years (See Figure 61 below). It

should be noted that not all fins in the market originate from shark finning, and there is growing pressure from many countries to stop finning and instead require all fins remain naturally attached to the carcass, which has likely had some effect on the recent surge in the shark meat trade (see section 4.4 on *Inadequacy of Existing Regulatory Mechanisms*).

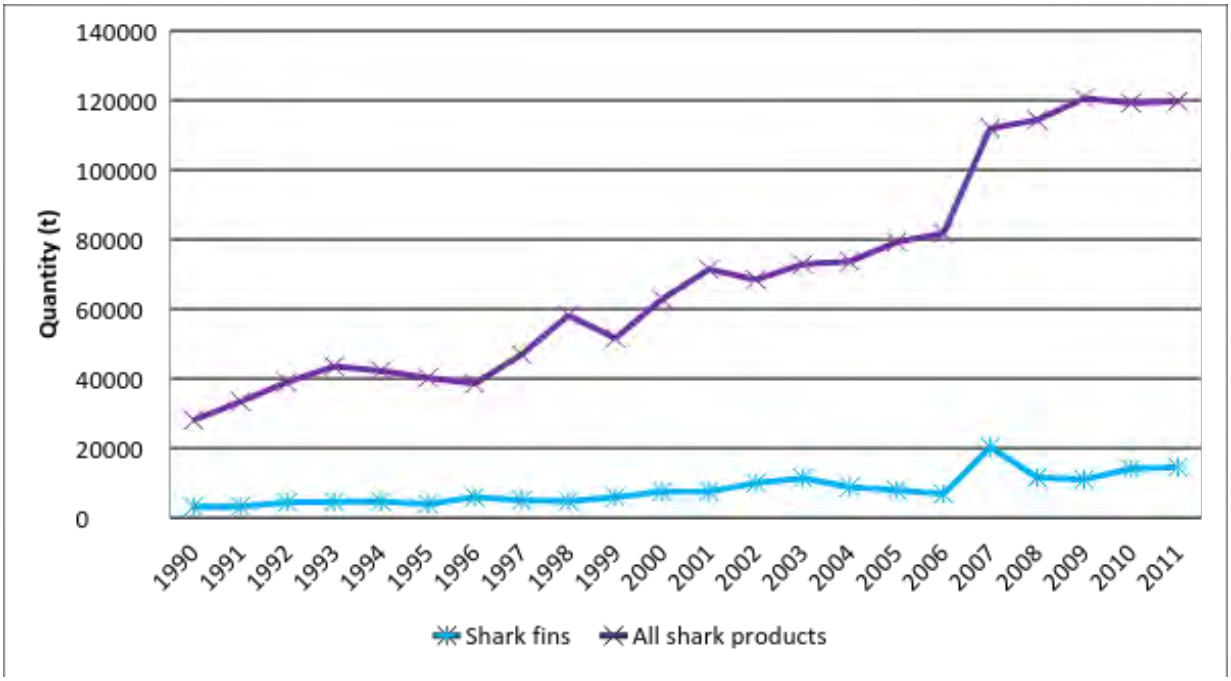


Figure 61 Global exports of shark products from 1990-2011, as reported in the FAO Fishery Commodities and Trade Database. Shark fins include: shark fins dried, salted; shark fins dried, unsalted; shark fins in brine but not dried or smoked; shark fins frozen; and shark fins prepared or preserved. Shark products include: all shark fins (described above); sharks nei, frozen; sharks, rays nei, frozen; shark fillets nei. frozen; sharks, rays, chimaeras nei fillets, frozen; sharks nei, fresh or chilled; sharks rays, skates, fresh or chilled; shark fillets, fresh or chilled; sharks, rays, chimaeras fillets, fresh or chilled; sharks, dried, salted or in brine; sharks, rays, etc., dried, salted or in brine; shark oil; shark liver oil ("nei" = not elsewhere included).

Despite the potential improvements in the trade, it is clear that the shark fin trade has asserted and continues to assert significant pressure on oceanic whitetip sharks, as they are preferred species for their fins and obtain a high price in the international market. Although quantifying the magnitude of impact on the global population abundance of oceanic whitetip shark is difficult, it is likely that the trade has had a significant impact as it has been a main economic driver for retention of oceanic whitetip sharks in commercial fisheries throughout its range. Although the global trade in shark fins appears to have decreased slightly since the early 2000s, it appears that there has been a major surge in the shark meat trade, with global trade data showing a steady expansion of the shark meat trade over the last decade or so (Dent and Clarke 2015). In fact, the latest official FAO figure of chondrichthyan meat imported in 2011 (121,641 t worth $379.8 million) represents a 42% increase by volume compared with 2000. Additionally, the trend observed in shark meat trade unit values in many key trading countries has increased in the past decade, even as the quantity of shark meat being traded has risen substantially. This suggests that underlying demand for these products is increasing. Thus, there are likely to be some areas where demand for shark meat is high enough that even if demand for shark fins wanes, existing fishing pressure will not (Dent and Clarke 2015). However, given that oceanic whitetip shark is prohibited in fisheries of all the relevant RFMOs, it is unlikely new markets would develop for this species.

Summary

Overall, there is a paucity of quantitative data with which to determine global trends in this widely-distributed tropical oceanic shark. However, based on best available scientific and commercial information, it appears that the oceanic whitetip shark has experienced significant population declines throughout a large portion of its range due to pressures associated with bycatch-related retention and mortality in commercial fisheries (e.g., Western and Central Pacific, Northwest and Southwest Atlantic, and Indian Oceans). Although the Northwest Atlantic population may have stabilized, all other populations are likely experiencing some level of decline or their status is currently unknown. All stocks of oceanic whitetip are experiencing some level of exploitation from commercial fisheries, but the level of fishing mortality likely varies, and is unknown for all stocks except one (Western and Central Pacific) due to the general lack of stock assessments on oceanic whitetip sharks. However, a number of other abundance indices are available to make inferences regarding population trends in several areas.

In the Eastern Pacific, fisheries data from the tropical tuna purse seine fishery indicates a significant population decline in this region as a result of bycatch-related mortality in both purse seine and longline fisheries. Based on catches per set as well as presence/absence of oceanic whitetip shark on associated sets in the tuna purse seine fishery, the oceanic whitetip shark population in the tropical Eastern Pacific has potentially declined by 80-95%. However, the reliability of these estimates may be somewhat uncertain as they are derived from nominal catch rates and are not standardized to account for other factors that may affect catch rates not related to changes in abundance (e.g., climate related factors). Nonetheless, based on the known condition of the species, there is no evidence to suggest that other factors besides overutilization have caused the significant observed decline, as the species has seemingly disappeared from fishing grounds here and is now rarely encountered, while catches and encounters of the closely related silky shark have remained relatively constant. Given the continued increase in fishing effort in this region, including a steady increase in the number of FAD sets (which account for 90% of oceanic whitetip catch in this region), oceanic whitetip sharks will likely continue to experience overutilization in the Eastern Pacific Ocean.

In the Northwest Atlantic and Gulf of Mexico, several studies indicate large historical declines in oceanic whitetip shark abundance (e.g., up to 70% from 1992-2000 and up to 88% between the 1950's and 1990's, respectively); but, more recent analyses indicate this population may have stabilized in recent years, with an estimated decline of approximately 4% since 1992. However, fishing pressure on oceanic whitetip sharks began over two decades prior to the start of this time series; thus the estimated declines are not from historical virgin biomass. There is still disagreement in the literature regarding the current status of oceanic whitetip shark in the U.S. Atlantic, and a stock assessment has not been conducted. Currently, the best available scientific information indicates that current catch levels of oceanic whitetip shark in this region are low, which may be a result of past declines; however, landings of the species in this region have also continued to decline since species-specific regulations have been implemented that prohibit this species in U.S. commercial ICCAT-associated fisheries. Therefore, overutilization may not be as significant of a threat in this region in the foreseeable future.

In the Southwest Atlantic, oceanic whitetip sharks were once considered common bycatch in commercial longline fisheries in Brazil, comprising nearly 30% of all shark catches in surveys from the 1990s. Recently, however, it appears that oceanic whitetip shark is less abundant in the

Southwest Atlantic region, with very low CPUE rates across the region and most captures comprised of juveniles. In Brazil, which is the largest oceanic whitetip shark catching country in the region, a combination of tagging data and fisheries information suggests that the species' preferred vertical and horizontal habitat is significantly exploited by the Brazilian longline fishery. A demographic analysis from this region also suggests that the species has undergone at least a 50% population decline as a result of unsustainable fishing effort.

In the Western and Central Pacific, historical information and observations suggest this species was once one of the most abundant pelagic shark species encountered in commercial fisheries; however, several lines of evidence suggest significant and continued population declines of oceanic whitetip shark across the Western and Central Pacific, with some areas exhibiting declines in excess of 90%. In particular, the first and only stock assessment of oceanic whitetip shark determined that the species is experiencing overfishing and the stock is in an overfished state (Rice and Harley 2012). The main cause of these declines identified in the stock assessment was bycatch-related mortality in longline fisheries, with targeted longlining and purse seine fisheries being secondary sources of mortality. These fisheries tend to concentrate their efforts in tropical latitudes, which is the species preferred core habitat, thereby contributing to substantial fisheries-related mortality. Thus, due to the high fishing effort on large pelagic species in this region, with reported increases in fishing effort in recent years, oceanic whitetip sharks are likely experiencing overutilization across the Western and Central Pacific, as evidenced by declines in catch rates as well as biomass and size indices.

In the Indian Ocean, a combination of qualitative and quantitative data suggests that the oceanic whitetip shark has undergone population declines in this region. Oceanic whitetip sharks have been recorded in fisheries data for over 60 years; however, due to a lack of catch and abundance information, the status of oceanic whitetip shark in the Indian Ocean is largely uncertain. While robust species-specific fisheries information is largely unavailable, decreases in nominal CPUE and mean weight of individuals have been demonstrated for the oceanic whitetip shark. Additionally, a few quantitative assessments of various longline and purse seine fisheries operating in the Indian Ocean indicate potential abundance declines between 25-90%, though these estimates are uncertain due to the lack of robust datasets. Overall, catches of oceanic whitetip shark reported to the IOTC are notably high in this region, with high at-vessel mortality rates and no indication of fishing pressure ceasing in the foreseeable future; thus, given the prevalence of oceanic whitetip shark as bycatch in fisheries in this region, representing approximately 11% of the total shark catch, combined with their relatively low-moderate productivity, it is likely that the impact to oceanic whitetip is significant in the Indian Ocean.

Shark trade

Studies found that oceanic whitetip shark represents approximately 2% of the Hong Kong shark-fin market, which has been used as an indicator of the global trade for many years. This level of oceanic whitetip fins in the trade translates to an annual estimate of up to 1.2 million individuals killed and traded per year. Given the relative ease of identifying oceanic whitetip shark fins, it is likely that the estimate is more reliable than for other species. Genetic studies of fins from markets in Indonesia, Taiwan, and United Arab Emirates also recorded oceanic whitetip shark at the species level, indicating the prevalence of oceanic whitetip fins in various markets throughout its range. Thus, it is clear that the shark fin trade is asserting significant pressure on the global oceanic whitetip shark population, as it is the main driving factor behind retention of

this species, though the exact magnitude of impact is uncertain. Although demand for shark fins is seemingly on the decline in recent years, it is clear that the demand for oceanic whitetip shark fins is still high, given their high preference and monetary value in the Hong Kong market. This is evidenced by the fact that as recently as October 2015, Indonesian authorities conducted a seizure of 3,000 illegal fins from oceanic whitetip sharks taken from Indonesian waters, despite national and international regulations to protect the species. Additionally, since 2014, several shipments of oceanic whitetip fins have been confiscated upon arrival in Hong Kong because they lacked proper CITES export permits from the countries of origin. In fact, in the first two months of 2017 alone, more than a ton of shark fins from hammerhead and oceanic whitetip sharks were seized by Hong Kong customs[11]. Although the demand for shark meat has increased in recent years, it is unlikely that new markets would develop for oceanic whitetip shark meat, given retention of the species has been prohibited in all relevant RFMOs.

4.3 (C) Disease or Predation

Disease

Disease is not thought to be a factor influencing the status of oceanic whitetip shark. If the oceanic whitetip shark is similar to other shark species, it likely harbors a diverse assemblage of macroparasites including cestodes, nematodes, leeches, copepods, and amphipods. In addition, at least some oceanic whitetip sharks are infected with highly pathogenic *Vibrio harveyi* (Zhang, *et al*., 2009). This bacterium is known to cause deep dermal lesions, gastro-enteritis, eye lesions, infectious necrotizing enteritis, vasculitis, and skin ulcers in marine vertebrates (Austin and Zhang 2006). *Vibrio harveyi* is considered to be more serious in immunocompromised hosts (Austin and Zhang 2006), and therefore may act synergistically with the high pollutant loads that oceanic whitetip sharks potentially experience to create an increased threat to the species. However, there is no additional information available regarding the magnitude of impact these parasites may have on the health of oceanic whitetip populations. Therefore, we cannot conclude that disease is an operative threat to the oceanic whitetip shark.

Predation

Predation is also not thought to be a factor influencing the status of oceanic whitetip sharks; the most significant predator on oceanic whitetip sharks is likely humans. Given that oceanic whitetip pups are born at a small size (about 65 cm), pups born in oceanic tropical waters are more vulnerable to predation. It may take the oceanic whitetip shark 2-3 years to attain a size that would deter predation, , although the larger litter size may serve to counteract the longer exposure and vulnerability to predators (Branstetter (1990) *In:* Pratt (1990)). However, information regarding natural predation rates of oceanic whitetip sharks and how predation may be impacting the global population is unavailable. Therefore, we cannot conclude that predation is an operative threat to the oceanic whitetip shark.

4.4 (D) Inadequacy of Existing Regulatory Mechanisms

Existing regulatory mechanisms for oceanic whitetip shark include federal, state, and international regulations. Below is a description and evaluation of current domestic and international management measures that may affect oceanic whitetip sharks. Though there are numerous regulatory mechanisms that may impact the status of sharks in general, as well as

[11] https://phys.org/news/2017-03-massive-hong-kong-shark-fin.html

species-specific regulations for oceanic whitetip in particular, the lack of data reporting on oceanic whitetip catches, combined with a the lack of information on implementation of and compliance with management measures in most countries, makes it difficult to measure the adequacy of current regulatory mechanisms as they relate to the global population of the oceanic whitetip shark. The oceanic whitetip shark is a highly migratory species found worldwide and thus requires protection in every ocean basin through international cooperation. Below is an analysis of existing regulatory mechanisms.

United States Regulations

There are a number of management authorities governing U.S. Fisheries, including the Magnuson-Stevens Fisheries Conservation and Management Act (MSA), 16 U.S.C. 1801 *et seq*. The Magnuson-Stevens Act establishes the authority and responsibility of the Secretary of Commerce to develop FMPs and subsequent amendments for managed stocks. The MSA requires NMFS to allocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery. In the case of an overfished stock, NMFS must establish a rebuilding plan. The FMP or amendment to such a plan must specify a time period for ending overfishing and rebuilding the fishery that shall be as short as possible, taking into account the status and biology of the stock of fish, the needs of fishing communities, recommendations by international organizations in which the U.S. participates, and the interaction of the overfished stock within the marine ecosystem. The rebuilding plan cannot exceed ten years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the U.S. participates dictate otherwise. The U.S. Atlantic tuna and tuna-like species fisheries are managed under the dual authority of the MSA and the Atlantic Tunas Convention Act (ATCA) of 1975, 16 U.S.C. 971 *et seq*. The U.S. vessels that fish for tuna and associated species in the eastern tropical Pacific Ocean may be subject to management measures under the Tuna Conventions Act of 1950 (16 U.S.C. 951 *et seq*.) and potentially the U.S.-Canada Albacore Treaty (Miller *et al*. 2014). U.S. vessels that fish for highly migratory fish species in the Western and Central Pacific Ocean may be subject to management measures under the Western and Central Pacific Fisheries Convention Implementation Act (16 U.S.C. 6901 *et seq*.).

State fishery management agencies have authority for managing fishing activity only in state waters (0-3 miles in most cases; 0-9 miles off Texas and the Gulf coast of Florida). As mentioned above, in the case of federally permitted shark fishers along the Atlantic coast and in the Gulf of Mexico and Caribbean, fishers are required to follow federal regulations in all waters, including state waters. To aid in enforcement and reduce confusion among fishers, the Atlantic States Marine Fisheries Commission (ASMFC), which regulates fisheries in state waters from Maine to Florida, implemented a Coastal Shark FMP that mostly mirrors the federal regulations for sharks (See Appendix 1). Additionally, other states have implemented or are working towards the implementation of fin bans and efforts are being made to allow/preserve subsistence harvest in some of the U.S. territories.

Pacific Ocean

In the U.S. Pacific, HMS fishery management is the responsibility of adjacent states and three regional management councils that were established by the Magnuson-Stevens Act, including: the Pacific Fishery Management Council (PFMC), North Pacific Fishery Management Council (NPFMC), and the Western Pacific Fishery Management Council (WPFMC). However, because

of the oceanic whitetip shark's more tropical distribution, only the WPFMC directly manages this species. The WPFMC has jurisdiction over the EEZs of Hawaii, Territories of American Samoa and Guam, Commonwealth of the Northern Mariana Islands, and the Pacific Remote Island Areas, as well as the domestic fisheries that occur on the adjacent high seas. The WPFMC developed the Pelagics FEP (formerly the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region) in 1986 and NMFS, on behalf of the U.S. Secretary of Commerce, approved the Plan in 1987. Since that time, the WPFMC has recommended, and NMFS has approved, numerous amendments to the Plan as necessary for conservation and management purposes. The WPFMC manages HMS fisheries pursuant to the FEP, and species that are managed under FMPs or FEPs are called Management Unit Species (MUS) and typically include those species that are caught in quantities sufficient to warrant management or specific monitoring by NMFS and the Council. In the FEP, the oceanic whitetip shark is designated as a Pelagic MUS and, thus, is subject to regulations under the FEP. These regulations are intended to minimize impacts to targeted stocks as well as protected species. Fishery data are also analyzed in annual reports and used to amend the FEP as necessary. As previously described, oceanic whitetip sharks are caught in longline fisheries of both Hawaii and American Samoa. The Hawaii-based and American Samoa longline fisheries are similar, in that they operate under extensive regulatory measures, including gear, permit, logbook requirements, vessel monitoring system, and protected species workshop requirements. In 2002, vessels 50 feet and longer were prohibited from fishing for pelagic fish around Tutuila, the Manua Island, Rose Atoll, and Swains Islands in American Samoa. However, due to a change in fishery conditions, NMFS recently proposed to allow federally-permitted U.S. longline vessels 50 ft and longer to fish in certain portions of the LVPA (80 FR 51527). Specifically, the proposed action would allow large U.S. vessels that hold a Federal American Samoa longline limited entry permit to fish within the LVPA seaward of 12 nm around Swains Island, Tutuila, and the Manua Islands.

In 2015, NMFS issued final regulations to implement decisions of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC) to prohibit the retention of oceanic whitetip sharks in fisheries operating within the WCPFC's area of competence (or Convention Area), which comprises the majority of the Western and Central Pacific Ocean. The regulations were published in the *Federal Register* on February 19, 2015 (80 FR 8807) and include prohibitions on the retention of the oceanic whitetip shark, as well as requirements to release any oceanic whitetip caught, and are applicable to all U.S. fishing vessels used for commercial fishing for HMS in the Convention Area (PIRO 2015). Given the relatively higher at-vessel survivorship of oceanic whitetip sharks, adequate implementation of these regulations has the potential to be beneficial for the species. However, given the severely depleted state of the oceanic whitetip shark in the Western and Central Pacific, less than full implementation and enforcement may not be adequate to prevent continued population declines of the species given the high level of fishing mortality the species experiences in this portion of its range (see the *Regional Analysis* section for the Western and Central Pacific below for more details).

Atlantic Ocean (U.S. Northwest Atlantic and Gulf of Mexico)
On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990. This law amended the Magnuson-Stevens Act and gave the Secretary of Commerce the authority to manage HMS in the U.S. EEZ of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. 1811 and 16 U.S.C. 1854(f)(3)). The Atlantic

HMS Management Division within NMFS develops regulations for Atlantic HMS fisheries and primarily coordinates the management of HMS fisheries in Federal waters (domestic) and the high seas (international), while individual states establish regulations for HMS in state waters. However, in the case of federally permitted shark fishers, as a condition of their permit, the fishers are required to follow Federal regulations in all waters, including state waters, unless the state has more restrictive regulations. For example, the Atlantic States Marine Fisheries Commission (ASMFC) recently developed an interstate coastal shark FMP that coordinates management measures among all states along the Atlantic coast (FL to ME) in order to ensure that the states are following Federal regulations. This interstate shark FMP became effective in 2010.

In the Atlantic, oceanic whitetip sharks are managed under the pelagic species complex of the Consolidated Atlantic HMS FMP. The first FMP for sharks of the Atlantic Ocean (1993) classified the status of pelagic sharks as unknown because no stock assessment had been conducted for this complex. At that time, the Maximum Sustainable Yield (MSY) for pelagic sharks was set at 1,560 mt dressed weight (dw), which was the 1986-1991 commercial landings average for this group. However, as a result of indications that the abundance of Atlantic sharks had declined, commercial quotas for pelagic sharks were reduced in 1997. The quota for pelagic sharks was then set at 580 mt. In 1999, the FMP for Atlantic Tunas, Swordfish, and Sharks[12] implemented the following measures affecting pelagic sharks: 1) a reduction in the recreational bag limit to 1 Atlantic shark per vessel per trip, with a minimum size of 137 cm fork length for all sharks, 2) an increase in the annual commercial quota for pelagic sharks to 853 mt dw, apportioned between porbeagle (92 mt), blue sharks (273 mt dw), and other pelagic sharks (488 mt dw), with the pelagic shark quota being reduced by any overharvest in the blue shark quota, and 3) making the bigeye sixgill, sixgill, sevengill, bigeye thresher, and longfin mako sharks prohibited species that cannot be retained.

The implementing regulations for the conservation and management of the domestic fisheries for Atlantic swordfish, tunas, sharks, and billfish are published in the 2006 Consolidated HMS FMP[13] (71 FR 58058, NMFS 2006). Since 2006, this FMP has been amended ten times. Amendment 2, finalized in June 2008, requires that all fins remain naturally attached through landing in both the commercial and recreational fisheries (June 24, 2008, 73 FR 35778; corrected on July 15, 2008, 73 FR 40658).

Any fisher who fishes for, retains, possesses, sells, or intends to sell, Atlantic sharks needs a Federal Atlantic Directed or Incidental shark limited access permit. Generally, directed shark permits allow fishers to target sharks while incidental permits allow fishers who normally fish for other species to land a limited number of sharks. The limited access permits are administered under a limited access program and NMFS is no longer issuing new shark limited access permits. To enter the directed or incidental shark fishery, fishers must obtain a permit via transfer from an existing permit holder who is leaving the fishery, subject to the vessel upgrading restrictions. Under a directed shark permit, there is no directed numeric retention limit for pelagic sharks, subject to quota limitations. An incidental permit allows fishers to keep up to a total of 16 pelagic or small coastal sharks (all species combined) per vessel per trip. Authorized gear types

[12] http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/tss_fmp/index.html

[13] http://www.fisheries.noaa.gov/sfa/hms/documents/fmp/consolidated/index.html

include: pelagic or bottom longline, gillnet, rod and reel, handline, or bandit gear. All fins must remain naturally attached. The annual quota for pelagic sharks (other than blue sharks or porbeagle sharks) is currently 488.0 mt dressed weight.

NMFS monitors the different shark quota complexes annually and will close the fishing season for each fishery after 80% of the respective quota has been landed or is projected to be landed. Atlantic sharks and shark fins from federally permitted vessels may be sold only to federally permitted dealers; however, as noted previously, all sharks must have their fins naturally attached through offloading. The head may be removed and the shark may be ◦ and bled, but the shark cannot be filleted or cut into pieces while onboard the vessel. Logbook reporting is required for selected fishers with a federal commercial shark permit. In addition, fishers may be selected to carry an observer onboard, and some fishers are subject to vessel and electronic monitoring systems depending on the gear used and where they fish. Since 2006, pelagic longline, bottom longline and gillnet fishermen fishing for sharks have been required to attend workshops to learn how to release sea turtles, protected species, and prohibited shark species in a manner that maximizes survival. Additionally, NMFS published a final rule on 7 February, 2007 (72 FR 5633), that requires participants in the Atlantic shark bottom longline fishery to possess, maintain, and utilize handling and release equipment for the release of sea turtles, other protected species, and prohibited shark species. Additionally, in efforts to reduce bycatch in the first place, NMFS has implemented a number of time/area closures with restricted access to fishermen with HMS permits who have pelagic longline gear onboard their vessel (see Figure 62 below).

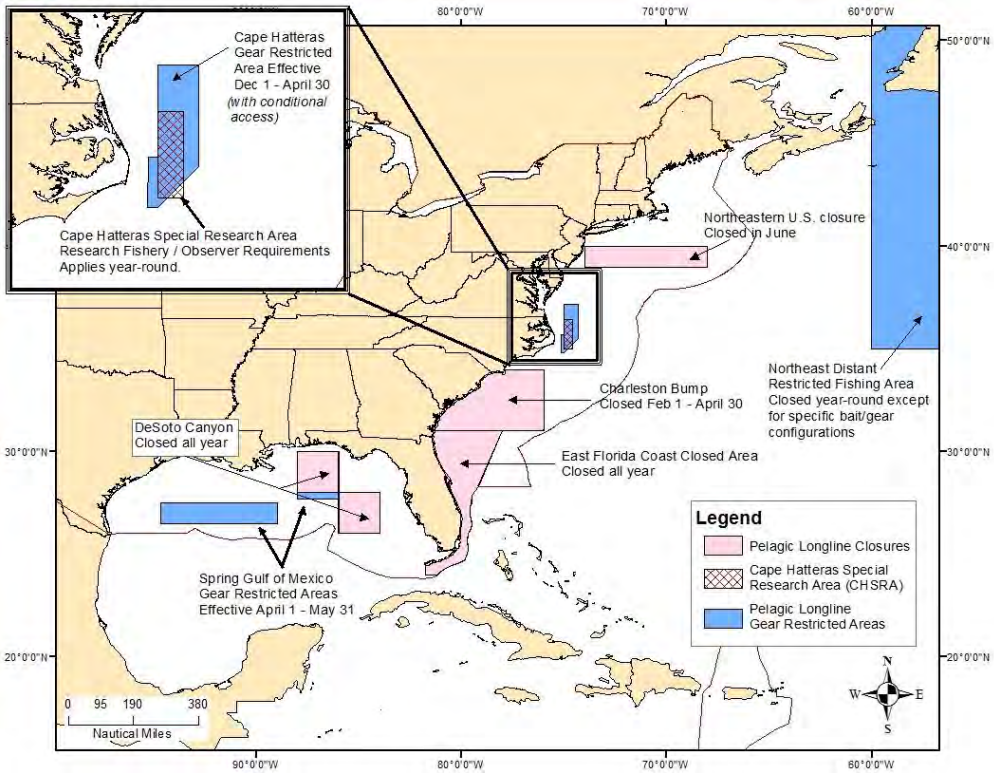


Figure 62 Time/area closures and gear restricted areas in the Atlantic, Gulf of Mexico, and Caribbean Sea that limit use of pelagic longline gear (NMFS 2016).

Although there has been so scientific study conducted to confirm whether these time/area seasonal closures have reduced bycatch of oceanic whitetip sharks, it is possible these regulations have had a positive impact on reducing bycatch of oceanic whitetip shark in the Northwest Atlantic pelagic longline fishery. In particular, the area of the Charleston Bump has historically proven to be a hotspot for oceanic whitetip catches (John Carlson, personal communication 2017); therefore, that particular closure has likely benefited oceanic whitetip sharks to some degree.

The HMS Management Division also published an amendment to the Consolidated Atlantic HMS FMP that specifically addresses Atlantic HMS fishery management measures in the U.S. Caribbean territories (77 FR 59842; Oct. 1, 2012). Due to substantial differences between some segments of the U.S. Caribbean HMS fisheries and the HMS fisheries that occur off the mainland of the United States (including permit possession, vessel size, availability of processing and cold storage facilities, trip lengths, profit margins, and local consumption of catches), the HMS Management Division implemented measures to better manage the traditional small-scale commercial HMS fishing fleet in the U.S. Caribbean Region. Among other things, this rule created an HMS Commercial Caribbean Small Boat (CCSB) permit, which: allows fishing for and sales of bigeye, albacore, yellowfin, and skipjack tunas, Atlantic swordfish, and Atlantic sharks within local U.S. Caribbean market; collects HMS landings data through existing territorial government programs; authorizes specific gears; is restricted to vessels less than or equal to 45 feet (13.7 m) length overall all; and may not be held in combination with any other Atlantic HMS vessel permits. However, at this time, fishermen who hold the CCSB permit are prohibited from retaining Atlantic sharks, and are restricted to fishing with only rod and reel, handline, and bandit gear under the permit. Both the CCSB and Atlantic HMS regulations will help protect oceanic whitetip sharks while in the Northwest Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

In order to implement the International Commission for the Conservation of Atlantic Tuna (ICCAT) Recommendation 10-07 for the conservation of oceanic whitetip sharks, NMFS published a final rule in 2011 that prohibits retention of oceanic whitetip sharks in the PLL fishery and on recreational (HMS Angling and Charter headboat permit holders) vessels that possess tuna, swordfish, or billfish (76 FR 53652). See Appendix 1 for a table that describes relevant regulatory mechanisms in U.S. states and territories in the Atlantic. The implementation of regulations to comply with ICCAT Recommendation 10-07 for the conservation of oceanic whitetip sharks is likely the most influential regulatory mechanism in terms of reducing mortality of oceanic whitetip sharks in the U.S. Atlantic. It should be noted that oceanic whitetip sharks are still occasionally caught as bycatch and landed in this region despite its prohibited status in ICCAT associated fisheries (NMFS 2012; 2014), as retention is permitted in other authorized gears other than pelagic longlines (e.g., gillnets, bottom longlines); however, these numbers have decreased. Prior to the implementation of the retention prohibition on oceanic whitetip, an analysis of the 2005-2009 HMS logbook data indicated that, on average, a total of 50 oceanic whitetip sharks were kept per year, with an additional 147 oceanic whitetip sharks caught per year and subsequently discarded (133 released alive and 14 discarded dead). Thus, without the prohibition, approximately 197 oceanic whitetip sharks could be caught and 64 oceanic whitetip sharks (32%) could die from being discarded dead or retained each year (NMFS 2011b). However, since the prohibition was implemented in 2011, estimated commercial landings of oceanic whitetip declined from only 1.1 mt in 2011 to only 0.03 mt in 2013 (NMFS 2012;

2014). While the retention ban for oceanic whitetip does not prevent incidental catch or subsequent at-vessel and post-release mortality, it is likely somewhat effective in reducing overall fishing mortality on the species in the Atlantic PLL fishery. In fact, in 2013, NMFS reported a total of 33 oceanic whitetip interactions, with 88% (i.e., 29 individuals) released alive and only 4 discarded dead. It also appears that the relative abundance of oceanic whitetip shark may have stabilized in the region concomitant with pelagic shark management in the early 1990s.

Overall, it's possible these regulations may have had a positive effect on reducing bycatch and fisheries-related mortality of oceanic whitetip shark in the Northwest Atlantic pelagic longline fishery, particularly given the stabilized trend shown by the ERA team's analysis of observer data from the fishery, but there's no way to confirm this assertion. Overall, we do agree that regulatory mechanisms in the Northwest Atlantic in general have likely improved the status of the oceanic whitetip shark in this portion of its range.

U.S. Finning Laws and Regulations

Two influential domestic regulations for the conservation and management of sharks in the United States include the *Shark Finning Prohibition Act* and the *Shark Conservation Act*. The Shark Finning Prohibition Act was enacted in December 2000 and implemented by final rule on February 11, 2002; (67 FR 6194). Section 3 of the Shark Finning Prohibition Act amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to prohibit any person under U.S. jurisdiction from: (i) engaging in the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass. In addition, Section 3 of the Shark Finning Prohibition Act contains a rebuttable presumption that any shark fins landed from a fishing vessel or found on board a fishing vessel were taken, held, or landed in violation (of the Act) if the total weight of shark fins landed or found on board exceeds 5% of the total weight of shark carcasses landed or found on board. Section 9 of the Act defines finning as the practice of taking a shark, removing the fin or fins from a shark, and returning the remainder of the shark to the sea. The Shark Conservation Act was signed into law on January 4, 2011, and it amended the High Seas Driftnet Fishing Moratorium Protection Act and the MSA to improve existing domestic and international shark conservation measures. To address concerns over the practice of shark finning, the Shark Conservation Act, among other things, prohibits any person from removing shark fins at sea (with a limited exception for smooth dogfish); or possessing, transferring, or landing shark fins unless they are naturally attached to the corresponding carcass.

After the passage of the Shark Finning Prohibition Act, U.S. exports of dried shark fins dropped substantially (Figure 63), which was expected. With the passage of the U.S. Shark Conservation Act in 2011, exports of dried shark fins dropped again by 58% to 15 mt, which represented the second lowest export amount since 2001. This is in contrast to the price per kg of shark fin, which was at its highest price of ~$100/kg, and suggests that existing regulations have likely been effective at discouraging fishing for sharks solely for the purpose of the fin trade. Thus, although the international shark fin trade is likely a driving force behind the overutilization of many global shark species, the U.S. participation in this trade appears to be diminishing (Miller *et al.* 2014). In 2012, the value of fins also decreased suggesting that the worldwide demand for fins may be on a decline. For example, due to the implementation of fin bans in various U.S. states in 2012 and 2013, U.S. fin prices decreased dramatically and U.S. shark fin exports have

continued on a declining trend. However, it should be noted that the continued decline is also likely a result of the waning demand for shark fin altogether (Dent and Clarke 2015).

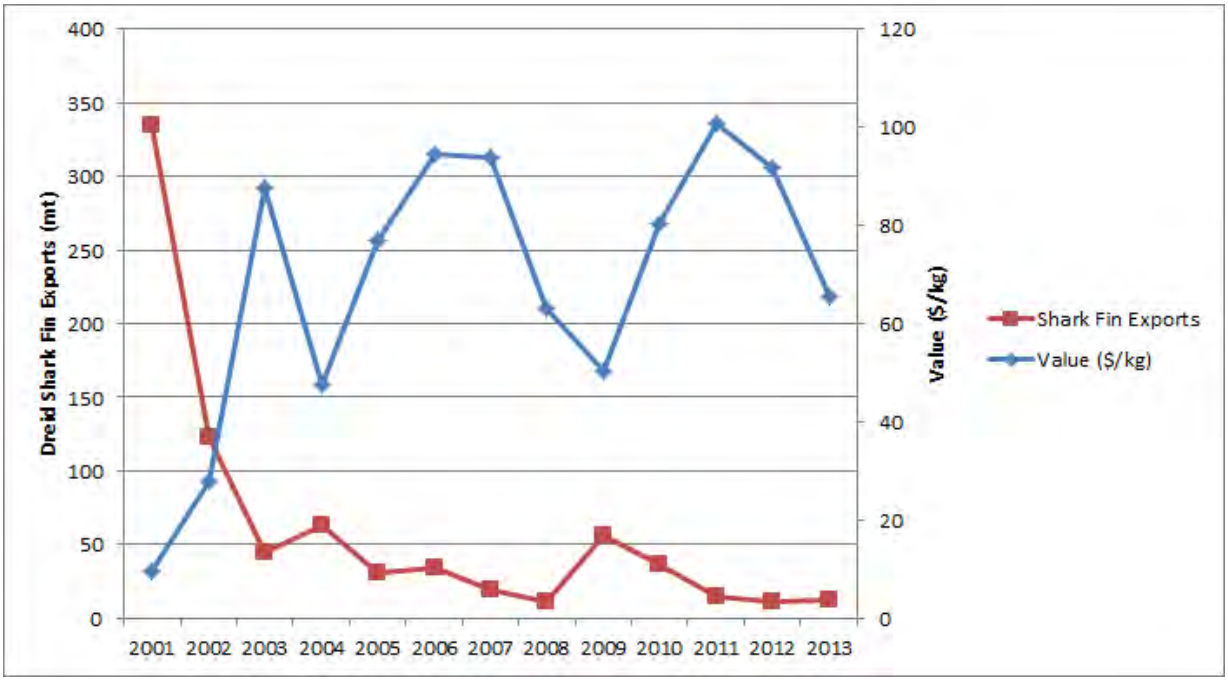


Figure 63 Amount and value of U.S. shark fin exports from 2001 to 2012. Source: Adapted from Miller *et al.* 2014 and NMFS (2012); NMFS (2013a)).

Similarly, many U.S. states, especially on the West Coast, and U.S. Flag Pacific Island Territories have also passed fin bans and trade regulations, which led to a subsequent decline of the United States' contribution to the fin trade. For example, after the state of Hawaii prohibited finning in its waters and required shark fins to be landed with their corresponding carcasses in the state in 2000, the shark fin imports from the U.S. into Hong Kong declined significantly (54% decrease, from 374 to 171 t) as Hawaii could no longer be used as a fin trading center for the international fisheries operating and finning in the Central Pacific (Figure 64) (Clarke *et al.,* 2007).

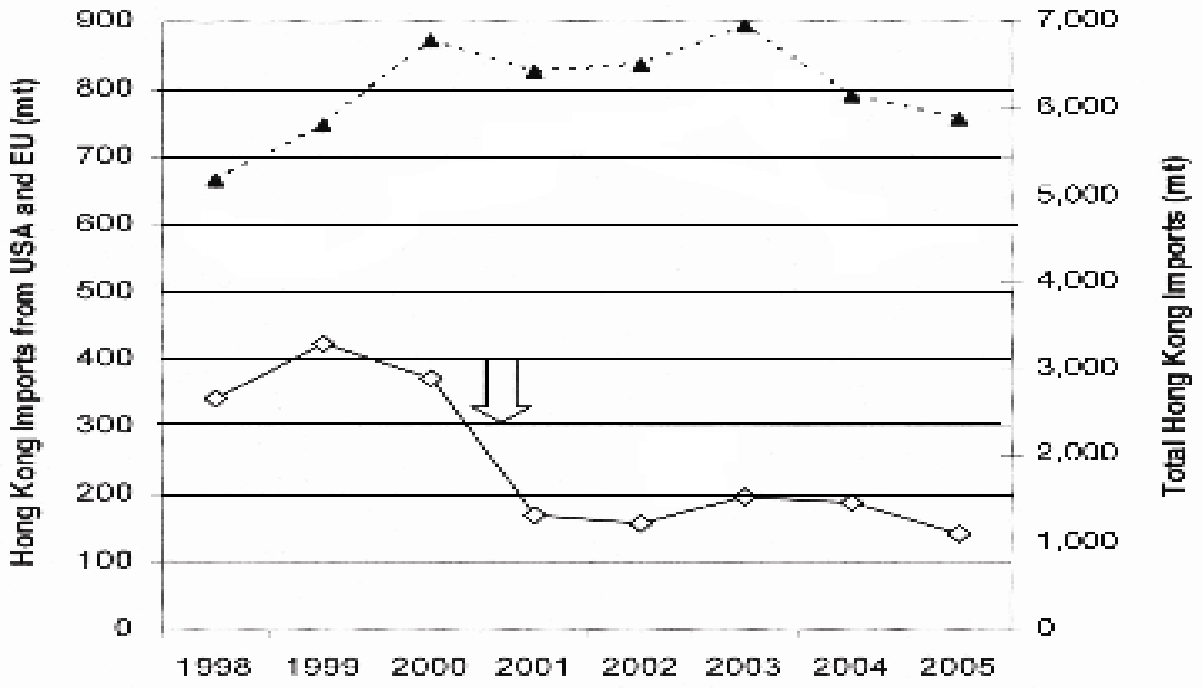


Figure 64 Annual imports of shark fin to Hong Kong from the U.S. (◊) and total Hong Kong imports (▲) from 1998-2005. The large arrow indicates the implementation of finning regulations in the state of Hawaii. Source: Adapted from Clarke *et al.* 2007.

More specifically to oceanic whitetip sharks, the finning regulations introduced in 2001 in the U.S. Hawaii-based longline fishery have reduced mortality on oceanic whitetip and other large shark species (Walsh *et al*. 2009). Prior to the ban from 1995–2000, fins were taken from a large proportion of captured oceanic whitetip sharks, with the remaining carcasses discarded (72.3% in deep sets and 52.7% from shallow sets) (Walsh *et al.,* 2009). Following the implementation of the new regulations, almost all sharks were released from 2004-2006, although some individuals were dead on release. Consequently, minimum mortality estimates declined substantially from 81.9% to 25.6% in deep sets and from 61.3% to 9.1% in shallow sets (Walsh *et al*. 2009).

Aside from this example, there is little information on the level of compliance with the various fisheries management measures for sharks, including oceanic whitetip, with compliance likely variable among other countries and regions. In other parts of the world, finning and retention bans may not be adequate for oceanic whitetip given the continued high value for their large fins. For example, despite being protected in Indonesia, an illegal seizure of approximately 3,000 oceanic whitetip fins occurred as recently as October, 2015 (see the *International Regulatory Mechanisms* section below for more details). This provides some evidence that despite species-specific regulations to protect the species, these regulatory mechanisms are only effective when implemented and enforced adequately.

International Regulations

Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)[14]

[14] https://www.cites.org/eng

CITES is an international agreement between governments, with the aim of ensuring that international trade in specimens of wild animals and plants does not threaten their survival. CITES contains three appendices: Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances; Appendix II includes species not necessarily threatened with extinction, but trade must be controlled to ensure utilization is compatible with their survival; and Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade. Due to reported population declines driven by the trade of oceanic whitetip shark fins, the oceanic whitetip shark was listed under Appendix II of CITES in 2013. This listing went into effect as of September 2014. International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate. No import permit is necessary for these species under CITES (although a permit is needed in some countries that have taken stricter measures than CITES requires). Because the oceanic whitetip is a pelagic species mostly occurring in waters not under the jurisdiction of any State, introduction from the sea (i.e. transport of captured specimens from international waters to areas under national jurisdiction) would be expected to occur frequently in fisheries regulated by RFMOs that allow the species to be landed (FAO 2012). Under CITES, such transport of specimens listed on Appendix II would require a certificate from the State to whose jurisdiction the specimens are brought, including a Non-detriment finding and a legal acquisition finding. However, given that all RFMOs now prohibit the retention of the oceanic whitetip shark (with the exception of some countries that have taken reservations to the prohibition (e.g., India)), export of oceanic whitetip fins from most RFMO member countries should not be occurring. However, recent data from Hong Kong's Agriculture Fisheries Conservation Department (AFCD) suggests this is not the case. Since the listing of oceanic whitetip sharks under CITES Appendix II went into effect in 2014, approximately 1,263 kg (2,784 lbs) of oceanic whitetip fins have been confiscated upon entry into Hong Kong because the country of origin did not include the required CITES permits. Since 2014, confiscated oceanic whitetip fin shipments included 940.46 kg from Colombia, 10.96 kg from the Seychelles, and 272.49 kg from the United Arab Emirates (AFCD, Unpublished data). Additionally, in the first two months of 2017 alone, more than a ton of shark fins from hammerhead and oceanic whitetip sharks were seized by Hong Kong customs[15].

Convention on the Conservation of Migratory Species of Wild Animals[16]

The Convention of Migratory Species (CMS) is an environmental treaty under the auspices of the United Nations Environment Programme. The CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats, and works to bring together the Range States (i.e., the States through which migratory species pass), and lay the legal foundation for coordinating international conservation measures throughout a migratory range. However, despite being a highly migratory species in need of international cooperation for its management and conservation, the oceanic whitetip shark is not listed under the Convention.

2009 FAO Port State Measures Agreement (PSMA)

The PSMA was adopted in 2009 as a tool to combat illegal, unreported and unregulated (IUU) fishing. It aims to prevent illegally caught fish from entering international markets through ports. Under the terms of the treaty: foreign vessels will provide advance notice and request permission

[15] https://phys.org/news/2017-03-massive-hong-kong-shark-fin.html

[16] http://www.cms.int/en

for port entry, countries will conduct regular inspections in accordance with universal minimum standards, offending vessels will be denied use of port or certain port services, and information sharing networks will be created. As IUU fishing is also a threat to vulnerable shark species, implementation of the PSMA can have a positive effect on the conservation of sharks.

International Shark Fishing and Finning Regulations

Finning bans have been implemented by a number of countries including the European Union (EU), as well as by nine RFMOs. These finning bans range from requiring fins remain attached to the body, to allowing fishers to remove shark fins if the weight of the fins does not exceed 5% of the total weight of shark carcasses landed or found onboard. In fact, all of the relevant RFMOS prohibit fins onboard that weigh more than 5% of the weight of sharks to curb the practice of shark finning. Although the fins:body weight ratios have the potential to reduce the practice of finning, these regulations do not prohibit the fishing of sharks and a number of issues associated with reliance on the 5% fins:body weight ratio requirement have been identified. For instance, some disagree that the ratio has a clear scientific basis as a conservation measure for sharks. For example, Lack and Sant (2009) note that: the percentage of fins:body weight varies widely among species, fin types used in calculation, the type of carcass weight used (whole or dressed) and fin cutting techniques. Additionally, under the fins:body weight ratio measure, sharks that are not landed with fins attached to the body make it difficult to match fins to a carcass (Lack and Sant 2009). There are also issues with using the ratios for dried vs. fresh fins, which can affect the ratio substantially. In a Fins Attached report, Arauz (2017) notes inaccurate data recording as a major issue, and provides an example from Costa Rica that demonstrates highly variable fin-to-body-weight ratios for oceanic whitetip sharks from one landing event to another. Again, such controls have no impact on the mortality of sharks that are discarded because their fins have either no or very low market value. Controls on finning also lack the capacity to provide differential protection to those shark species most at risk from overfishing (Lack and Sant 2009). In addition, with the rise in the shark meat market in recent years (Dent and Clarke 2015), retention of the full carcass for commercial purposes may be an advantage for fishers, as the product is worth keeping on board for landing. Overall, despite their existence, laws and regulations are rapidly changing and are not always effectively enforced by countries and RFMOs (Biery and Pauly 2012).

In addition to regulations specific to shark finning, numerous RFMOs and countries have implemented various regulations regarding shark fishing in general, which are described in Appendix 4 and discussed in detail below in the *Regional Analysis* section. A number of countries have enacted complete shark fishing bans (i.e., bans on retention and possession of sharks and shark products), with the Bahamas, Marshall Islands, Honduras, Sabah (Malaysia), and Tokelau (an island territory of New Zealand) adding to the list in 2011, the Cook Islands in 2012, and the Federated States of Micronesia in 2015. So-called "shark sanctuaries" (i.e., locations where harvesting sharks is prohibited) can also be found in the Eastern Tropical Pacific Seascape (which encompasses around two million km^2 and includes the Galapagos, Cocos, and Malpelo Islands), in waters off the Maldives, Mauritania, Palau, French Polynesia, New Caledonia and Raja Ampat, Indonesia. However, it should be noted that sharks can still be caught as bycatch in these areas. See Appendices 2 and 3 for a description of the existing regulatory mechanisms in place for shark fishing and finning, respectively, throughout the range of the oceanic whitetip.

A number of countries and territories also prohibit the sale or trade of shark fins or products, including:

- Bahamas
- Canada - The cities of Brantford, Oakville, Newmarket, Mississauga, London, Pickering and Toronto, as well as six municipalities in British Colombia: Abbotsford, Coquitlam, Nanaimo, Port Moody, North Vancouver, and Maple Ridge, have all passed bans on the sale of shark fins.
- CNMI
- American Samoa
- Cook Islands
- Egypt
- French Polynesia
- Guam (with an exception for subsistence fishing)
- Republic of the Marshall Islands
- Sabah, Malaysia

FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-SHARKS)

Developed in 1998, IPOA-SHARKS aims to ensure the conservation and management of sharks and their long-term sustainable use. Consequently, the FAO recommends that RFMOs carry out regular shark population assessments and that member States cooperate on joint and regional shark management plans, and develop National Plans of Action for sharks (NPOA-Sharks). The FAO reports on implementation of the IPOA-Sharks at each meeting of its Committee on Fisheries. In 2009 and 2011, significant implementation progress of the IPOA-Sharks was observed, indicating that international attention given to conservation and management of sharks positively influenced the motivation of governments to take action (Fischer *et al*. 2012). The most recent comprehensive review of implementation progress was conducted in 2012. Overall, 143 countries, areas, territories and entities report shark catches to FAO; however the 2012 review focused on the top 26 shark catching nations, as they represent approximately 84% of the global shark catches reported to the FAO from 2000-2009[17]. The development of NPOAs provides some indication of the level of commitment of a catching country to manage its shark fisheries; of the 26 key shark catching countries in the world, 18 are known to have developed NPOA-Sharks, and an additional five are in the process of adopting or developing such a plan (three[18] have completed a draft NPOA that is awaiting adoption by parliament and two[19] have initiated drafting of their NPOA). However, three countries (12% of the top shark fishing countries, areas and territories) have not yet addressed an NPOA-Sharks (Fischer *et al*. 2012). See Appendix 5 for a table that describes the current status of development of NPOAs by the top 26 shark-catching countries and territories.

Despite the improvements in development and implementation of IPOA-Sharks in recent years, successful implementation of these plans continues to be hampered by a number of problems and issues. Because of slow progress in the initial implementation of IPOA-Sharks among member countries, the FAO convened an Expert Consultation on the Implementation of the IPOA-Sharks

[17] http://www.fao.org/fishery/topic/18123/en

[18] Brazil, Peru and Thailand

[19] India and Sri Lanka

in 2005, which focused on the challenges encountered by FAO Members with regard to the conservation and management of sharks. According to Fischer *et al*. (2012), nine areas of particular concern were identified by the Expert Consultation, including:

- lack of appropriate taxonomic guides to identify species;
- lack or insufficient information on the population biology of elasmobranch species, both targeted and bycatch species;
- lack of funds for management;
- lack of human resources;
- competition from other management imperatives;
- lack of effective policy and institutional practices;
- scarce or lacking data, particularly for catch and fishing effort, to inform management decision making;
- weak or non-existent capacity of many developing countries; and
- low political priority for elasmobranch fisheries.

Despite progress achieved since 2005, the main findings of the Expert Consultation were still valid as of 2012, evidenced by pertinent issues raised by respondents in the most recent IPOA-Sharks implementation review questionnaire (Fischer *et al.,* 2012). Overall, the majority of problems encountered regarding conservation and management of sharks were related to problems with fisheries management in general (e.g., institutional weaknesses, lack of trained personnel, inadequate fisheries research, and inadequate monitoring, control and surveillance (MCS)). Further, inadequate data pertaining to shark biological characteristics and fisheries were noted by almost half of the respondents, particularly in developing countries. In addition, many countries need more trained officers for fisheries monitoring and control, and, in some countries, there is also a need for institutional strengthening. In addition, many of the top shark-fishing countries, areas and territories also have difficulties with shark species identification, which considerably affects the reporting of shark catches and discards (Fischer *et al*. 2012). Finally, the quality of the existing NPOA-Sharks varies, and there are no reporting mechanisms on implementation of the NPOAs; thus, it remains uncertain whether a particular plan is being implemented or what impact the plan has had on conservation and management of sharks. Further, while the IPOA-Sharks indicates that NPOAs should be reviewed every five years, and some NPOAs have now been in place for five years or longer, evaluations of progress and revised Plans are lacking (Lack and Sant 2009), though a few revised Plans have been submitted (see Appendix 5 for more details).

Regional Analysis

Pacific

In the Eastern Pacific, the IATTC is the RFMO responsible for the conservation and management of tuna and tuna-like species. As noted previously, the IATTC has passed a no-retention measure for oceanic whitetip sharks by implementing Resolution C-11-10 for the conservation of oceanic whitetip sharks caught in association with fisheries in the Antigua Convention Area. This Resolution prohibits Members and Cooperating non-Members (CPCs) from retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in the fisheries covered by the Antigua Convention. As discussed in the *Overutilization* section of this status review, this measure is not likely adequate to prevent capture and mortality in one of the main fisheries that catches oceanic whitetip sharks

in this region (i.e., the tropical tuna purse seine fishery). Though mortality rates of oceanic whitetip in purse seine fisheries are not available, it is likely that oceanic whitetip sharks experience high mortality rates similar to congener *C. falciformis* (i.e., ~85% in Western and Central Pacific and Indian Ocean tropical purse seine fisheries; Poisson *et al.,* (2014); Hutchinson *et al.,* (2015)) during and after interactions with purse seine fisheries. Given that they are captured in a net where they are unable to swim, and subjected to the weight of whatever tonnage is on top of them, oceanic whitetip sharks likely experience high levels of stress that can lead to mortality even if they are released alive. In fact, when oceanic whitetip sharks are released alive in the fishery, they are considered to be dead by the IATTC observer program because there is no evidence of post-release survival (Martín Hall, Pers. Comm. 2016). Some of these issues (i.e., the high level of stress that oceanic whitetip sharks experience when caught in purse seine nets) may be addressed by the 2016 Resolution C-16-05 for the Management of Shark Species. This Resolution will require purse seine vessels to follow safe-release requirements for all sharks, whether alive or dead (with the exception of those retained), including prompt release as soon as the shark is seen in the net or on deck. Considering safety precautions, sharks must be released out of the net directly from the brailer into the ocean and the use of gaffs, hooks, or similar instruments is prohibited. Resolution C-16-05 also bans the use of "shark lines" in longline vessels targeting tuna or swordfish in the Convention Area. However, Resolution C-16-05 does not come into force until January 2018. Additionally, given the depleted status of the population in this region, it is unclear as to how effective these measures will be.

In the Western and Central Pacific, the WCPFC is the main regulatory body for the management of sharks. Like other RFMOs, the WCPFC also has regulatory measures for the conservation of sharks in general, as well as specific measures for the conservation of oceanic whitetip sharks. Clarke (2013) identifies three main objectives of the shark CMMs in this region: 1) promote full utilization and reduce waste of sharks by controlling finning (perhaps as a means to indirectly reduce fishing mortality for sharks); 2) increase the number of sharks that are released alive (in order to reduce shark mortality); and 3) increase the amount of scientific data that is collected for use in shark stock assessments. Clarke (2013) found variable implementation rates of the CMM requirements by the WCPFC members and a lack of effectiveness of these measures in terms of reducing mortality of shark stocks. Clarke (2013) attributes this ineffectiveness to a lack of outcome-focused objectives of the CMM requirements, resulting in increased difficulty and challenges associated with verifying compliance and data monitoring and review. In addition to CMMs for sharks in general, CMM 2011-04 (which prohibits WCPFC vessels from retaining onboard, transshipping, storing on a fishing vessel, or landing any oceanic whitetip shark, in whole or in part, in the fisheries covered by the Convention), is likely the most influential management measure for the conservation of oceanic whitetip sharks in the Western and Central Pacific is. Clarke (2013) reviewed the potential efficacy of the oceanic whitetip retention prohibition measure as follows:

> "With regard to the expected effectiveness of the no-retention measure for oceanic whitetip sharks, a previous analysis of longline observer data from 1995-2010 suggested that without a no-retention measure the mortality rate for oceanic whitetip shark catches would be 87%. Assuming full implementation of no-retention and prompt release

> unharmed requirements for this species the mortality rate was estimated to fall to 31%[20] (Clarke 2011). The recent oceanic whitetip shark stock assessment found that overfishing is occurring (Fcurrent/FMSY = 6.5) and the stock is in an overfished state (SBcurrent/SBMSY = 0.153). Given the severely depleted state of the oceanic whitetip shark population, even if no-retention measures reduced mortality by more than 50% (i.e. from 87% to 31%), it is not clear how quickly and to what extent these conditions would allow the oceanic whitetip shark population to recover because model projections were not conducted (Rice and Harley 2012). Compounding this uncertainty, less-than-full implementation will erode the benefits of any mitigation measure."

Additionally, and as previously noted, finning bans and ratios do not address incidental catch of oceanic whitetip sharks and the subsequent mortality that may result after release; thus, these management measures may not necessarily prevent mortality of oceanic whitetip sharks. Although it is possible that a reduction in finning would coincide with an increase in the percentage of sharks released alive, this is not necessarily the case. In a study of longline fisheries of the Western and Central Pacific, Rice *et al*. (2015) showed a reduction in the percentage of key shark species that were finned from 2010-2013, with the last year of the study showing an increase in finning and a decrease in the number of sharks retained. The reduction in finning from 2010-2013 paralleled a rise in retention, which would be expected if fishers were beginning to retain the carcass to comply with CMM 2010-07 (the 5% fin to carcass rule; Rice *et al*. 2015). However, this could also be due to the growing demand for meat and a waning interest in shark fins, as discussed earlier (see Dent and Clarke (2015) and Eriksson and Clarke (2015) for more details). With respect to oceanic whitetip sharks, Rice *et al*. (2015) concluded that observations of the species in the longline fishery have generally indicated a reduction in the proportion finned since the mid-2000s (See Figure 66 below). For example, data collected by on-board observers from the Fijan longline fishery show that even though the fishery has not fully complied with the measure, a clear improvement was detected from 2011 to 2014; the percentage of oceanic whitetips released alive increased from 0% in 2011 to 63% in 2014 (See Figure 65 below). Also, while 100% of oceanic whitetips were finned in 2011 and 2012, and 60% were finned in 2013, only 3% were finned in 2014 (Piovano and Gilman 2016), though there is no information regarding how many of these sharks survived after their release.

[20] This lower estimate assumes that mortality only occurs during haulback, not during handling. Any rough handling, e.g. to retrieve the terminal tackle, would tend to increase the mortality rate (Clarke 2013).

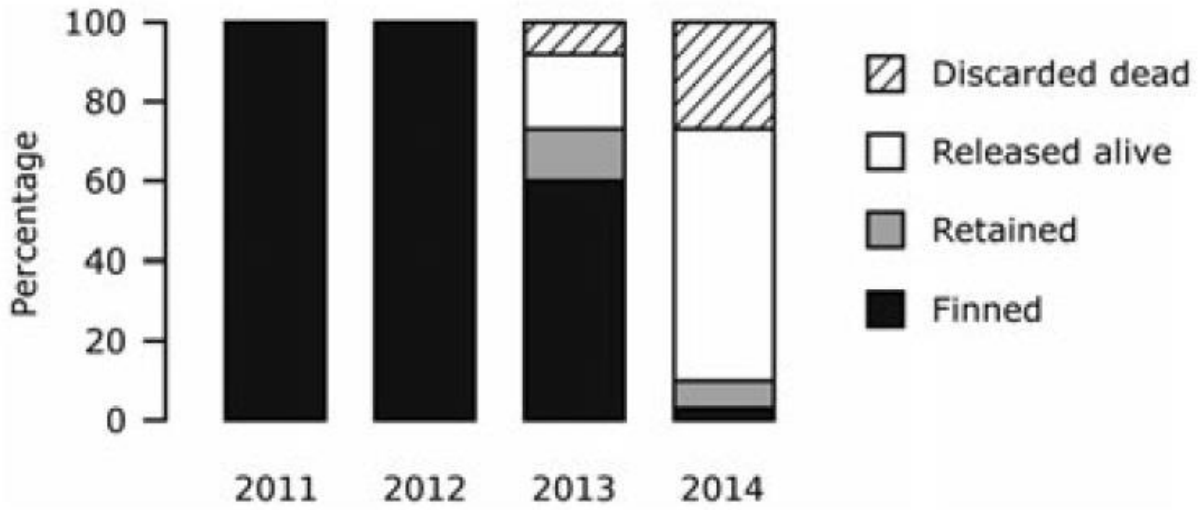


Figure 65 Fate of oceanic whitetip sharks after capture in the longline gear (expressed as percentage per year, N = 109). Source: Poviano and Gilman 2016.

However, in the first year of the CMM (2013) proportionally more oceanic whitetip sharks were retained and, with respect to CMM 2011-04, observations from the longline fishery have shown that the CMM is not being strictly adhered to, with non-negligible proportions of oceanic whitetips retained or finned. More oceanic whitetip sharks were retained in 2013 (the first year of the CMM) both in numbers and proportionally than in 2012 in the longline fishery. Due to recent change in observer coverage and lack of data from U.S. and Australian longline fisheries for years 2012-2014 and 2014, respectively, evaluating the efficacy of this measure in recent years is complicated (Rice *et al*., 2015).

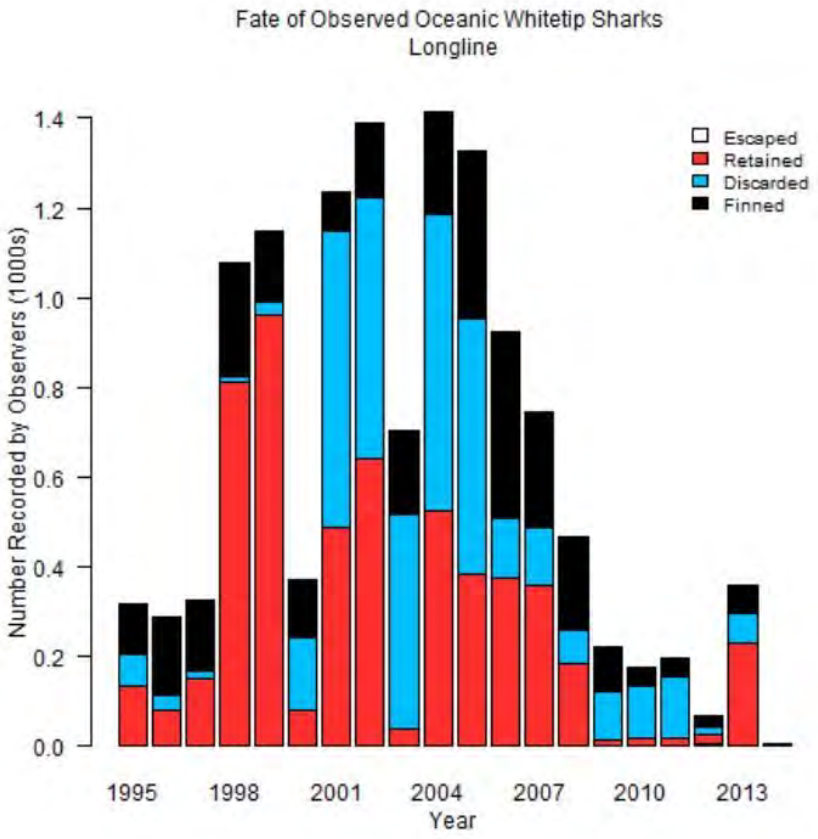


Figure 66 Fate of observed oceanic whitetip sharks caught by longline in the WCPO from 1995-2013. Source: Rice *et al.* 2015.

It remains impossible to evaluate the proportion of sharks released alive in WCPFC purse seine fisheries because purse seine observers do not record the sharks' condition at release. Nonetheless, studies of shark mortalities in various purse seine fisheries have shown that ~60-80% of sharks are dead when they are first observed at net retrieval and approximately half of those which survive retrieval die after release (Poisson *et al.,* 2014; Hutchinson *et al.,* 2015). Therefore, even if live release is strictly practiced in purse seine fisheries, the number of sharks expected to survive is low. The analysis of the oceanic whitetip retention prohibition CMM in the purse seine fishery is also hampered by the fact that there were no available data showing observations of oceanic whitetip sharks in 2014. In 2013, the proportion of oceanic whitetip sharks that were either finned or discarded in the purse seine fishery increased, but the proportion retained decreased. Thus, it appears that this measure is only partially successful (Rice *et al*. 2015).

Overall, while it is likely that existing controls on shark finning and species retention bans are reducing fishing mortality of oceanic whitetip sharks in the Western and Central Pacific to some degree, these conservation measures appear only partially effective, and implementation and enforcement rates are likely variable. Additionally, an increase in the percentage of sharks released alive will not likely translate into substantial increases in survival due to the fact that most sharks have been found to suffer high mortality rates when caught in purse seine nets and on longline gear (Clarke 2013). Although oceanic whitetip sharks have relatively higher at-vessel mortality rates in longlines compared to other shark species, given the severely depleted state of

oceanic whitetip shark in this portion of its range, it is likely that anything less than full implementation and enforcement would likely undermine any potential conservation benefit (Clarke 2013), and may not be adequate to prevent further population declines of the species in this region.

In addition to finning controls and species retention bans, the WCPFC has also adopted some conservation measures related to fisheries gear. For example, CMM 2014-05 became effective in July 2015 and requires each national fleet to either ban wire leaders or ban shark lines, both of which have potential to reduce shark bycatch in the first place. However, while it is predicated that oceanic whitetip shark mortality may be reduced by up to 37% if both measures are used, this CMM allows flag-states to choose which fishing technique they exclude. Using Monte Carlo simulations, Harley and Pilling (2016) determined the following: if flag-states choose to exclude the technique least used by their vessels, the median predicted reduction in fishing-related mortality is only 10% for oceanic whitetip shark. If flag-states exclude the technique most used by their vessels, this would reduce the fishing mortality rate by 30%. This compares to a reduction of 37% if choice is removed and both techniques are prohibited. Thus, allowing flag states to choose which fishing technique they exclude under CMM 2014-05 has the potential to significantly undermine any benefits to the oceanic whitetip shark (Harley and Pilling 2016), particularly given the high levels of fishing mortality experienced by this species. It is therefore unlikely that the options under CMM 2014-05 of either banning shark lines or wire traces will result in sufficient reductions in fishing mortality (Harley *et al.,* 2015). Given the foregoing information, we conclude that existing regulatory mechanisms in the Western and Central Pacific are likely inadequate to control for overutilization of the species.

Atlantic

Oceanic whitetip catches have been reported by ICCAT vessels since the 1980s by the United States, but not by other countries until the early 1990s. In 2004, following the FAO International Plan of Action for Sharks (IPOA-Sharks), ICCAT published recommendation 04-10 requiring Contracting Parties, Cooperation non-Contracting Parties, Entities or Fishing Entities (CPCs) to annually report data for catches of sharks, including available historical data. In 2010, ICCAT developed recommendation 10-07, which specifically prohibits the retention, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in any fishery; however, the retention ban implemented by ICCAT does not necessarily prevent all fisheries-associated mortality. Although oceanic whitetip sharks have a relatively higher at-vessel survivorship rate than other pelagic sharks in the Atlantic, some will still likely die due to capture.

According to ICCAT data as shown previously in Figure 46, approximately 89% of the total reported catch for Atlantic oceanic whitetip sharks was caught by Brazil. Countries fishing in the South Atlantic within the ICCAT Convention Area are also required to adhere to management measures implemented by ICCAT, of which the most consequential for oceanic whitetip sharks is the prohibition on retention of the species. As noted previously, regulations that mandate the release of oceanic whitetip sharks back to the sea have the potential to be somewhat effective for their protection, since the majority of the specimens are captured alive and exhibit relatively low at-vessel mortality rates in this region of 11-28% (Fernandez-Carvalho *et al.,* 2015). However, whether the retention ban is fully implemented and enforced is unknown. In Brazil, which is one

of the top 26 shark-catching countries in the world and the largest oceanic whitetip catching country in the region, the significant decline in reported catches by the Brazilian fleet (as discussed in the *Overutilization* section of this status review) occurred prior to any management recommendations by ICCAT to prohibit retention of oceanic whitetip sharks in ICCAT-associated fisheries. In any case, despite the retention prohibition, Brazil reported 6 mt of oceanic whitetip in 2014, which indicates the species is still being caught and continues to experience fisheries-related mortality in this portion of its range. In addition to ICCAT regulations, sharks in Brazil must be landed with corresponding fins and a 5% fin-carcass weight ratio is required. In addition, all carcasses and fins must be unloaded and weighed and the weights reported to authorities. Pelagic gillnets and trawls are prohibited in waters less than 3 nmi (5.6 km) from the coast; however, given that the oceanic whitetip is pelagic species, a gillnet ban within 3 nmi of the coast is not likely going to be beneficial. Further, implementation and enforcement of these regulations have been noted as difficult and likely poor (Chiaramonte and Vooren 2007).

In December, 2014, the Brazilian Government's Chico Mendes Institute for Biodiversity Conservation approved the NPOA for the Conservation of Elasmobranchs of Brazil (No 125). However, this plan will not be fully implemented for another five years. In addition, this plan focuses on 12 priority species and does not include specific regulations to manage or protect the oceanic whitetip shark, despite the declining population off Brazil's coast. In 2004, the oceanic whitetip shark was designated as a "species threatened by overexploitation" by Brazil's Ministério do Meio Ambiente (Ministry of Environment), and listed under Annex II of Brazil's Normative Ruling No. 5 of May 21, 2004. In 2014, Brazil finalized its national assessment regarding the extinction risk of Brazilian fauna, and listed the oceanic whitetip shark as "Vulnerable" under Brazil's "Lista Nacional Oficial de Espécies da Fauna Ameaçadas de Extinção - Peixes e Invertebrados Aquáticos" (National Official List of Endangered Species of Fauna - Fish and Aquatic Invertebrate; ICMBio, 2014). Species listed as "Vulnerable" enjoy full protection, including, among other measures, the prohibition of capture, transport, storage, custody, handling, processing and marketing. The capture, transport, storage, and handling of specimens of the species shall only be allowed for research purposes or for the conservation of the species, with the permission of the Instituto Chico Mendes. However, it appears these regulations are not likely complied with or enforced adequately. In fact, a recent study that compared 179 legal instruments implemented for regulating Brazil's fisheries from 1934-2014 with fisheries landings from 1996-2011 concluded that there is a "a complete disrespect for the regulations" and that fleets continued landing prohibited or size limited species, including the oceanic whitetip shark (Fiedler *et al.,* 2017). For example, the prohibition for fishing oceanic whitetip sharks went into effect between 2004 and 2005. However, the species continued to be landed by national and leased foreign fleets, and was one of several species landed in the port of Itajaí despite a prohibition for catching this species (Fiedler *et al*., 2017). This study concluded that the current set of regulations for Brazil's fisheries are inconsistent, thereby rendering any management of fishing activities incompatible with species conservation. Additionally, there is strong opposition from the fishing industry and some ordinances guaranteeing protection to endangered species in the country have recently been canceled (Di Dario *et al.,* 2014). Further, systematic data collection from fleets fishing over Brazilian jurisdiction ended in 2012, and onboard observer programs have been cancelled, which renders any further monitoring of South Atlantic shark populations difficult or impossible (Barreto *et al.,* 2015). Given the foregoing

information, it appears that existing regulatory mechanisms in Brazil are not likely adequate to effectively manage the threat of fishing pressure and associated mortality on oceanic whitetip sharks in this region.

In Central American and Caribbean waters, management of shark species remains largely disjointed, with some countries lacking basic fisheries regulations and others lacking the capabilities to enforce what has already been implemented (Kyne *et al*. 2012). The Organization of the Fisheries and Aquaculture Section of the Central American Isthmus (OSPESCA) was established to address this situation by assisting with the development and coordination of fishery management measures in Central America. The OSPESCA recently approved a common regional finning regulation for eight member countries from the Central American Integration System (SICA) (Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama). The regulation specifically requires sharks to be landed with fins still attached for vessels fishing in SICA countries or in international waters flying a SICA country flag. If fins are to be traded in a SICA country, they must be accompanied by a document from the country of origin certifying that they are not the product of finning (Kyne *et al.,* 2012). Other Central American and Caribbean country-specific regulations include the banning or restriction of longlines in certain fishing areas (Bahamas, Belize, Panama), seasonal closures (Guatemala), shark fin bans (Colombia, Mexico, Venezuela) and the prohibition of shark fishing (Bahamas and Honduras). However, enforcement of these regulations is generally weak, with many reports of IUU fishing activities (see below for more information). For example, in May 2012, the Honduran navy seized hundreds of shark fins from fishers operating illegally within the borders of its shark sanctuary. As Kyne *et al.,* (2012) reports, it is basically common practice to move shark fins across borders for sale in countries where enforcement is essentially lacking in this region.

In the Sub Regional Fisheries Council (SRFC) region in the Atlantic (off West Africa), regulations specific to shark fishing are minimal. Fishing occurs year-round, including during shark breeding season, and, consequently, both pregnant and juvenile shark species may be fished (Diop and Dossa 2011). In fact, fins from fetal sharks are included on balance sheets at landing areas (Diop and Dossa 2011). Many of the state-level management measures in this region lack standardization at the regional level (Diop and Dossa 2011), which weakens some of their effectiveness. For example, Sierra Leone and Guinea both require shark fishing licenses; however, these licenses are much cheaper in Sierra Leone. As a result, fishers from Guinea will fish for sharks in Sierra Leone, thereby minimizing the benefits that could have been gained from having mutually supported management measures (Diop and Dossa 2011). In addition, Camara (2008) notes that fishery regulations are usually not adequately enforced due to a lack of funds, trained staff, and proper monitoring equipment. Corruption is also prevalent, especially in Mauritania, whereby enforcement officials are paid off by fishermen caught committing offenses (Camara 2008). However, many fishermen in this region are also unaware (or claim to be unaware) of the current fishing regulations, legal fishing zones, and gear restrictions, which has also contributed to deterioration of the West African fisheries (Camara 2008). However, it is unclear how important oceanic whitetip sharks are in this region's fisheries. As of 2011, the only member state of the SRFC in which oceanic whitetip sharks have been reported is Cape Verde, which reported the oceanic whitetip as "very rare" (Diop and Dossa 2011), although information from this region is fairly limited and other African countries (Guinea and Ghana) reported catches of oceanic whitetip shark to ICCAT in 2014.

Indian Ocean

In Indian Ocean waters, the main regulatory body is the IOTC, which has management measures in place for sharks in general, and also specifically for the oceanic whitetip shark. The IOTC requires CPCs to annually report shark catch data and provide statistics by species for a select number of sharks, including oceanic whitetip sharks (Resolutions 05/05, 11/04, 08/04, 10/03, 10/02). The IOTC also developed additional shark conservation and management measures that aim to further reduce shark waste and encourages the live release of sharks, especially juveniles or pregnant females, caught incidentally (and not used for food or other purposes) in fisheries for tunas and tuna-like species. However, the efficacy of these measures remain unclear. For example, in a recent status report, the IOTC's Working Party on Ecosystems and Bycatch noted that the International Plan of Action for sharks was adopted in 2000, which requires each CPC to develop a National Plan of Action (NPOA) for sharks; however, despite the time that has elapsed since then, very few CPCs have developed NPOAs for sharks, or even carried out assessments to determine whether the development of a plan is prudent. As of 2014, only 12 of the 35 CPCs had developed NPOAs for sharks (IOTC 2014).

With regard to species-specific management measures for the oceanic whitetip shark, the IOTC passed Resolution 13-06 in 2013 as a pilot measure that prohibits the retention, transshipment, landing, or storing of any part or whole carcass of oceanic whitetip sharks. However, unlike similar regulations implemented by other RFMOs, the IOTC retention prohibition of oceanic whitetip shark exempts "artisanal fisheries operating exclusively in their respective EEZ for the purpose of local consumption." However, the definition of artisanal vessels in the IOTC encompasses a wide array of boats with vastly different characteristics. These vessels range from the pirogue that fishes close to shore for subsistence purposes with no motor, no deck and no holding facilities, to a longliner, gillnetter or purse seiner of less than 24 m with an inboard motor, deck, communications, fish holding facilities, and in some cases chilling or freezing capabilities. This latter vessel could potentially conduct fishing operations offshore, including outside its EEZ (Moreno and Herrera 2013). For example, in 2014 and 2015 the Islamic Republic of Iran and Sri Lanka reported 239 mt of oceanic whitetip sharks caught by gillnets that fall under the definition of "artisanal" fisheries. Additionally, while some no-retention measures ban the "selling or offering for sale" of any products from the specified shark species, the IOTC oceanic whitetip shark measure does not (Clarke 2013). Further, this measure is not binding on India, which is one of the main oceanic whitetip shark catching countries identified by the IOTC in the Indian Ocean. Thus, it appears that the retention ban of oceanic whitetip in the Indian Ocean is limited in scope relative to other RFMO no-retention measures, and only partially protective depending on whether the measure is adequately implemented and enforced. Finally, as an interim pilot measure, it is highly uncertain as to whether this measure will be ongoing into the foreseeable future.

In Indonesia, which is the top shark fishing nation in the world, there are few restrictions pertaining to shark fishing. In fact, Indonesian small-scale fisheries, which account for around 90% of the total fisheries production, are not required to have fishing permits (Varkey *et al.,* 2010), increasing the incentive for shark finning by this sector (Lack and Sant 2012). Although Indonesia adopted an FAO recommended shark conservation plan (National Plan of Action-Shark) in 2010, due to budget constraints, it can only focus its implementation of key conservation actions in one area, East Lombok (Satria *et al.,* 2011). Further, current Indonesian

regulations pertaining to sharks are limited to those necessary for fulfilling obligations under international agreements (e.g., trade controls for certain species listed under CITES or prescribed by RFMOs) (Fischer *et al*. 2012). Ultimately, Indonesian fishing activities remain largely unreported (Varkey *et al.,* 2010), which suggests that the estimates of Indonesian shark catches are greatly underestimated. In fact, in Raja Ampat, an archipelago in Eastern Indonesia, Varkey *et al*. (2010) estimated that 44% of the total shark catch in 2006 was unreported (includes small-scale and commercial fisheries unreported catch and IUU fishing). In 2013, the Regency Government of Raja Ampat officially declared its 46,000 km^2 marine waters a shark and manta ray sanctuary, the first established in Indonesia that bans the harvesting and trade of sharks and manta rays from its marine waters. However, for the most part, without proper fishery management regulations in place, many of the larger species in Indonesian waters have been severely overfished and have forced Indonesian fishermen to fish elsewhere. Additionally, despite the fact that oceanic whitetip shark is protected in Indonesia under IOTC Resolution 13-06, evidence suggests that this Resolution may not be strictly followed. For example, in a genetic barcoding study of shark fin samples throughout traditional fish markets in Indonesia from mid-2012 to mid-2014, oceanic whitetip shark was identified as present despite being prohibited as of 2013. In addition, authorities confiscated around 3,000 oceanic whitetip shark fins from sharks caught in waters near Java Island in October 2015 (South China Morning Post 2015)[21].

Thus, while it generally appears that the IOTC has increased its number of management measures for sharks, including the oceanic whitetip, these regulations may only provide partial protection to the oceanic whitetip shark and may not be adequate to prevent further population declines due to overutilization.

Illegal, unregulated and unreported (IUU) Fishing

Despite the number of existing regulatory measures in place to protect sharks and promote sustainable fishing, enforcement tends to be difficult and illegal fishing has emerged as a problem in many fisheries worldwide. In general, illegal fishing occurs when vessels or harvesters operate in violation of the laws of a fishery; however, there are numerous activities that constitute IUU fishing (e.g., misreporting, use of prohibited gear, fishing inside closed waters, fishing without a license, shark finning, illegal transshipping, landing catch in unauthorized ports, etc). For purposes of this review, we focus on illegal finning and trafficking of oceanic whitetip sharks. In order to justify the risks of detection and prosecution involved with illegal fishing, efforts tend to focus on high value products (e.g., shark fins) to maximize returns to the illegal fishing effort. Thus, as the lucrative market for shark products (particularly shark fins) developed, so did increased targeting (both legal and illegal) of sharks around the world. Given that illegal fishing tends to go unreported, it is difficult to determine, with any certainty, the proportion of current fishery-related mortality rates that can be attributed to this activity. A study that provided regional estimates of illegal fishing (using FAO fishing areas as regions) found the Western Central Pacific (Area 71) and Eastern Indian Ocean (Area 57) regions have relatively high levels of illegal fishing (compared to the rest of the regions), with illegal and unreported catch constituting 34% and 32% of the region's catch, respectively (Agnew *et al.,* 2009). In the Pacific tuna fisheries alone, the total volume of product either harvested or transshipped involving IUU activity is estimated to be 306,440t (90% CI: 276,546t to 338,475t)

[21] http://www.scmp.com/news/asia/southeast-asia/article/1864948/indonesia-seizes-3000-shark-fins-destined-hong-kong

and an estimated value of $616.11m (90% CI: $517.91m to $740.17m) (MRAG Asia Pacific 2016). The annual worldwide economic losses from all IUU fishing is estimated to be between $10 billion and $23 billion (NMFS 2015).

However, as mentioned in the *Overutilization* section of this review, given the recent downward trend in the trade of shark fins (Dent and Clarke 2015; Eriksson and Clarke 2015), illegal fishing for the sole purpose of shark fins may not be as prevalent in the future. It is also a positive sign that most (70%) of the top 26 shark-fishing countries, areas and territories have taken steps to combat IUU fishing, either by signing the Port State Measures Agreement (PSMA) (46%) or by adopting a National Plan of Action to prevent, deter, and eliminate IUU (NPOA-IUU) or similar plan (23%) (Fischer *et al*. 2012). However, whether these agreements or plans translate to less IUU fishing activity is unclear. For example, in many countries, effective implementation of monitoring, control, and surveillance schemes is challenging, often due to a lack of personnel and inadequate financial resources (Fischer *et al.,* 2012), and a number of instances of IUU fishing, specifically involving sharks, have been documented over the past decade. For instance, in 2014, illegal oceanic whitetip shark fins were discovered in a random sample inspection of three 40 kg sacks slated for export from Costa Rica to Hong Kong (Tico Times 2014)[22]. Additionally, and as noted previously, Indonesian authorities confiscated around 3,000 oceanic whitetip shark fins from sharks caught in waters near Java Island as recently as October 2015. This haul was worth an estimated US $72,000 in Indonesia, but would reportedly earn several times that amount in Hong Kong (South China Morning Post, 2015)[23]. In February 2013, oceanic whitetip fins were found in a large seizure of fins from a Taiwanese vessel fishing in the Marshall Islands[24]. In September 2015, Greenpeace activists boarded a Taiwan-flagged boat fishing near Papua New Guinea and found 110 shark fins but only 5 shark carcasses (which was in violation of both the Taiwanese and the WCPFC rules requiring onboard fins to be at most 5% of the weight of the shark carcasses)[25]. Recreational fishermen have also been caught with illegal shark fins. A report from June 2015 identified three unlicensed recreational fishers operating in waters off Queensland, Australia and in possession of 3,200 illegal shark fins most likely destined for the black market[26]. While these reports provide just a few examples of recent illegal fishing activities, more evidence and additional reports of specific IUU fishing activities throughout the world can be found in Miller *et al.,* (2014).

In terms of tracking IUU fishing, most of the RFMOs maintain lists of vessels they believe to be involved in illegal fishing activities, with the latest reports on this initiative seeming to indicate some improvement in combatting IUU fishing. In the most recent 2015 Biennial Report to Congress, which highlights U.S. findings and analyses of foreign IUU fishing activities, NMFS reports that all 10 nations that were previously identified in the 2013 Biennial Report for IUU activities took appropriate actions to address the violations (e.g., through adoption of new laws and regulations or by amending existing ones, sanctioning vessels, and improving monitoring

[22] http://www.ticotimes.net/2014/11/25/illegal-shark-fins-destined-for-hong-kong-seized-at-costa-rica-airport#comments-53192
[23] http://www.scmp.com/news/asia/southeast-asia/article/1864948/indonesia-seizes-3000-shark-fins-destined-hong-kong
[24] http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11119560
[25] http://www.msn.com/en-us/news/world/taiwan-boat-caught-with-huge-illegal-shark-fin-haul/ar-AAeuKhd
[26] http://www.abc.net.au/news/2015-06-12/fishers-caught-with-shark-fin/6541278

and enforcement) (NMFS 2015). In the current report, 6 countries were identified for having vessels engaged in IUU fishing activities; however, no countries were identified for engaging in protected living marine resources bycatch or for catching sharks on the high seas (although NMFS caveats this by noting the inability to identify nations due primarily to the restrictive time frames and other limitations in the statute) (NMFS 2015).

Overall, it is clear that the oceanic whitetip shark is subject to IUU fishing, particularly for its valuable fins. Given the recent downturn in the shark fin trade (Dent and Clarke, 2015; Eriksson and Clarke 2015), the threat of this IUU fishing for the sole purpose of shark fins may not be as significant into the future. However, based on the best available information on the species' declining population trends throughout its range, as well as current utilization levels, the present mortality rates associated with illegal fishing and impacts on oceanic whitetip shark populations may be contributing to the overutilization of the species.

Marine Protected Areas (MPAs) and Shark Sanctuaries

Marine protected areas are a popular tool to enhance fisheries management. Effectiveness of protected areas depends on implementation and enforcement of regulations, as well as reserve design. Reserves are not always created or designed with an understanding of how they will affect biological factors or how they can be designed to meet biological goals more effectively (Halpern 2003). Since 2009, 15 countries have declared their EEZs as "shark sanctuaries," with primary goals of protecting and recovering shark populations by reducing fishing mortality and eliminating local contributions to the global market for shark products (Ward-Paige 2017). Currently, shark sanctuaries cover approximately 3% of ocean area. However, a variety of limitations exists regarding the size, location, compliance and enforcement of these protected areas. For example, much of the range and habitat of oceanic whitetip sharks overlap with large areas of unregulated fishing activities (e.g., high seas) where there are limited protections for sharks aside from the regulations of RFMOs. Therefore, because the oceanic whitetip shark is a highly migratory species, they only benefit from protected areas when they are actually inside the protected area's boundaries. Additionally, while many of these MPAs prohibit directed shark fishing, incidental bycatch and subsequent mortality of sharks can still occur in these areas. Nonetheless, given the species has exhibited a tendency of site fidelity in certain areas (e.g., Cat Island, Bahamas) this information could prove useful in the location and design of MPAs for the purposes of oceanic whitetip shark management. As mentioned previously, effectiveness of these protected areas also relies on the level of implementation and enforcement of regulations therein. Thus, while MPAs may provide some benefit to sharks in various locations around the world (Ward-Paige and Worm 2017), it is unclear whether and to what degree they confer conservation benefits to oceanic whitetip sharks, specifically.

Summary

A wide variety of existing laws and regulations have been implemented throughout the range of the oceanic whitetip shark that may positively affect the conservation status of the species. For example, all relevant RFMOs have taken steps towards implementing regulations to protect the oceanic whitetip shark, including prohibiting retention of the species, improving data reporting, and expanding research. Measures prohibiting retention of oceanic whitetip, if adequately implemented and enforced, could reduce the overall bycatch mortality of oceanic whitetip to some extent, because the species has relatively higher at-vessel survivorship compared to other shark species (Musyl *et al*. 2011); therefore, a large proportion of individuals caught and released

alive may be able to survive. However, as previously emphasized several times, no-retention measures do not entirely mitigate for any potential post-release mortality that may occur. Thus, these measures may only be partially effective. As an additional caveat, the rarity of a particular species could be capitalized upon. Due to their large rounded shape and distinctive white markings, the fins of the oceanic whitetip shark are among the easiest to identify (Clarke *et al.,* 2006a); this means its vulnerability could increase to dangerous levels should their rarity become an attractive quality (Tolotti *et al*., 2015c). Additionally, in light of the numerous conservation regulations set forth for this species of late, awareness regarding its threatened status has clearly increased. Although future scenarios are difficult to predict and highly uncertain, it seems that many of the rarity-associated black market factors described above are possible for the oceanic whitetip, especially given the global ban on its retention in pelagic fisheries under tuna RFMO management (Tolotti *et al.,* 2015c). Additionally, issues of non-reporting and non-compliance remain problematic. Of note is the fact that compliance with and enforcement of species-specific retention bans are not necessarily adequate, as evidenced by the fact that non-negligible proportions of oceanic whitetips are being retained or finned in areas that prohibit these actions (e.g., Western and Central Pacific and Indian Oceans). In addition, they do not address potential post-release mortality that may occur after the shark is released.

Likewise, although various shark fishing and finning regulations and bans have been increasing in recent years globally, levels of compliance and enforcement are highly variable, as evidenced by numerous incidents of IUU fishing throughout the world's oceans due to the high demand for lucrative shark products, particularly fins. While there has been a recent downturn in the shark fin market, and more information is necessary to determine the magnitude of impact the shark trade is having specifically on oceanic whitetip sharks, the demand for *C. longimanus* fins is evident by the recent incidents of illegal finning and trafficking of oceanic whitetip in places like Indonesia and Costa Rica. Further, while reporting of shark catches to FAO has improved in the last decade (e.g., shark catches reported at species level doubled from 14% in 1995 to 29% in 2010), data collection and research on sharks is still lacking in many regions and many of the top shark-catching countries still report most of their catches at a very high aggregated level. On the other hand, complete bans on shark fishing have been implemented in some areas, which can help reduce fishing pressure on oceanic whitetip sharks while in these areas (e.g., the Bahamas). Regulatory mechanisms for oceanic whitetip shark in the U.S. Atlantic are seemingly adequate in achieving their intended purpose, with the Northwest Atlantic population of oceanic whitetip potentially stabilized. There is also a declining trend of oceanic whitetip mortality in Hawaii fisheries due to various regulations. Overall, we recognize the mere existence of regulatory mechanisms does not necessarily equate to their effectiveness in achieving their intended purpose. Issues related to community awareness, compliance, enforcement, regional priorities, and complex political climates within many countries in which oceanic whitetip sharks occur can limit the effectiveness of well-intended statutes and legislation.

4.5 (E) Other Natural or Manmade Factors

Information regarding the potential impacts of climate change on pelagic shark habitat is described in Section 4.1 (A) *Present or Threatened Habitat Destruction, Modification, or Curtailment*. Below we discuss environmental pollutants and toxins and their potential impacts to oceanic whitetip sharks.

Pollution and Toxins

Environmental pollutants may have negative impacts on the oceanic whitetip shark, but this has not yet been demonstrated by any scientific study. Many pollutants in the environment, such as brevotoxins, heavy metals, and polychlorinated biphenyls (PCBs), have the ability to bioaccumulate in fish species. A number of studies have shown that because of the higher trophic level position and longevity of some sharks, these pollutants tend to biomagnify in liver, gill, and muscle tissues (Storelli *et al.,* 2003; García-Hernández *et al.,* 2007; Escobar-Sanchez *et al.,* 2010; Gelsleichter and Walker 2010; Lee *et al.,* 2015). These studies have also attempted to quantify the concentration levels of these pollutants in fish species, but with a focus on human consumption and safety. As such, many of the results from these studies may indicate either "high" or "low" concentrations in fish species, but this is primarily in comparison to recommended safe concentrations for human consumption and does not necessarily infer any impact on the biological status of the species. Most reports of pollutant concentrations in elasmobranch tissues that exceed safe limits for animal health and/or human consumption are restricted to a small number of large upper trophic level sharks (Gelsleichter and Walker 2010). In fact, only one study exists that analyzed the pollutant composition of a liver oil sample from an oceanic whitetip shark, which was an amalgamated liver oil sample that also included two other shark species (silky *C. falciformis* and nurse *Ginglymostoma cirratum* sharks). This sample was used to analyze levels of dioxins and dioxin-like PCBs and found very high levels of both of these pollutants in the tested liver oil (Cruz-Nuñez *et al.,* 2009). Based on a comparison of levels found in smooth hammerhead sharks (which were much lower) (Storelli *et al.,* 2003), the levels found in oceanic whitetip shark may have a high potential for causing PCB effects in the species, as these levels that would likely exceed threshold levels of PCBs for some cell- and molecular-level effects seen in aquatic vertebrates (Gelsleichter and Walker, 2010). However, the aquatic vertebrate threshold levels referenced in Gelsleichter and Walker (2010) originate from a study on the California sea otter (Kannan *et al.,* 2000), and, at this time, there is no information to confirm that PCB threshold levels in marine mammals are comparable to threshold levels for shark species. Specifically, threshold PCB concentrations at which detrimental effects may occur in cartilaginous fish are virtually unknown (Gelsleichter and Walker, 2010). In fact, it is hypothesized that sharks can actually handle higher body burdens of anthropogenic toxins due to the large size of their livers which "provides a greater ability to eliminate organic toxicants than in other fishes" (Storelli *et al*. 2003) or may even be able to limit their exposure by sensing and avoiding areas of high toxins (like during *K. brevis* red tide blooms) (Flewelling *et al.,* 2010). The large size and vast lipid stores in the elasmobranch liver provide the capacity for a substantial sequestration of lipophilic contaminants.

Overall, although oceanic whitetip sharks are likely exposed to a number of pollutants and contaminants in their habitat that have the potential to cause negative physiological impacts to the species, the effects of these pollutants in oceanic whitetip shark populations and potential risk to the viability of the species remain unknown. In fact, there is no information on the lethal concentration limits of toxins or metals in oceanic whitetip sharks or evidence to suggest that current concentrations of environmental pollutants are causing detrimental physiological effects to the point where the species may be at an increased risk of extinction. As such, the best available information does not indicate that the present bioaccumulation rates and concentrations of environmental pollutants in the tissues of oceanic whitetip sharks are significant threats to the species, such that it substantially increases the species' risk of extinction throughout its global range.

5. EXTINCTION RISK ANLAYSIS

5.1 Introduction

The Endangered Species Act (ESA) (Section 3) defines endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range." Threatened species is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Neither the National Marine Fisheries Service (NMFS) nor the U.S. Fish and Wildlife Service (USFWS) have developed any formal policy guidance about how to interpret the definitions of threatened or endangered species in the ESA. In many previous NMFS status reviews, a team has been convened, often referred to as a "Biological Review Team," in order to compile the best available information on the species and conduct a risk assessment through evaluation of the demographic risks, threats, and extinction risk facing the species or distinct population segment (DPS). This information is ultimately used by the NMFS Office of Protected Resources, after consideration of the legal and policy dimensions of the ESA standards and benefits of ongoing conservation efforts, to make a listing determination. For purposes of this risk assessment, an Extinction Risk Analysis (ERA) team, comprised of fishery biologists, managers, and shark experts, was convened to review the best available information in this Status Review document and evaluate the overall risk of extinction facing the oceanic whitetip shark.

5.2 Distinct Population Segments

Criteria for Identification of Distinct Population Segments

Under the ESA, a listing determination may address a "species," which is defined to also include subspecies and, for any vertebrate species, any DPS that interbreeds when mature (16 U.S.C. 1532(16)). The joint policy of the USFWS and NMFS provides guidelines for defining DPSs below the taxonomic level of species (61 FR 4722; February 7, 1996). The policy identifies two elements to consider in a decision regarding whether a population qualifies as a DPS: discreteness and significance of the population segment to the species.

Discreteness

A DPS may be considered discrete if it is markedly separate from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors, or if it is delimited by international governmental boundaries. Genetic differences between the population segments being considered may be used to evaluate discreteness.

Significance

If a population segment is considered discrete, its biological and ecological significance must then be evaluated. Significance is evaluated in terms of the importance of the population segment to the overall welfare of the species. Some of the considerations that can be used to determine a discrete population segment's significance to the taxon as a whole include:

1) Persistence of the population segment in an unusual or unique ecological setting;
2) Evidence that loss of the population segment would result in a significant gap in the range of the taxon; and
3) Evidence that the population segment differs markedly from other populations of the

species in its genetic characteristics.

However, NMFS determined at the 90-day finding stage that the petition to list the oceanic whitetip shark was warranted for the global species. As such, we (the ERA team) conducted the extinction risk analysis on the global oceanic whitetip shark population.

5.3 Extinction Risk Analysis

The ability to measure or document risk factors to a marine species is often limited, where quantitative estimates of abundance and life history information are often lacking altogether. Therefore, in assessing extinction risk of a data limited species, it is important to include both qualitative and quantitative information. In previous NMFS status reviews, Biological Review Teams have used a risk matrix method to organize and summarize the professional judgment of a panel of knowledgeable scientists. This approach is described in detail by Wainright and Kope (1999) and has been used in Pacific salmonid status reviews as well as in reviews of Pacific hake, walleye pollock, Pacific cod, Puget Sound rockfishes, Pacific herring, and black abalone (see http://www.nmfs.noaa.gov/pr/species/ for links to these reviews). In the risk matrix approach, the condition of the species is summarized according to four demographic risk criteria: abundance, growth rate/productivity, spatial structure/connectivity, and diversity. These viability criteria, outlined in McElhany *et al*. (2000), reflect concepts that are well-founded in conservation biology and that individually and collectively provide strong indicators of extinction risk. Using these concepts, the ERA team estimated the extinction risk of the oceanic whitetip shark after conducting a demographic risk analysis. Likewise, the ERA team performed a threats assessment for the species by scoring the severity of current threats to the species and their impact on the species through the foreseeable future. The summary of the demographic risks and threats obtained by this approach was then considered by the ERA team in determining the species' overall level of extinction risk. Specifics on each analysis for the species are provided below.

Foreseeable future – ERA team discussion

For the purpose of this extinction risk analysis, the term "Foreseeable future" was defined as the timeframe over which threats can be predicted reliably to impact the biological status of the species. In determining an appropriate "foreseeable future" timeframe, we first considered the life history of the oceanic whitetip shark. The most recent longevity estimate for the oceanic whitetip is approximately 20 years (Rodrigues *et al*. 2015). Generation time, which is defined as the time it takes, on average, for a sexually mature female oceanic whitetip shark to be replaced by offspring with the same spawning capacity, is estimated to be around 11 years (Smith *et al*. 2008). As a long-lived species that matures relatively late, has relatively slow growth rates and low to moderate productivity, it would likely take several generation times for any conservative management action to be realized and reflected in population abundance indices. Thus, we determined that 30 years would reflect the species' life history and encompass 3 generation times. We then discussed whether we could confidently predict the impact of threats on the species out to 30 years and agreed that since the main threats to the species were likely fisheries and the regulatory measures that manage these fisheries, we had the background knowledge and

expertise to confidently predict the impact of these threats on the biological status of the species within this timeframe. For the foregoing reasons, we agreed that a biologically reasonable foreseeable future timeframe would be 30 years for the oceanic whitetip.

Methods

Demographic Risks Analysis

After reviewing all relevant biological and commercial information for the species, including: current abundance of the species in relation to historical abundance and trends in abundance based on indices such as catch statistics; the species growth rate and productivity in relation to other species and its potential effect on survival rates; its spatial and temporal distribution; natural and human-influenced factors that cause variability in survival and abundance; and possible threats to genetic integrity; each ERA team member assigned a risk score to each of the four demographic criteria (abundance, growth rate/productivity, spatial structure/connectivity, diversity). Risks for each demographic criterion were ranked on a scale of 0 (unknown risk) to 3 (high risk). Below are the definitions that the team used for each ranking:

> 0 = Unknown: The current level of information is either unavailable or unknown for this demographic factor, such that the contribution of this factor to the extinction risk of the species cannot be determined.
>
> 1 = Low risk: It is unlikely that the particular factor contributes or will contribute significantly to the species' risk of extinction.
>
> 2 = Moderate risk: It is likely that the particular factor contributes or will contribute significantly to the species' risk of extinction.
>
> 3 = High risk: It is highly likely that the particular factor contributes or will contribute significantly to the species' risk of extinction.

The team members were given a template to fill out and asked to rank the risk of each demographic factor. After scores were provided, the team discussed the range of perspectives for each of the demographic risks and the supporting data on which they were based, and was given the opportunity to revise scores if desired after the discussion. The scores were reviewed by the ERA team and considered in making the overall risk determination, which is presented at the end of this section. Although this process helps to integrate and summarize a large amount of diverse information, there is no simple way to translate the risk matrix scores directly into a determination of overall extinction risk. Thus, it should be emphasized that this exercise was used simply as a tool to help the ERA team members organize the information and assist in their thought processes for determining overall risk of extinction for the species. Other descriptive statistics, such as mean, variance, and standard deviation, were not calculated as the ERA team felt these metrics would add artificial precision or accuracy to the results.

Table 3 Template for the Demographics Risk Analysis Worksheet used in ERA team deliberations. The matrix is divided into four sections that correspond to the parameters for assessing population viability (McElhany *et al.* 2000).

Name	*Abundance*	Notes	*Growth/ Productivity*	Notes	*Spatial Structure/ Connectivity*	Notes	*Diversity*	Notes

Threats Assessment

Section 4(a)(1) of the ESA requires the agency to determine whether the species is endangered or threatened because of any of the following factors:

1) destruction or modification of habitat;
2) overutilization for commercial, recreational, scientific, or educational purposes;
3) disease or predation;
4) inadequacy of existing regulatory mechanisms; or
5) other natural or human factors

Similar to the demographics risk analysis, the ERA team members were given a template to fill out and asked first to determine the relative importance of each identified potential threat in terms of whether that threat rose to the level of having any impact on the extinction risk of the species. Below are the relative importance levels of the threats.

0 = It is unknown whether this is a threat to the species
1 = It is unlikely that this is a threat to the species
2 = It is likely that this is a threat to the species
3 = It is highly likely that this is a threat to the species

The ERA team members were then asked to rank each threat in terms of the magnitude of impact each threat has on the extinction risk of the species. Below are the specific definitions of the threat effect levels:

0 = Unknown: The current level of information is either unavailable or unknown for this particular threat, such that the contribution of this threat to the extinction risk of the species cannot be determined.
1 = Low: It is unlikely that this factor contributes significantly to risk of extinction.
2 = Moderate: This factor contributes significantly to long-term risk of extinction, but does not in itself constitute a danger of extinction in the near future.
3 = High: This factor contributes significantly to long-term risk of extinction and is likely to significantly contribute to short-term risk of extinction.

After scores were provided, the team discussed the range of perspectives for each of the threats, and the supporting data on which they were based, and was given the opportunity to revise scores if desired after the discussion. The scores were then reviewed by the ERA team and considered in making the overall risk determination that is presented at the end of this section. Again, it should be emphasized that this exercise was used simply as a tool to help the ERA team members organize the information and assist in their thought processes for determining the overall risk of extinction for the oceanic whitetip shark.

Table 4 Template for the threats assessment used in ERA team deliberations.

ESA Factor 4(a)	Threat	Relative importance of threat	Likelihood of impact on trajectory of species	Rationale
Habitat destruction, modification or curtailment	Loss or degradation of habitat			
Overutilization	Bycatch (incl. at-vessel and post-release mortality) Shark trade			
Disease, predation				
Inadequacy of existing regulatory mechanisms	Current regulations			
Other natural or manmade factors	Climate change			

Overall Level of Extinction Risk Analysis

Guided by the results from the demographics risk analyses as well as the threats assessments, the ERA team members used their informed professional judgment to make an overall extinction risk determination for both species. For these analyses, the ERA team defined three levels of extinction risk:

> 1 = Low risk: A species or DPS is at low risk of extinction if it is not at moderate or high level of extinction risk (see "Moderate risk" and "High risk" above). A species or DPS may be at low risk of extinction if it is not facing threats that result in declining trends in abundance, productivity, spatial structure, or diversity. A species or DPS at low risk of extinction is likely to show stable or increasing trends in abundance and productivity with connected, diverse populations.
>
> 2 = Moderate risk: A species or DPS is at moderate risk of extinction if it is on a trajectory that puts it at a high level of extinction risk in the foreseeable future (see description of "High risk" above). A species or DPS may be at moderate risk of extinction due to projected threats or declining trends in abundance, productivity, spatial structure, or diversity. The appropriate time horizon for evaluating whether a species or DPS is more likely than not to be at high risk in the foreseeable future depends on various case- and species-specific factors.
>
> 3 = High risk: A species or DPS with a high risk of extinction is at or near a level of abundance, productivity, spatial structure, and/or diversity that places its continued persistence in question. The demographics of a species or DPS at such a high level of risk may be highly uncertain and strongly influenced by stochastic or depensatory processes. Similarly, a species or DPS may be at high risk of extinction if it faces clear and present threats (e.g., confinement to a small geographic area; imminent destruction, modification, or curtailment of its habitat; or disease epidemic) that are likely to create present and substantial demographic risks.

To allow individuals to express uncertainty in determining the overall level of extinction risk facing the oceanic whitetip, the ERA team adopted the "likelihood point" (FEMAT) method (see Table 3 below for template). This approach has been used in previous status reviews (e.g., Pacific salmon, Southern Resident Killer Whale, Puget Sound Rockfish, Pacific herring, and black abalone) to structure the team's thinking and express levels of uncertainty in assigning threat risk categories. For this approach, each team member distributed 10 'likelihood points' among the three extinction risk levels. After scores were provided, the team discussed the range of perspectives for the species, and the supporting data on which it was based, and was given the opportunity to revise scores if desired after the discussion.

Finally, the ERA team did not make recommendations as to whether the oceanic whitetip shark should be listed as threatened or endangered. Rather, the ERA team drew scientific conclusions

about the overall risk of extinction faced by the species under present conditions and in the foreseeable future based on an evaluation of the species' demographic risks and assessment of threats.

Table 5 Template for the overall level of extinction risk analysis used in ERA team deliberations.

	1 = Low risk	2 = Moderate Risk	3= High Risk	Rationale
Number of likelihood points				

ERA Team's Extinction Risk Results and Conclusion for the Oceanic Whitetip Shark

Evaluation of Demographic Risks

Out of the four demographic factors analyzed in this ERA, we identified abundance as most concerning in terms of demographic risks that may contribute to the extinction risk of the oceanic whitetip shark. The other demographic factors, including growth rate/productivity, spatial structure/connectivity, and diversity also garnered some concern by the ERA team. Below is a brief discussion of the rationale for our ERA team's conclusions regarding the demographic risk assessment for the oceanic whitetip shark.

Abundance

While there is currently no reliable global population size estimate for the oceanic whitetip shark, the ERA team evaluated numerous sources of information, including the results of a recent stock assessment and several other abundance indices including: trends in occurrence and composition in fisheries catch data, CPUE, and biological indicators to assess current abundance and trends. The ERA team agreed that while the oceanic whitetip shark was historically one of the most abundant and ubiquitous shark species in tropical seas around the world, numerous lines of evidence suggest the species has not only undergone significant historical declines throughout its range, but likely continues to experience declines in abundance globally.

In the Eastern Pacific, oceanic whitetip sharks were historically the third most abundant shark species after blue sharks (*P. glauca*) and silky sharks (*C. falciformis*), and comprised approximately 20% of the total shark catch in the tropical tuna purse seine fishery. However, both nominal catches and encounters with oceanic whitetip sharks in all set types in the purse seine fishery have declined significantly since 1994. In fact, these declines are compatible with an 80-95% population decline compared to the late 1990s, and the species has virtually disappeared from the fishing grounds (Hall and Roman 2013). Similar levels of decline have also been observed throughout the Western and Central Pacific Ocean. Like the Eastern Pacific, the

oceanic whitetip shark was once one of the most abundant pelagic shark species throughout the Western and Central Pacific Ocean, comprising up to 28% of the shark catch during the 1950s (Strasburg 1958). A recent stock assessment conducted in the Western and Central Pacific estimated an 86% decline in spawning biomass from 1995 to 2009, with total biomass reduced to just 6.6% of the theoretical equilibrium virgin biomass (Rice and Harley 2012). An updated assessment analyzing various abundance indices, including standardized CPUE, concluded that the oceanic whitetip shark continues to decline throughout the tropical waters of the Western and Central Pacific (Rice *et al*. 2015), indicating a severely depleted population of oceanic whitetip across the region with observations of the species becoming increasingly rare. Similar results were found in analyses of CPUE data from the Hawaii-based pelagic longline fishery, where oceanic whitetip shark showed a decline in relative abundance on the order of 90% (Clarke *et al.,* 2012; Brodziak *et al.,* 2013). An update of this time series conducted by the ERA team in this report indicates a relative stability in the population size at the post-decline depressed state with no signs of recovery. The ERA team agreed that the levels of significant population decline observed in these studies indicate that these declines are not just local or regional, but rather a Pacific-wide phenomenon, with no significant indication that these trends have reversed.

Similar levels of historical decline have been observed for oceanic whitetip sharks in the Atlantic Ocean. While there is some debate regarding the exact magnitude of decline in the Northwest Atlantic, the best available data indicates that the oceanic whitetip experienced a significant historical decline ranging from 50-88% (Baum *et al.,* 2003; Baum and Myers 2004; Cortés *et al.,* 2007). In order to discern the species' current abundance trend in this area, we conducted an analysis of the most recent observer data from the U.S. Northwest Atlantic Pelagic Longline Fishery from 1992-2015. We determined that the population experienced a small decline of 4% over the time series, with the overall trend indicative that the population may have stabilized. An earlier analysis of the same data series from 1992-2005 showed a 9% decline in abundance (Cortés *et al.,* 2007). Farther south, while robust abundance data is lacking in the South Atlantic, the best available information, including analyses of fisheries data from 1980-2011, indicate the oceanic whitetip shark has undergone at least an 85% decline (Santana *et al.,* 2004; ICMBio; Barreto *et al.,* 2015). In addition, demographic analyses from the largest oceanic whitetip shark catching country in the South Atlantic (i.e., Brazil) indicate declines similar to the Northwest Atlantic of 50-79% in recent decades, though some of this decline may be attributed to a shift in effort distribution to more temperate waters since 2006. Elsewhere across the South Atlantic, the oceanic whitetip shark appears to be relatively rare, with low patchy abundance. Overall, the ERA team determined that while the Northwest Atlantic population of oceanic whitetip shark has likely begun to stabilize, it is at a significantly diminished abundance. Elsewhere in the Atlantic, the ERA team agreed that declines of oceanic whitetip shark are likely ongoing, although we acknowledge some uncertainty regarding the available data from this region.

Abundance information from the Indian Ocean is relatively deficient and unreliable. However, historical research data shows overall declines in both CPUE and mean weight of oceanic whitetip sharks, with anecdotal reports suggesting that the species has become rare throughout much of the Indian Ocean over the past 20 years (Romanov *et al.,* 2008). In addition, the IOTC

reports that despite limited data, oceanic whitetip shark abundance has likely declined significantly over recent decades. Quantitative studies on various fisheries operating in the Indian Ocean indicate population declines ranging from 25-90%. Despite the varying magnitudes of reported declines, the ERA team agreed that given the high fishing pressure and catches of oceanic whitetip shark in the Indian Ocean (which are likely severely underreported), combined with the species' high at-vessel mortality rates in longlines in this area and the species' low-moderate productivity, it is likely that the species will continue to experience population declines in this region into the foreseeable future.

Overall, in areas where oceanic whitetip shark data are available, trends from throughout the species' global range show large historical declines in abundance (e.g., Eastern Pacific, Western and Central Pacific, Atlantic and Indian Oceans). Recent evidence suggests that most populations are still experiencing various levels of decline due to continued fishing pressure and associated mortality. The potential stabilization of the abundance trends at depleted levels seen in pelagic longline observer data from the Northwest Atlantic and Hawaiian pelagic longline fisheries represents a small contingent of the global population and has not shown any signs of recovery. Thus, the best available data included in this Status Review document suggest that the global population of oceanic whitetip continues to experience various levels of decline throughout the majority of its range.

Growth rate/productivity

The ERA team noted that this species has some life history parameters that are typically advantageous, and some that are likely detrimental to the species' resilience to excessive levels of exploitation. For example, in comparison to other shark species, the oceanic whitetip is relatively productive, with an intrinsic rate of population increase (r) of 0.121 per year (Cortés *et al*. 2012). The oceanic whitetip also ranked among the highest in productivity when compared with other pelagic shark species in terms of its pup production, rebound potential, potential for population increase, and for its stochastic growth rate (Chapple and Botsford 2013). However, although the oceanic whitetip shark has a relatively high productivity rate relative to other sharks, it is still considered low for a fish species ($r < 0.14$). Additionally, the species has a fairly late age of maturity (~6-9 years for females depending on the location), has a lengthy gestation period of 9-12 months, and only produces an average of 5-6 pups every two years. Thus, while this species may generally be able to withstand low to moderate levels of exploitation, given the high level of fishing mortality this species has and continues to experience throughout the majority of its range, its life history characteristics may only provide the species with a limited ability to compensate. Therefore, based on the best available information, the ERA team concluded that these life history characteristics likely pose a risk to this species in combination with threats that reduce its abundance, such as overutilization.

Spatial structure/connectivity

The oceanic whitetip shark is a relatively widespread species that may be comprised of distinct stocks in the Pacific, Indian, and Atlantic oceans. The population exchange between these stocks is unknown; however, based on genetic information, telemetry data, and temperature preferences

it is unlikely that there is much exchange between populations in the Atlantic and Indo-Pacific Oceans. However, recent genetic data suggests potentially significant population structure within the Atlantic, which may be underpinned by the fact that this species exhibits a high degree of philopatry in some locations (i.e., the species returns to the same site for purposes of breeding or feeding, etc). For example, the population structure observed in the Atlantic, despite no physical or oceanographic barrier, could result in localized depletions in areas where fishing pressure is high. However, habitat characteristics that are important to this species are unknown. The species is highly mobile, and there is little known about specific migration routes. It is also unknown if there are source-sink dynamics at work that may affect population growth or species' decline. There is no information on critical source populations to suggest spatial structure and/or loss of connectivity are presently posing demographic risks to the species. Thus, based on the best available information, there is insufficient information to support the conclusion that spatial structure and connectivity currently pose a significant demographic risk to this species.

Diversity

Preliminary research suggests the oceanic whitetip has low genetic diversity (0.33% ± 0.19%; Ruck 2016; Camargo *et al*. 2016), which is about half that of silky sharks (0.61% ± 0.32%; Clarke *et al.,* (2015a)). The ERA team noted that the relatively low mtDNA genetic diversity of the oceanic whitetip raises potential concern for the future genetic health of this species, particularly in concert with steep global declines in abundance. Based on the fact that exploitation of the oceanic whitetip shark began with the onset of industrial fishing in the 1950s, only 5-7 generations of oceanic whitetip have passed since the beginning of this exploitation. Thus, the low genetic diversity of oceanic whitetip shark likely reflects historical levels, and the significant global declines are not yet reflected genetically (Ruck 2016). The ERA team noted that this may be a cause for concern in the foreseeable future, since a species with already relatively low genetic diversity undergoing significant levels of exploitation may increase the species' risk in terms of evolutionary adaptability to a rapidly changing oceanic environment as well as potential extirpations (Camargo *et al*., 2016). However, the ERA team also noted that low genetic diversity does not necessarily equate to a risk of extinction in and of itself for all species; but, in combination with low levels of abundance and continued exploitation, low genetic diversity may pose a viable risk to the species in the foreseeable future.

Threats Assessment

Out of the five ESA section 4(a)(1) factors, based on the best available information, we identified overutilization and inadequate regulatory mechanisms as most concerning in terms of threats that may contribute to the extinction risk of the species. The other factors, including habitat destruction, modification, or curtailment; disease and predation; and other natural or manmade factors were not identified as threats to the species. Below is a brief discussion of the rationale for our ERA team's conclusions regarding the threats assessment for the oceanic whitetip shark.

Habitat Destruction, Modification, or Curtailment

The ERA team did not identify habitat destruction, modification, or curtailment as a threat that contributes significantly to the species' risk of extinction. The ERA team emphasized that the oceanic whitetip shark is a highly migratory, pelagic species of shark that likely spends much of its lifecycle in the open ocean. As such, the oceanic whitetip shark is likely more confined by temperature and prey distributions, and is not reliant on any particular habitat type that would be affected by threats such as climate change or physical destruction, etc. Additionally, due to their highly migratory nature, they can modify their distributional range to remain in an environment conducive to their physiological and ecological needs. The oceanic whitetip shark is also an extremely opportunistic feeder. It is therefore very unlikely that the loss or degradation of any particular habitat type would have a substantial effect on the oceanic whitetip population. As a result, and given the best available information, the ERA team concluded that habitat destruction, modification, or curtailment is not a threat that contributes to the species' extinction risk, now or in the foreseeable future.

Overutilization

The ERA team concluded that overutilization is the single most important threat contributing to the extinction risk of the oceanic whitetip shark globally. The ERA team assessed various factors that may contribute to the overutilization of the oceanic whitetip shark, including incidental bycatch in commercial fisheries (considering impacts of at-vessel and post-release mortality), retention and finning for purposes of the international fin trade, and impacts of IUU fishing. The oceanic whitetip shark is generally not a targeted species, but because of its tendency to remain in surface waters (0-152 m depth) and in tropical latitudes where fishing pressure is often most concentrated for target species such as tuna, the species is frequently encountered and suffers high mortality rates in numerous fisheries throughout its global range. Although the ERA team recognized that the oceanic whitetip shark has relatively lower at-vessel mortality rates in longlines than other shark species, the species still exhibits a range of mortality from 11-28% in the Atlantic to upwards of 60% in the Indian Ocean (Fernandez-Carvalho *et al*. 2015; IOTC 2015b), and these rates do not account for post-release mortality. In addition to bycatch-related mortality, the oceanic whitetip shark is a preferred species for retention because its large fins obtain a high price per kg in the Asian fin market, and comprises approximately 2% of the global fin trade (Clarke *et al.,* 2006a). This high value and demand for oceanic whitetip fins incentivizes the retention and subsequent finning of oceanic whitetip sharks when caught, and thus represents the main economic driver of mortality of this species in commercial fisheries throughout its global range. In fact, growth in demand from the fin trade during the 1990s coincided with a pattern of soaring catches of oceanic whitetip sharks in numerous fisheries across the globe. Catches generally peaked between 1995 to 2000 followed by precipitous declines over the next 10 years due to severe overfishing (Hazin *et al.,* 2007; Lawson 2011; Clarke *et al.,* 2012; Hasarangi *et al.,* 2012; Brodziak *et al.,* 2013; Hall and Román 2013).

The ERA team concluded that overutilization is likely a significant threat to the oceanic whitetip shark throughout the Pacific Ocean basin. In the Eastern Pacific, the oceanic whitetip shark was historically caught in large numbers in the tropical tuna purse seine fishery. However, in recent years, oceanic whitetip shark catches declined dramatically despite a generally increasing trend

in fishing effort (both in geographic scope and number of sets). In total, oceanic whitetip catches declined drastically from a peak of 9,000+ individuals caught in 1995 to only 120 individuals in 2015 (refer back to Figure 35). In addition, their capture probability in floating object purse seine sets (the set type responsible for 90% of catches) has decreased from a high of 30% capture rate per set between 1994 and 1998, to less than 5% from 2004 to 2008 (Morgan 2014). This is in stark contrast to catches of the closely related silky shark, which have remained relatively constant over the same time period (Hall and Roman 2013). This indicates that the large decline in catches of oceanic whitetip shark in the purse seine fishery has largely been driven by unsustainable fishing mortality. Thus, given the increase in fishing effort in the Eastern Pacific over time, combined with the decline in catches and virtual disappearance of oceanic whitetip sharks from purse seine fishing grounds in the Eastern Pacific, the ERA team agreed that the oceanic whitetip shark population in the Eastern Pacific is likely experiencing overutilization.

In the Western and Central Pacific Ocean, numerous analyses indicate that the oceanic whitetip shark is experiencing overutilization across the region. The ERA team concluded that the once ubiquitous oceanic whitetip shark has experienced significant and ongoing declines in the Western and Central Pacific Ocean as a direct result of unsustainable fishing mortality in both longline and purse seine fisheries operating in the species' core tropical habitat area. The ERA team accepted the results of a recent stock assessment report that determined fishing mortality of oceanic whitetip throughout the Western and Central Pacific has increased to levels that are 6.5 times what is sustainable. Because of this fishing mortality, oceanic whitetip biomass declined by 86% (Rice and Harley 2012). Currently, the population is overfished and overfishing is still occurring. As a result, catch trends of oceanic whitetip shark in both longline and purse seine fisheries have significantly declined, with declining trends also detected in some biological indicators, such as biomass and size indices. Similar results between analyses of SPC observer data from the larger Western and Central Pacific and the observer data from the Hawaii-based pelagic longline fishery suggest that the population decline of oceanic whitetip in this portion of its range is not just a localized trend, but rather a region-wide phenomenon across the Pacific Ocean basin. Updated analyses of the Hawaii observer data indicate a stabilized trend at depleted levels in recent years. The significant declining trends observed in all available abundance indices (e.g., standardized CPUE, biomass and median size) of oceanic whitetips occurred as a result of increased fishing effort in the longline fishery, with lesser impacts from targeted longline fishing and purse-seining. Because of the significant fishing mortality in both longline and purse seine fisheries that has contributed to large abundance declines of the species, the ERA team concluded that overutilization of the species is likely occurring throughout the Western and Central Pacific.

As discussed in the *Abundance* section above, there has been debate in the literature regarding the exact magnitude of decline of oceanic whitetip shark in the Northwest Atlantic and Gulf of Mexico (with estimates of up to 50-70% in the Northwest Atlantic from 1986-2005 and estimates of up to 88% in the Gulf of Mexico from the 1950s to the late 1990s). Nonetheless, the ERA team agreed that the oceanic whitetip shark suffered significant historical declines in abundance as a result of overexploitation since the onset of industrial fishing in the 1950s. Because these

data are largely based on fisheries logbooks and have been openly criticized in the scientific literature, the ERA team conducted its own species-specific analysis of observer data from the Northwest Atlantic, which were deemed more reliable and accurate by the ERA team than fisheries logbook data. Based on this updated analysis, the Northwest Atlantic population of oceanic whitetip shark has declined by 4% since 1992, but has likely begun to stabilize (albeit at a significantly diminished abundance). Reported landings for oceanic whitetip in the Northwest Atlantic have been variable over the last 10 years of available data, with a decrease since the implementation of ICCAT Recommendation 10-07 in 2011. This indicates that these regulatory mechanisms may be effective in reducing retention in the region. Furthermore, the Northwest Atlantic population of oceanic whitetip shark may have stabilized since the 1990s, which coincides with the first Federal Fishery Management Plan for Sharks in the Northwest Atlantic Ocean and Gulf of Mexico. The plan directly manages oceanic whitetip shark under the pelagic shark group, and includes regulations on trip limits and quotas; therefore, under current management measures, including the implementation of ICCAT Recommendation 10-07, the ERA team concluded that the threat of overutilization is not likely as significant in this area relative to other portions of the species' range.

In contrast, the ERA team agreed that overutilization is likely a significant threat to oceanic whitetip sharks in the South Atlantic, and in particular, the population that appears to show site fidelity to a specific area off the northeastern coast of Brazil. While robust quantitative studies regarding catch trends of oceanic whitetip sharks are limited, the oceanic whitetip was once one of the most abundant shark species encountered in longline fisheries in the southern and equatorial Atlantic; however, this species is now seemingly rare with low, patchy abundance across the region. Additionally, the large majority of catches across the region are comprised of immature individuals. The team considered trends in several indicators, including average CPUE, commercial catches, and size composition of oceanic whitetip that show significant declines in recent decades that are indicative of overutilization of the species. The high fishing pressure across the South Atlantic that occurred concomitantly with a lack of regulations to control fishing from the mid-1990s through the mid-2000s likely led to the overutilization of oceanic whitetip shark. The team agreed that overutilization is likely still occurring given that the highest levels of fishing effort in this region overlap significantly with the preferred vertical and horizontal habitat of the species, including potential nursery grounds and areas where the species shows a high degree of site fidelity.

Finally, the ERA team agreed that overutilization of oceanic whitetip is likely occurring in the Indian Ocean. This species is caught as bycatch in all three major commercial fisheries in the Indian Ocean, including pelagic longline, purse seine and gillnet fisheries. Although information from this region is limited and catch data are severely underreported, the IOTC reports that catches of oceanic whitetip shark are high, and comprise a significant proportion of the total estimated shark catch in this region at 11% (Murua *et al*. 2013). The oceanic whitetip also suffers from a relatively high at-vessel mortality rate in longlines in this region (i.e., 58%). In 2013, the IOTC reported average catches of ~347 t over the previous 5 years and noted that this level of catch put the oceanic whitetip population at considerable risk. The IOTC also noted that

maintaining or increasing this level of catch would likely result in further declines of the species. The ERA team noted that these conclusions were made before improved species-specific reporting of incidental catches and discards of oceanic whitetip to the IOTC was required. Once the IOTC Resolution for the conservation of oceanic whitetip shark was implemented, catch estimates for the species skyrocketed, with 5,000+ mt of oceanic whitetip shark catches estimated for 2013 and 2014. While the ERA team acknowledges a level of uncertainty with these estimates, given the significantly high level of fishing pressure in this region, the species' relatively high mortality in longline and purse seine fisheries in this region (with unknown levels of mortality in the region's gillnet fisheries), combined with the species' low-moderate productivity, the ERA team concluded that the oceanic whitetip shark is likely experiencing ongoing threats of overutilization that may contribute to continued population declines in this region into the foreseeable future.

As described in this Status Review, the main economic driver for overutilization of the oceanic whitetip shark throughout its global range has been its high value and demand in the international shark fin trade. The oceanic whitetip shark has been reported as a preferred species for the international fin trade and is a species often categorized as "first choice" in the China Hong Kong SAR fin market. The morphologically distinct oceanic whitetip fins are sold under the name "*Liu Qiu*," fetching a high price of $45-85/kg and comprising approximately 2% (by weight) of the global shark fin trade based on data from 2000. Although 2% may seem like a relatively small portion of the trade, this equated to an estimated 220,000 -1.2 million oceanic whitetip sharks traded globally in 2000. Clarke (2008) estimated 80-210,000 oceanic whitetip sharks were sourced from the Atlantic Ocean alone to supply the Hong Kong fin market in 2003. At this rate, a species with life history characteristics like the oceanic whitetip would not likely be able to sustain continued pressure of that magnitude. Recent genetic analyses of fins in markets of major shark fin exporting countries throughout the range of the species, including Taiwan, Indonesia, and UAE, confirm the continued presence of oceanic whitetip shark fins in various markets throughout its range. Although the ERA team recognizes that the situation regarding the fin trade may be improving, as evidenced by an overall decline in the fin trade and increased regulations, the recent incidents of illegal trafficking and exports of oceanic whitetip fins from places like Costa Rica, Egypt, India, Indonesia, and other locations as recently as 2017 indicate that oceanic whitetip sharks are still sought after for their fins and continue to experience pressure from demands of the fin trade. Thus, the ERA team concluded that based on the best available information, the incentive to take oceanic whitetip sharks for their fins remains high and is an ongoing threat contributing to the overutilization of the species. The ERA team also considered whether the recent shift in demand away from shark fins to shark meat would have any considerable impact on the oceanic whitetip shark. Although there are markets for low-value shark meat such as oceanic whitetip, the retention bans for the species in all relevant RFMOs will likely dampen this threat. Thus, the ERA team did not think this shift in demand from shark fins to meat would create a significant new threat to the species.

Disease or Predation

We could find no information linking disease to declines in oceanic whitetip shark populations.

Predation also does not appear to be increasing this species' risk of extinction, as the oceanic whitetip is a large shark with limited numbers of predators. Therefore, based on the best available information, we concluded that neither disease nor predation is contributing to the species' risk of extinction, now or in the foreseeable future.

Inadequacy of Existing Regulatory Mechanisms

In discussions regarding existing regulatory mechanisms for the oceanic whitetip, the ERA team noted that the most influential regulations currently in place are likely the species-specific retention prohibition measures recently implemented by all RFMOs throughout the species' range. In fact, the oceanic whitetip shark is currently the only shark species protected by RFMO's in all oceans, which underscores the conservation needs of the species. In addition, the oceanic whitetip was also recently added to Appendix II of CITES, which went into effect in 2014. However, the team emphasized the difficulty in analyzing the efficacy of these regulations, as many have been in place for only a couple of years and implementation and enforcement across international boundaries are likely highly variable and/or lacking altogether. Despite this difficulty, the ERA team largely agreed that these prohibition measures may only be partially effective and thus inadequate for significantly reducing the threat of overutilization to the species.

For all of the retention prohibitions enacted by RFMOs, the ERA team acknowledged that these measures do not prevent oceanic whitetip sharks from being caught or any at-vessel and post-release mortality that may result. For example, the ERA team agreed that the retention prohibition enacted for oceanic whitetip sharks in the Eastern Pacific would not likely be effective for the tropical tuna purse seine fishery (the main fishery that catches this species in this region), as individuals probably suffer from high mortality rates in this fishery, even if they are released. In the Western and Central Pacific, observations from the longline fishery have shown that CMM 2011-04 for the retention prohibition of oceanic whitetip is not being strictly followed (or not yet fully implemented), with non-negligible proportions of oceanic whitetips still being retained or finned. In fact, more oceanic whitetip sharks were retained in 2013 (the first year of the CMM) than 2012 in the longline fishery (Rice *et al*., 2015). The ERA team agreed that despite the increasing management measures in this region, given the severely depleted state of the oceanic whitetip population, less-than-full implementation erodes the benefits of any mitigation measures. In the Indian Ocean, the ERA team expressed significant concern regarding the inadequacy of management measures. In particular, the IOTC's Resolution 13-06 on the retention prohibition of oceanic whitetip shark is limited in terms of its scope and effectiveness. This is because the IOTC Resolution 13-06 is not binding on India (one of the main oceanic whitetip shark catching countries identified by the IOTC), does not apply to artisanal fisheries operating within their EEZs for the purposes of local consumption, and does not explicitly prohibit selling or offering for sale any oceanic whitetip products.

We noted that in some locations, regulatory measures may be effective for reducing the threat of overutilization. For example, in the U.S. Northwest Atlantic and Pacific Island States and

Territories, oceanic whitetip sharks are managed under comprehensive management plans and regulations. In Hawaii for example, finning regulations have resulted in a significant decline in the number of oceanic whitetip sharks finned and an increase in the number of sharks released alive. In the Northwest Atlantic, oceanic whitetip sharks are managed under the pelagic species complex of the Atlantic HMS FMP, with commercial quotas imposed that restrict the overall level of oceanic whitetip sharks taken in this part of its range. Pelagic longline gear is heavily managed and strictly monitored. The use of pelagic longline gear (targeting swordfish, tuna and/or shark) also requires specific permits, with all required permits administered under a limited access program. Presently, no new permits are being issued; thus, persons wishing to enter the fishery may only obtain these permits by transferring the permit from a permit holder who is leaving the fishery, and are currently subject to vessel upgrading restrictions. These national regulations, as detailed in the 2006 Consolidated HMS FMP and described in this Status Review Report, combined with ICCAT's Recommendation 10-07 on the retention prohibition of oceanic whitetip shark have likely led to the recent stabilization of the Northwest Atlantic population. In contrast, the ERA team had significant concerns regarding the inadequacy of regulatory mechanisms in the South Atlantic, and in particular, the most significant oceanic whitetip shark catching country in the region (i.e., Brazil). Specifically, the ERA team expressed concern regarding the end of systematic data collection in 2012 from fleets fishing over Brazilian jurisdiction, and the cancellation of onboard observer programs, which renders any further monitoring of South Atlantic shark populations difficult or impossible.

The ERA team also deemed inadequate regulations to control for overutilization via the shark fin trade a concern, because the shark fin trade has and continues to be the main economic driver for retention and mortality of oceanic whitetip shark in commercial fisheries throughout the globe. As noted previously in the *Overutilization* section above, the ERA team recognized that the situation regarding the fin trade is showing a general improvement, with recent studies indicating a decline in the shark fin market due to a waning interest in fins and an increase in regulations to curb shark finning. For example, many countries and RFMOs have implemented shark finning bans or have prohibited the sale or trade of shark fins or products (as described in detail in this Status Review document), with declining trends in finning and catches of oceanic whitetip sharks evident in some locations as a result of these regulations (e.g., Fiji, Australia and the United States). In fact, the trade in shark fins through China, Hong Kong Special Administrative Region (SAR), which has served as an indicator of the global trade for many years, rose by 10% in 2011 but fell by 22% in 2012. Additionally, current indications are that the shark fin trade through Hong Kong SAR and China will continue to contract (Dent and Clarke 2015). However, despite the slight improvement regarding the decline of the shark fin trade, the ERA team expressed concern that the high demand for oceanic whitetip fins is ongoing, as evidenced by recent genetic studies that confirm the presence of oceanic whitetip shark fins in several markets throughout its range, as well as several incidents of illegal finning and trafficking of oceanic whitetip fins in places like Indonesia and Costa Rica. Additionally, while the species was listed under Appendix II of CITES in 2014, there have since been several shipments of oceanic whitetip fins confiscated upon entry into Hong Kong due to a lack of proper permitting paperwork from the countries of

origin. Based on the foregoing information, the ERA team concluded that despite national and international protections for oceanic whitetip, illegal finning and exportation activities are ongoing. As such, and based on the best available information, existing regulatory mechanisms to control for overutilization by the shark fin trade are likely inadequate to significantly reduce this threat to the oceanic whitetip shark at this time.

Other Natural or Manmade Threats

The ERA team did not identify any other natural or manmade threats that may affect the continued existence of the oceanic whitetip shark. As described in this Status Review, although oceanic whitetip sharks are likely exposed to a number of pollutants and contaminants in their habitat that have the potential to cause negative physiological impacts to the species, the effects of these pollutants in oceanic whitetip shark populations and potential risk to the viability of the species remain unknown. In fact, there is no information on the lethal concentration limits of toxins or metals in oceanic whitetip sharks or evidence to suggest that current concentrations of environmental pollutants are causing detrimental physiological effects to the point where the species may be at an increased risk of extinction. As such, the best available information does not indicate that the present bioaccumulation rates and concentrations of environmental pollutants in the tissues of oceanic whitetip sharks are significant threats to the species, such that it substantially increases the species' risk of extinction throughout its global range.

Overall Risk Summary

Guided by the results and discussions from the demographics risk analysis and threats assessment, we analyzed the overall risk of extinction to the global oceanic whitetip shark population. In this process, the ERA team considered the best available scientific and commercial information regarding the oceanic whitetip shark from all regions of the species' global range, and analyzed the collective condition of these populations to assess the species' global extinction risk. The following table gives the results of our likelihood point distributions. Likelihood points were tallied and the totals (n = 60) are presented for the overall level of extinction risk.

Table 6 Results of the ERA team's overall extinction risk analysis

Overall Level of Extinction Risk for the Oceanic Whitetip Shark			
	1 = Low risk	2 = Moderate risk	3= High risk
# of Likelihood Points	20	34	6

The ERA team was fairly confident in determining the overall level of extinction risk for the oceanic whitetip shark, placing the majority of our likelihood points in the "moderate risk" category. Due to some uncertainty regarding abundance trends and catch data for populations in certain areas (e.g., South Atlantic and Indian Ocean), as well as stabilizing trends observed in two areas (e.g., Northwest Atlantic and Hawaii), the team expressed uncertainty by placing some of their likelihood points in the "low risk" and "high risk" categories as well.

During discussions, the ERA team reiterated that the once abundant and ubiquitous oceanic whitetip shark has likely experienced significant historical population declines throughout its global range, with multiple data sources and analyses, including a stock assessment and trends in relative abundance, suggesting declines in excess of 80% in most areas. The ERA team concluded that declining abundance trends of varying magnitudes are likely ongoing in all three ocean basins. The ERA team noted that the species' ability to avoid extirpation in the Northwest Atlantic and Hawaii after significant declines and persist at a low population size, likely precludes the species from a current high risk of extinction. However, the ERA team noted that the most significant threat to the continued existence of the oceanic whitetip shark in the foreseeable future is ongoing and significantly high rates of fishing mortality driven by demands of the international trade in shark fins and meat, as well as impacts related to incidental bycatch and IUU fishing. The team emphasized that the oceanic whitetip shark's vertical and horizontal distribution significantly increases its exposure to industrial fisheries, including pelagic longline and purse seine fisheries operating within the species' core tropical habitat throughout its global range. In addition to declines in oceanic whitetip catches throughout its range, there is also evidence of declining average size over time in some areas, which is particularly concerning given that litter size has been shown to be correlated with maternal length. With such extensive declines in the species' global abundance and the ongoing threat of overutilization, the species' slow growth and low fecundity may limit its ability for compensation. Related to this, the low genetic diversity of oceanic whitetip is also cause for concern and a viable risk over the foreseeable future for this species. This is particularly concerning since it is possible (though uncertain) that a reduction in genetic diversity following the large reduction in population size due to overutilization has not yet manifested in the species. Loss of genetic diversity can lead to reduced fitness and a limited ability to adapt to a rapidly changing environment, thus increasing the species' overall risk of extinction.

Finally, the species' extensive distribution, ranging across entire oceans and across multiple international boundaries complicates management of the species. The ERA team agreed that implementation and enforcement of management measures that could reduce the threat of overutilization to the species are likely highly variable and/or lacking altogether across the species' range. The ERA team acknowledged a significant increase in species-specific management measures to control for overutilization of oceanic whitetip shark across its range; however, the ERA team also noted that most of these regulations, particularly the retention prohibitions enacted by all relevant RFMOs throughout the range of the species, are too new to truly determine their efficacy in reducing mortality of oceanic whitetip shark. Despite this limitation, and with the exception of the Northwest Atlantic and Pacific Island States and Territories, the ERA team was not confident in the adequacy of these regulations to reduce the threat of overutilization and prevent further abundance declines in the foreseeable future. First, the ERA team discussed the fact that retention prohibitions do not prevent at-vessel and post-release mortality, which is likely high in some fisheries. In addition, the biggest concern to the ERA team with regard to these regulatory mechanisms going forward is the lack of full implementation and enforcement. The ERA team noted that proper implementation and

enforcement of these regulations would likely result in a reduction in overall mortality of the species over time. However, the best available information suggests that this may not currently be the case. Given the species' depleted state throughout its range, the ERA team agreed that less than full implementation and enforcement of current regulations is likely undermining any conservation benefit to the species.

Based on all of the foregoing information, which represents the best scientific and commercial data available regarding current demographic risks and threats to the species, the ERA team concluded that the oceanic whitetip shark currently has a moderate risk of extinction. We concluded that the species does not currently have a high risk of extinction because of the following: (1) the species has a significantly broad distribution and does not seem to have been extirpated in any region, even in areas where there is heavy harvest bycatch and utilization of the species' high-value fins; (2) there appears to be a potential for relative stability in population sizes on the order of 5-10 years at the post-decline depressed state. This suggests that this species is potentially capable of persisting at a low population size; (3) two populations seem to have stabilized, which reduces the global population's overall extinction risk; (4) the overall reduction of the fin trade as well as increasing management regulations will likely reduce overall mortality to some extent, and thus reduces the species' current risk of extinction. However, given the species' significant historical and ongoing abundance declines in all three ocean basins, slow growth, low fecundity, and low genetic diversity, combined with ongoing threats of overutilization and largely inadequate regulatory mechanisms, we concluded that over the next 30 years, the oceanic whitetip shark has a moderate risk of extinction throughout its global range.

Appendix 1

Current and relevant shark regulations by U.S. state and territory in the Atlantic and Pacific (Source: Adapted from Miller *et al*. 2014; NMFS (2011a); NMFS (2013a); HMSMT Report 2008).

U.S. Atlantic States	Shark Regulations
Maine	Although part of the Atlantic States Marine Fisheries Commission (ASMFC), both Maine and New Hampshire were granted de minimis status for the Interstate FMP for Atlantic Coastal Sharks (see further details below) that was adopted by the ASFMC in 2008 (ASFMC 2008). These states implement the following rules that uphold the goals and objectives of the FMP: require federal dealer permits for all dealers purchasing Coastal Sharks; prohibit the take or landings of prohibited species in the plan; close the fishery for porbeagle sharks when the NMFS quota has been harvest; prohibit the commercial harvest of porbeagle sharks in State waters; require that head, fins and tails remain attached to the carcass of all shark species, except smooth dogfish, through landing.
New Hampshire	
Massachusetts	Also a part of the ASMFC, and was granted de minimis status for the Interstate FMP for Atlantic Coastal Sharks. Granted an exemption from the possession limit for non-sandbar large coastal sharks and closures of the non-sandbar large coastal shark fisheries.
Rhode Island Connecticut New York New Jersey Delaware Maryland Virginia	Fishers must abide by the Interstate FMP for Atlantic Coastal Sharks adopted by the ASMFC (ASFMC 2008). This FMP requires that all sharks harvested by commercial or recreational fishers within state waters have the tail and fins attached naturally to the carcass. While there are no set quotas for the pelagic group, ASFMC opens and closes the fishery when NMFS opens and closes the corresponding federal fisheries. Sharks caught in the recreational fishery must have a fork length of at least 4.5 feet (54 inches) and they must be caught using a handline or rod and reel. Each recreational shore-angler is allowed a maximum harvest of one shark from the federal recreationally permitted species per calendar day. Recreational fishing vessels are allowed a maximum harvest of one shark from the federal recreationally permitted species per trip, regardless of the number of people on board the vessel. An annual recreational seasonal closure is imposed in state waters of Virginia, Maryland, Delaware and New Jersey from May 15 through July 15 during which time fishers are prohibited from possessing certain species - regardless of where the shark was caught. Fishers who catch any of these species in federal waters may not transport them through the state waters of Virginia, Maryland, Delaware, and New

U.S. Atlantic States	Shark Regulations
	Jersey during the seasonal closure. New York amended its Environmental Conservation Law to prohibit sharks (excluding spiny dogfish) from being taken for commercial or recreational purposes by baited hooking except with the use of non-stainless steel non-offset circle hooks. New York, Maryland, and Delaware have shark fin laws that ban the possession, sale, or distribution of shark fins. All three laws in these states exempt Spiny dogfish and Smooth dogfish fins from the ban. Each state law also includes other exceptions including for education, research, and other situations.
North Carolina	Adopted the ASMFC Coastal Shark Interstate FMP. Additionally, the Director may impose restrictions for size, seasons, areas, quantity, etc. via proclamation. The longline in the shark fishery shall not exceed 500 yds or have more than 50 hooks. Requires reporting of all recreationally landed sharks through state administered HMS catch card program.
South Carolina	Adopted the ASMFC Coastal Shark Interstate FMP. Additionally, defers to federal regulations. Gillnets may not be used in the shark fishery in state waters.
Georgia	Adopted the ASMFC Coastal Shark Interstate FMP. Additionally, commercial/recreational regulations: 2 sharks/person or boat, whichever is less, with a minimum size of 48” FL (122 cm). It is unlawful to have in possession more than one shark greater than 84" TL (213 cm). All sharks must be landed with the head and fins intact. Sharks may not be landed in Georgia if harvested using gillnets.
Florida	Adopted the ASMFC Coastal Shark Interstate FMP.
Alabama	Recreational and commercial: bag limit – 1 shark/person/day with a minimum size of 54” FL (137 cm) or 30” dressed (76 cm). State waters close when federal season closes and no shark fishing on weekends, Memorial Day, Independence Day, or Labor Day. Restrictions on chumming and shore-based angling if creating unsafe bathing conditions. Regardless of open or closed season, gillnet fishers targeting other fish may retain sharks with a dressed weight not exceeding 10% of total catch.

U.S. Atlantic States	Shark Regulations
Louisiana	Recreational: bag limit 1 shark/person/day with a minimum size of 54" FL (137 cm). Commercial: 33 sharks/vessel/day limit and no minimum size. Commercial and recreational harvest of sharks prohibited from April 1st through June 30th. Fins must remain naturally attached to carcass through off-loading. Owners/operators of vessels other than those taking sharks in compliance with state or federal commercial permits are restricted to no more than one shark from either the large coastal, small coastal, or pelagic group per vessel per trip within or without Louisiana waters.
Mississippi	Recreational: bag limit - LCS/Pelagics 1 shark/person (possession limit) up to 3 sharks/vessel (possession limit) with a minimum size of 37" TL (94 cm). Finning is prohibited.
Texas	Commercial/recreational: bag limit – 1 shark/person/day; Commercial/recreational possession limit is twice the daily bag limit (i.e., 2 sharks/person/day)
Illinois	Bans the possession, sale, or distribution of detached shark fins.
U.S. Atlantic and Caribbean Territories:	
U.S. Virgin Islands	Federal regulations and federal permit requirements apply in territorial waters.
Puerto Rico	Federal regulations and federal permit requirements apply in territorial waters.

U.S. Pacific States	
California	California's Shark Fin Prohibition law prohibits the sale, purchase, or possession of detached shark fins. The law exempts licensed shark fishers that land sharks in California from the possession ban. Includes an education and research exemption. Sharks may not be taken with drift gillnets of mesh size eight inches (20 cm) or greater except under a revocable permit issued by the California Department of Fish and Game.
Hawaii	It is unlawful to possess, sell, offer for sale, trade, or distribute shark fins. Includes exemptions for education and research.
U.S. Pacific	

Territories:	
American Samoa	Prohibits the possession, delivery, or transportation of any shark species or shark body part. Includes an exemption for research. Shark fishing and possession of sharks within 3 nmi of shoreline was banned in Nov 2012.
Guam	Bans the possession, sale, offer for sale, take, purchase, barter, transport, export, import, trade or distribution of shark fins. Includes exemptions for research and subsistence fishing.
CNMI	Bans the possession, sale, offer for sale, trade, or distribution of shark fins. Includes exemptions for research and subsistence fishing.

Appendix 2

Summary of Global Shark Fishing Regulations (excluding the United States)

Country	Date	Prohibited Shark Fishing
Bahamas	2011	Commercial shark fishing in the approximately 630,000 square kilometers (243,244 square miles) of the country's waters is prohibited.
British Virgin Islands	2014	No commercial fishing of sharks or rays
Brunei	2013	No harvest or importation of shark products
Colombia	1995	Shark fishing is prohibited in the Malpelo Wildlife Sanctuary
Cook Islands	2012	Commercial shark fishing banned. Created a sanctuary in its waters, contiguous with the sanctuary in French Polynesia and bans the possession or sale of shark products.
Congo-Brazzaville	2001	Shark fishing is prohibited.
Costa Rica	1978	Shark fishing is prohibited in Cocos Island National Park.
Ecuador	2004	Directed fishing for sharks is banned in all Ecuadorian waters, but sharks caught in "continental" (i.e., not Galapagos) fisheries may be landed if bycaught (finning is banned).
Egypt	2005	Shark fishing is prohibited throughout the Egyptian Red Sea territorial waters to 12 miles from the shore, as is the commercial sale of sharks.
French Polynesia	2012	All shark fishing banned. Created shark sanctuary in its waters contiguous with the sanctuary in Cook Islands, and banned trade in all sharks.

Country	Date	Prohibited Shark Fishing
Guinea-Bissau	2009	Ban on shark fishing in Marine Protected Areas (two parks covering 2,077 km^2).
Honduras	2010	No shark fishing
Indonesia	2010	No shark fishing in Raja Ampat
Israel	1980	No shark fishing
Kiribati	2015	No commercial shark fishing in the Phoenix Islands Protected Area and Southern Line Islands
Maldives	2010	Bans fishing, trade and export of sharks and shark products in the country, effectively converting its 35,000-square-mile (90,000-square-kilometer) EEZ into a sanctuary for sharks, a swath of the Indian Ocean about the size of the U.S. State of Maine.
Marshall Islands	2011	No commercial shark fishing or sale of shark products
Mauritania	2003	Created a 6000 km^2 coastal sanctuary for sharks and rays (Banc d'Arguin National Park - PNBA). Targeted shark fishing is prohibited.
Micronesia Region	2015	Established the Micronesia Regional Shark Sanctuary, which prohibits the commercial fishing and trade of sharks and rays and their parts. The sanctuary includes the waters of the Republic of Marshall Islands, Republic of Palau, Guam, CNMI, Federated States of Micronesia and its four member states, Yap, Chuuk, Pohnpei, and Kosrae.
Micronesia	2015	Passed Public Law No. 18-108 in early 2015 to implement the Micronesia Regional Shark Sanctuary, which prohibits the commercial fishing and trade of sharks and rays and their parts.
New Caledonia	2013	Passed regulations to prohibit all shark fishing in its EEZ. Regulations also ban the taking, possession, sale or export of all species of sharks. The Pacific waters of this French overseas territory are roughly the size of South Africa and can protect upwards of 50 species of sharks.

Country	Date	Prohibited Shark Fishing
Palau	2009	Created a shark sanctuary that encompasses 240,000 square miles (621,600 square kilometers, roughly size of France) of protected waters. Prohibits the commercial fishing of sharks.
Republic of the Marshall Islands	2011	Bans commercial fishing of sharks in all 1,990,530 square kilometers (768,547 square miles) in the country's waters, an ocean area four times the landmass of California. A complete prohibition on the commercial fishing of sharks as well as the sale of any sharks or shark products. Any shark caught accidentally by fishing vessels must be set free. A ban on the use of wire leaders, a longline fishing gear which is among the most lethal to sharks.
Sabah, Malaysia	2011	Prohibits shark fishing.
Spain	2011	Prohibits the capture, injury, trade, import and export of specific shark species, and requires periodic evaluations of their conservation status.
Tokelau (an island territory of New Zealand in the South Pacific)	2011	Created a shark sanctuary which encompasses all 319,031 square kilometers (123,178 square miles) of Tokelau's exclusive economic zone; however, dead sharks may be retained.
Venezuela	2012	Commercial shark fishing is prohibited throughout the 3,730 square kilometers (1,440 square miles) of the Caribbean Sea that make up the Los Roques and Las Aves archipelagos.

Appendix 3

Summary of Global Shark Finning Regulations (excluding U.S.)

Country	Date	Prohibited Shark Finning
Argentina	2009	Ban on shark finning.
Australia	Various	States and Territories govern their own waters. Central government regulates 'Commonwealth' or Federal waters, from 3 to 200 nautical miles offshore. Sharks must be landed with fins naturally attached in Commonwealth, NSW and Victorian waters, and must be landed with corresponding fins in a set fin to carcass ratio in Tasmanian, Western Australian, Northern Territory and Queensland waters.
Brazil	1998	Sharks must be landed with corresponding fins. Fins must not weigh more than 5% of the total weight of the carcass.

Country	Date	Prohibited Shark Finning
		All carcasses and fins must be unloaded and weighed and the weights reported to authorities. Pelagic gillnets and trawls are prohibited in waters less than 3 nautical miles (5.6 km) from the coast.
Canada	1994	Finning in Canadian waters and by any Canadian licensed vessel fishing outside of the EEZ is prohibited.When landed, fins must not weigh more than 5% of the dressed weight of the shark.
Cape Verde	2005	Finning prohibited throughout the EEZ.
Chile	2011	Bans shark finning in Chilean waters. Sharks must be landed with fins naturally attached.
Colombia	2007	Sharks must be landed with fins naturally attached to their bodies.
Costa Rica	2006	Ban on shark finning.
El Salvador	2006	Shark finning is prohibited. Sharks must be landed with at least 25% of each fin still attached naturally. The sale or export of fins is prohibited without the corresponding carcass.
England and Wales	2009	Ban on shark finning.
European Union	2003 (finning) 2013 (fins-attached)	Shark finning is prohibited by all vessels fishing in EU waters and on all EU vessels fishing in oceans worldwide since 2003. Sharks must be landed with fins naturally attached since 2013.
Gambia	2004	Ban on finning in all territorial waters. Mandatory to land sharks caught in Gambian waters on Gambian soil.
Guinea	2009	Ban on finning in all territorial waters.
India	2013	Bans removal of shark fins on board a vessel in the sea.
Japan	2008	Ban on shark finning by Japanese vessels; however, Japanese vessels operating and landing outside Japanese waters are exempt.
Mexico	2007	Shark finning is prohibited. Shark fins must not be landed unless the bodies are on board the vessel. In 2011, Mexico banned shark fishing from May 1 to July 31 in Pacific Ocean and from May 1 to June 30 in Gulf of Mexico and Caribbean Seas.
Namibia	2003	Generally prohibits the discards of harvested or bycaught marine resources. Prohibits shark finning.

Country	Date	Prohibited Shark Finning
New Zealand	2009/2016	Finning of live sharks (and disposing of carcasses at sea) is prohibited. By 2016, all species of sharks must be released alive or brought to shore with fins naturally attached (with the exception of some species that may be landed in accordance with a gazette fin to "greenweight" ratio)[27].
Nicaragua	2004	Fins must not weigh more than 5% of the total weight of the carcass. Export of fins allowed only after proof that carcass has been sold as the capture of sharks for the single use of their fins is prohibited.
Oman	1999	Prohibits the throwing of any shark part or shark waste in the sea or on shore. It is also prohibited to separate shark fins and tails unless this is done according to the conditions set by the competent authority.
Pakistan		Require that all parts of the shark are used and fins be landed naturally attached.
Panama	2006	Shark finning is prohibited. Industrial fishers must land sharks with fins naturally attached. Artisanal fishers may separate fins from the carcass but fins must not weigh more than 5% of the total weight of the carcass.
Seychelles	2006	Fins may not be removed onboard a vessel unless authorized. Must produce evidence that they have the capacity to utilize all parts or the shark. Fins may not be transshipped. Fins must not weigh more than 5% of the total weight of the carcass (after evisceration) or 7% (after evisceration and beheading).
Sierra Leone	2008	Ban on shark finning.
South Africa	1998	Sharks must be landed, transported, sold, or disposed of whole (they can be headed and gutted). Sharks from international waters may be landed in South Africa with fins detached.
Sri Lanka	2001	Ban on shark finning.
Taiwan	2012	Enacted a shark finning ban with the exception of vessels not landing in Taiwan.
Venezuela	2012	Sharks caught in Venezuelan waters must be brought to port with fins naturally attached.

[27] http://www.fish.govt.nz/en-nz/Environmental/Sharks/Eliminating+shark+finning+in+New+Zealand.htm

Appendix 4

Summary of RFMO Shark Regulations pertinent to the oceanic whitetip shark

RFMO	Date	Shark Regulations
International Commission for the Conservation of Atlantic Tunas (ICCAT)[28]	2010	Recommendation 10-07 specifically prohibits the retention, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks (*C. longimanus*) in any fishery.
Inter-American-Tropical-Tuna-Commission (IATTC)[29]	2011	Resolution C-11-10 on the conservation of oceanic whitetip sharks caught in association with fisheries in the Antigua Convention Area prohibits retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in the fisheries covered by the Antigua Convention.
Western and Central Pacific Fisheries Commission (WCPFC)[30]	2013	Conservation Management Measure (CMM) 2011-04 prohibits vessels flying their flag and vessels under charter arrangements to the CCM from retaining onboard, transshipping, storing on a fishing vessel, or landing any oceanic whitetip shark, in whole or in part, in the fisheries covered by the Convention. WCPFC also adopted a CMM 2014-05 (effective July 2015) that requires each national fleet to choose either banning wire leaders or banning the use of shark lines.
Indian Ocean Tuna Commission (IOTC)[31]	2013	Resolution 13/06 prohibits, as an interim pilot measure, all fishing vessels flying their flag and on the IOTC Record of Authorized Vessels, or authorized to fish for tuna or tuna-like species managed by the IOTC on the high seas to retain onboard, transship, land or store any part or whole carcass of oceanic whitetip sharks with the exception of scientific observers collecting biological samples. The provisions of this measure do not apply to artisanal fisheries operating exclusively in their respective Exclusive Economic Zone (EEZ) for the purpose of local

[28] https://www.iccat.int/en/RecsRegs.asp
[29] https://www.iattc.org/ResolutionsActiveENG.htm
[30] https://www.wcpfc.int/conservation-and-management-measures
[31] http://www.iotc.org/cmms/basic

RFMO	Date	Shark Regulations
		consumption. This measure is also not binding on India.
Indian Ocean Tuna Commission (IOTC)	2005	Requires that fishers fully utilize any retained catches of sharks. Full utilization is defined as retention by the fishing vessel of all parts of the shark excepting head, guts, and skins, to the point of first landing. Onboard fins cannot weigh more than 5% of the weight of sharks onboard, up to the first point of landing (HSI 2014).
Inter-American Tropical Tuna Commission (IATTC)	2005	
North Atlantic Fisheries Organization (NAFO)	2005	
Southeast Atlantic Fisheries Commission (SEAFO)	2006	
Western and Central Pacific Fisheries Commission (WCPFC)	2008	
North East Atlantic Fisheries Commission (NEAFC)	2007	

Appendix 5

Status and Development of National Plans of Action-Sharks by top 26 shark-catching countries/territories and regulatory mechanisms in each country (Source: Adapted by Fischer *et al*. (2012) and updated via http://www.fao.org/fishery/ipoa-sharks/npoa/en).

Rank and Country/Territory	NPOA-Sharks
1. Indonesia	Yes, released in 2010
2. India	No, under development as at October 2004; current status unknown
3. Spain	Yes, European Community (EC) Action Plan on the Conservation and Management of Sharks
4. Taiwan	Yes, released in 2006
5. Argentina	Yes, released in 2004
6. Mexico	Yes, released in 2004
7. USA	Yes, released in 2001
8. Pakistan	No; status unknown
9. Malaysia	Yes, released in 2006; revised in 2014
10. Japan	Yes, released in 2001; revised in 2009
11. France	Yes, see EC Action Plan

Rank and Country/Territory	NPOA-Sharks
12. Thailand	No, drafted in 2005, but current status unknown
13. Brazil	No, draft available but not approved
14. Sri Lanka	Yes, released in 2013
15. New Zealand	Yes, released in 2008; revised in 2013
16. Portugal	Yes, see EC Action Plan
17. Nigeria	No
18. Iran	Yes, but unavailable
19. United Kingdom	Yes, see EC Action Plan
20. Republic of Korea	Yes, released in 2011
21. Canada	Yes, released in 2007
22. Peru	No, drafted in 2005, but awaiting adoption
23. Yemen	No
24. Australia	Yes, released in 2004; revised in 2012
25. Senegal	Yes, released in 2005
26. Venezuela	Yes, released in 2006

References

Agnew, D.J., Pearce, J., Pramod, G., Peatman, T., Watson, R., Beddington, J.R. and Pitcher, T.J. (2009) Estimating the Worldwide Extent of Illegal Fishing. *PloS one,* **4,** e4570-e4570.

Aguilar, C., González-Sansón, G., Hueter, R.E., Rojas, E., Cabrera, Y., Briones, A., Borroto, R., Hernández, A. and Baker, P. (2014) Captura de tiburones en la región noroccidental de Cuba. *Lat. Am. J. Aquat. Res.,* **42,** 477-487.

Amorim, A.F. (1998) Elasmobranchs caught by longlines off Brazil. *Marine and Freshwater Research,* **49,** 621-632.

Anderson, R.C. and Waheed, A. (1990) Exploratory fishing for large pelagic species in the Maldives. *Ministry of Fisheries and Agriculture. Republic of Maldives Bay of Bengal Programme For Fisheries Development.***,** 17 pp.

Anderson, R.C., Adam, M.S. and Saleem, M.R. (2011) Shark longline fishery in the northern Maldives. IOTC-2011-WPEB07-27 Rev_1.

Arauz, R. (2017) Report: oceanic whitetip shark (Carcharhinus longimanus) landing information from Costa Rica, inadequacy of existing domestic and regional regulatory regimes, and recommendations for oceanic whitetip shark protective regulations. Fins Attached Marine Research and Conservation. 16pp.

Ardill, D., Itano, D. and Gillett, R. (2011) A review of bycatch and discard issues in Indian Ocean tuna fisheries. *SmartFish Working Papers No. 00X. Indian Ocean Commission-SmartFish Programme.***,** 48 pp.

Arocha, F., Arocha, O. and Marcano, L.A. (2002) Observed shark bycatch from the Venezuelan tuna and swordfish fishery from 1994 through 2000. *Col. Vol. Sci. Pap. ICCAT,* **54,** 1123-1131.

Asano-Filho, M., Fonteles Holanda, F.C.A., da Silva Santos, F.J., Lucena, F. and de Sousa Lima Pantaleão, G. (2004) A short note on the catch composition and weight-length relationship of tunas, billfishes and sharks of North Brazil. *Brazilian Journal of Oceanography,* **52,** 249-253.

Austin, B. and Zhang, X.H. (2006) Vibrio harveyi: a significant pathogen of marine vertebrates and invertebrates. *Lett. Appl. Microbiol.,* **43,** 119-124.

Australia Department of the Environment (2014) Non-Detriment finding for the export of shark species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and harvested from Australian waters: *Sphyrna lewini* - scalloped hammerhead shark, *Sphyrna mokarran* -great hammerhead shark, *Sphyrna zygaena* -smooth hammerhead shark, *Lamna nasus* -porbeagle shark, *Carcharhinus longimanus* - oceanic whitetip shark. p. 56.

Backus, R.H., Springer, S. and Arnold Jr., E.L. (1956) A contribution to the natural history of the white-tip shark, *Pterolamiops longimanus* (Poey). *Deep-sea Research,* **3,** 178-188.

Barreto, R., Ferretti, F., Mills, J., Amorim, A., Andrade, H., Worm, B. and Lessa, R. (2015) Trends in the exploitation of South Atlantic shark populations. *Conservation Biology,* **30,** 792-804.

Bass, A.J., D' Aubrey, J.D. and Kistnasamy, N. (1973) *Sharks of the east coast of southern Africa. I. The genus Carcharhinus (Carcharhinidae).* Durban, Republic of South Africa: South African Association for Marine Biological Research, The Oceanographic Institute, 168pp.

Baum, J., Medina, E., Musick, J.A. and Smale, M. (2006) *Carcharhinus longimanus*. The IUCN Red List of Threatened Species. Version 2015.2. Downloaded on 24 June 2015.: IUCN.

Baum, J.K., Myers, R.A., Kehler, D.G., Worm, B., Harley, S.J. and Doherty, P.A. (2003) Collapse and conservation of shark populations in the Northwest Atlantic. *Science,* **299,** 389-392.

Baum, J.K. and Myers, R.A. (2004) Shifting baselines and the decline of pelagic sharks in the Gulf of Mexico. *Ecol. Lett.,* **7,** 135-145.

Baum, J.K. and Blanchard, W. (2010) Inferring shark population trends from generalized linear mixed models of pelagic longline catch and effort data. *Fisheries Research,* **102,** 229-239.

Beerkircher, L.R., Cortés, E. and Shivji, M. (2002) Characteristics of shark bycatch observed on pelagic longlines off the Southeastern United States, 1992–2000. *Marine Fisheries Review,* **64,** 40-49.

Beerkircher, L.R., Brown, C.J., Abercrombie, D.L. and Lee, D.W. (2004) SEFSC Pelagic observer program data summary for 1992-2002. *NOAA Technical Memorandum NMFS-SEFSC-522***,** 25.

Bensley, N., Woodhams, J., Patterson, H., Rodgers, M., McLoughlin K, Stobutzki, I. and Begg, G. (2010) 2009 Shark Assessment Report for the Australian National Plan of Action for the Conservation and Management of sharks, Final Report to the Department of Agriculture, Fisheries and Forestry, Bureau of Rural Sciences. Canberra, Australia.

Berkeley, S.A. and Campos, W.L. (1988) Relative abundance and fishery potential of pelagic sharks along Florida's East Coast. *Marine Fisheries Review,* **50.**

Blaber, S.J.M., Dichmont, C.M., White, W., Buckworth, R., Sadiyah, L., Iskandar, B., Nurhakim, S., Pillans, R., Andamari, R., Dharmadi and Fahmi (2009) Elasmobranchs in southern Indonesian fisheries: the fisheries, the status of the stocks and management options. *Rev. Fish Biol. Fish.,* **19,** 367-391.

Boggs, C.H. and Ito, R.Y. (1993) Hawaii's pelagic fisheries. *Marine Fisheries Review,* **55,** 69-82.

Bonfil, R., Clarke, S. and Nakano, H. (2008) The biology and ecology of the oceanic whitetip shark, *Carcharhinus longimanus*. In: *Sharks of the Open Ocean: Biology, Fisheries, and Conservation.* M.D. Camhi, E.K. Pikitch and E.A. Babcock (eds): Blackwell Publishing. pp. 128-139.

Bradai, M.N., Saidi, B. and Enajjar, S. (2012) Elasmobranchs of the Mediterranean and Black Sea: status, ecology and biology bibliographic analysis. *General Fisheries Commission for the Mediterranean Studies and Reviews,* **91,** 116.

Branstetter, S. (1990) Early life-history implications of selected carcharhinoid and lamnoid sharks of the Northwest Atlantic. In: *Elasmobranchs as living resources: advances in the biology, ecology, systematics, and the status of the fisheries. NOAA Tech. Rep. NMFS 90.* J. Pratt, Harold L. , S.H. Gruber and T. Taniuchi (eds): U.S. Dep. Commer., NOAA NMFS. pp. 17-28.

Brodziak, J., Walsh, W.A. and Hilborn, R. (2013) Model selection and multimodel inference for standardizing catch rates of bycatch species: a case study of oceanic whitetip shark in the Hawaii-based longline fishery. *Canadian Journal of Fisheries and Aquatic Sciences,* **70,** 1723-1740.

Bromhead, D., Clarke, S., Hoyle, S., Muller, B., Sharples, P. and Harley, S. (2012) Identification of factors influencing shark catch and mortality in the Marshall Islands tuna longline fishery and management implications. *Journal of fish biology,* **80,** 1870-1894.

Burgess, G.H., Beerkircher, L.R., Cailliet, G.M., Carlson, J.K., Cortés, E., Goldman, K.J., Grubbs, R.D., Musick, J.A., Musyl, M.K. and Simpfendorfer, C.A. (2005a) Reply to "Robust estimates of decline for pelagic shark populations in the Northwest Atlantic and Gulf of Mexico". *Fisheries,* **30,** 30-31.

Burgess, G.H., Beerkircher, L.R., Cailliet, G.M., Carlson, J.K., Cortés, E., Goldman, K.J., Grubbs, R.D., Musick, J.A., Musyl, M.K. and Simpfendorfer, C.A. (2005b) Is the collapse of shark populations in the Northwest Atlantic Ocean and Gulf of Mexico real? *Fisheries,* **30,** 19-26.

Camara, M.B. (2008) Quelle gestion des peches artisanales en Afrique de l'Ouest ? Etude de la complexite de l'espace halieutique en zone littoral senegalaise., Universite Cheikh Anta Diop Dakar.

Camargo, S.M., Coelho, R., Chapman, D., Howey-Jordan, L., Brooks, E.J., Fernando, D., Mendes, N.J., Hazin, F.H., Oliveira, C., Santos, M.N., Foresti, F. and Mendonca, F.F. (2016) Structure and genetic variability of the oceanic whitetip shark, *Carcharhinus longimanus*, determined using mitochondrial DNA. *PloS one,* **11,** 1-11.

Camhi, M.D., Pikitch, E.K. and Babcock, E.A. (2008) *Sharks of Open Ocean: Biology, Fisheries and Conservation.* Blackwell Publishing, 536pp.

Camhi, M.D., Valenti, S.V., Fordham, S.V., Fowler, S.L. and Gibson, C. (2009) The conservation status of pelagic sharks and rays: report of the IUCN Shark Specialist Group Pelagic Shark Red List Workshop. Newbury, UK., IUCN Species Survival Commission's Shark Specialist Group. 78pp.

Carlson, J.K. and Gulak, S.J.B. (2012) Habitat use and movements patterns of oceanic whitetip, bigeye thresher, and dusky sharks based on archival satellite tags. *Collect. Vol. Sci. Pap. ICCAT,* **68,** 1922-1932.

Castro, A.L., Stewart, B.S., Wilson, S.G., Hueter, R.E., Meekan, M.G., Motta, P.J., Bowen, B.W. and Karl, S.A. (2007) Population genetic structure of Earth's largest fish, the whale shark (Rhincodon typus). *Mol. Ecol.,* **16,** 5183-5192.

Castro, J.A. and Mejuto, J. (1995) Reproductive parameters of blue shark, *Prionace glauca*, and other sharks in the Gulf of Guinea. *Marine Freshwater Research,* **46,** 967-973.

Cavanagh, R.D. and Gibson, C. (2007) Overview of the conservation stuats of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea. The World Conservation Union (IUCN). vi + 42.pp.

Chapple, T.K. and Botsford, L.W. (2013) A comparison of linear demographic models and fraction of lifetime egg production for assessing sustainability in sharks. *Conservation biology : the journal of the Society for Conservation Biology,* **27,** 560-568.

Chiaramonte, C. and Vooren, C.M. (2007) Squatina guggenheim, Hidden Angelshark. The IUCN Red List of Threatened Species 2007: e.T39330A10202558. http://dx.doi.org/10.2305/IUCN.UK.2007.RLTS.T39330A10202558.en.

Chin, A., Kyne, P.M., Walker, T.I. and McAuley, R.B. (2010) An integrated risk assessment for climate change: analysing the vulnerability of sharks and rays on Australia's Great Barrier Reef. *Glob. Chang. Biol.,* **16,** 1936-1953.

Chin, A., Simpfendorfer, C., Tobin, A. and Heupel, M. (2013) Validated age, growth and reproductive biology of Carcharhinus melanopterus, a widely distributed and exploited reef shark. *Marine and Freshwater Research,* **64**.

CITES (2013) Convention on International Trade in Endangered Species of Wild Fauna and Flora consideration of proposals for amendment of Appendices I and II. Sixteenth meeting of the Conference of the Parties Bangkok (Thailand), 3-14 March 2013.

Clarke, C.R., Karl, S.A., Horn, R.L., Bernard, A.M., Lea, J.S., Hazin, F.H., Prodöhl, P.A. and Shivji, M.S. (2015a) Global mitochondrial DNA phylogeography and population structure of the silky shark, *Carcharhinus falciformis*. *Marine Biology,* **162,** 945-955.

Clarke, S., Milner-Gullande, J. and Bjorndal, T. (2007) Perspectives social, economic, and regulatory drivers of the shark fin trade. *Marine Resource Economics,* **22,** 305-327.

Clarke, S. (2008) Use of shark fin trade data to estimate historic total shark removals in the Atlantic Ocean. *Aquatic Living Resources,* **21,** 373-381.

Clarke, S. (2009) An alternative estimate of catches of five species of sharks in the Western and Central Pacific Ocean based on shark fin trade data. Western and Central Pacific Fisheries Commission Scientific Committee Fifth Regular Session. WCPFC-SC5-2005/EB-WP-02. 31 pp.

Clarke, S. (2011) A status snapshot of key shark species in the Western and Central Pacific and potential management options. Western and Central Pacific Fisheries Commission Scientific Committee Seventh Regular Session. WCPFC-SC7-2011/EB-WP-04. 36 pp.

Clarke, S., Harley, S., Hoyle, S. and Rice, J. (2011a) An indicator-based analysis of key shark species based on data held by SPC-OFP. Western and Central Pacific Fisheries Commission Scientific Committee Seventh Regular Session. WCPFC-SC7-2011/EB-WP-01. 1-88.

Clarke, S., Yokawa, K., Matsunaga, H. and Nakano, H. (2011b) Analysis of North Pacific shark data from Japanese commercial longline and research/training vessel records. Western and Central Pacific Fisheries Commission Scientific Committee Seventh Regular Session. WCPFC-SC7-2011/EB-WP-02. 87 pp.

Clarke, S. (2013) Towards an Integrated Shark Conservation and Management Measure for the Western and Central Pacific Ocean. Western and Central Pacific Fisheries Commission Scientific Committee Ninth Regular Session. WCPFC-SC9-2013/ EB-WP-08. 36 pp.

Clarke, S., Rui, C., Francis, M., Kai, M., Kohin, S., Liu, K.-M., Simpfendorfer, C., Tovar-Avila, J., Rigby, C. and Smart, J. (2015b) Report of the Pacific Shark Life History Expert Panel Workshop 28-30 April 2015. Western and Central Pacific Fisheries Commission Scientific Committee Eleventh Regular Session. 116pp.

Clarke, S.C., Magnussen, J.E., Abercrombie, D.L., Mcallister, M.K. and Shivji, M.S. (2006a) Identification of shark species composition and proportion in the Hong Kong shark fin market based on molecular genetics and trade records. *Conservation Biology,* **20,** 201-211.

Clarke, S.C., McAllister, M.K., Milner-Gulland, E.J., Kirkwood, G.P., Michielsens, C.G., Agnew, D.J., Pikitch, E.K., Nakano, H. and Shivji, M.S. (2006b) Global estimates of shark catches using trade records from commercial markets. *Ecol. Lett.,* **9,** 1115-1126.

Clarke, S.C., Harley, S.J., Hoyle, S.D. and Rice, J.S. (2012) Population trends in Pacific Oceanic sharks and the utility of regulations on shark finning. *Conservation Biology,* **27,** 197-209.

Claro, R., Baisre, J.A., Lindeman, K.C. and García-Arteaga, J.P. (2001) Cuban fisheries: historical trends and current status. In: *Ecology of the Marine Fishes of Cuba.* R. Claro, K.C. Lindeman and L.R. Parenti (eds): Washington DC: Smithsonian Institution Press. pp. 194-218.

Coelho, R., Hazin, F.H.V., Rego, M., Tambourgi, M., Oliveira, P., Travassos, P., Carvalho, F. and Burgess, G. (2009) Notes of the reproduction of the oceanic whitetip shark, Carcharhinus longimanus, in the southwestern equatorial Atlantic Ocean. *Collect. Vol. Sci. Pap. ICCAT,* **64,** 1734-1740.

Coelho, R., Fernandez-Carvalho, J., Lino, P.G. and Santos, M.N. (2012) An overview of the hooking mortality of elasmobranchs caught in a swordfish pelagic longline fishery in the Atlantic Ocean. *Aquatic Living Resources,* **25,** 311-319.

Compagno, L.J.V. (1984) FAO Species Catalogue. Vol 4. Sharks of the world: an annotated and illustrated catalogue of shark species known to date. Parts 1 and 2. FAO Fisheries Synopsis No. 125. FAO, Rome, Italy. p. 655.

Correia, J.P.S. and Smith, M.F.L. (2001) Elasmobranch landings for the Portuguese Commercial Fishery from 1986 to 2001. *Marine Fisheries Review***,** 32-40.

Cortés, E. (1999) Standardized diet compositions and trophic levels of sharks. *ICES Journal of Marine Science,* **56,** 707-717.

Cortés, E. (2002) Incorporating uncertainty into demographic modeling: application to shark populations and their conservation. *Conservation biology : the journal of the Society for Conservation Biology,* **16,** 1048-1062.

Cortés, E., Brown, C.A. and Beerkircher, L.R. (2007) Relative abundance of pelagic sharks in the western and north Atlantic ocean, including the Gulf of Mexico and Caribbean Sea. *Gulf and Caribbean Research,* **19,** 37-52.

Cortés, E. (2008a) Catches of pelagic sharks from the Western North Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea. *SCRS/2007/072 Collect. Vol. Sci. Pap. ICCAT,* **62,** 1434-1446.

Cortés, E. (2008b) Comparative life history and demography of pelagic sharks. In: *Sharks of the open ocean: biology, fisheries and conservation.* M.D. Camhi, E.K. Pikitch and E.A. Babcock (eds): Blackwell Publishing Ltd. pp. 309-320.

Cortés, E., Arocha, F., Beerkircher, L., Carvalho, F., Domingo, A., Heupel, M., Holtzhausen, H., Santos, M.N., Ribera, M. and Simpfendorfer, C. (2010) Ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. *Aquatic Living Resources,* **23,** 25-34.

Cortés, E., Domingo, A., Miller, P., Forselledo, R., Mas, F., Arocha, F., Campana, S., Coelho, R., DaSilva, C., Hazin, F.H.V., Holtzhausen, H., Keene, K., Lucena, F., Ramirez, K., Santos, M.N., Semba-Murakami, Y. and Yokawa, K. (2012) Expanded ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. *SCRS/2012/167***,** 1-56.

Cragg, J.G. (1971) Some statistical models for limited dependent variables with application to the demand for durable goods. *Econometrica,* **39,** 829-844.

Cruz-Nuñez, G., Palmadóttir, H., Jónsdóttir, R. and García- Rodríguez, E. (2009) Quality of Cuban shark liver oil. Comparison with Icelandic cod liver oil. *REDVET. Revista electrónica de Veterinaria,* **10,** 1-10.

Cuba Department of Fisheries (2016) Analysis of catches of Oceanic Whitetip sharks Carcharhinus longimanus in Cuba. Cuba Department of Fisheries Fisheries Research Center.

Cuba NPOA-Sharks (2015) National plan of action for the conservation and management of Chondrichthyes in the Republic of Cuba. Havana, Cuba: Ministry of the Food Industry. p. 51.

D'Alberto, B.M., Chin, A., Smart, J.J., Baje, L., White, W.T. and Simpfendorfer, C.A. (2017) Age, growth and maturity of oceanic whitetip shark (Carcharhinus longimanus) from Papua New Guinea. *Marine and Freshwater Research,* **68**.

Dagorn, L., Holland, K.N., Restrepo, V. and Moreno, G. (2013) Is it good or bad to fish with FADs? What are the real impacts of the use of drifting FADs on pelagic marine ecosystems? *Fish and Fisheries,* **14,** 391-415.

Dapp, D., Arauz, R., Spotila, J.R. and O'Connor, M.P. (2013) Impact of Costa Rican longline fishery on its bycatch of sharks, stingrays, bony fish and olive ridley turtles (Lepidochelys olivacea). *Journal of Experimental Marine Biology and Ecology,* **448,** 228-239.

De Young, C. (2006) Review of the state of world marine capture fisheries management: Indian Ocean. Rome, FAO. 458pp.

Dent, F. and Clarke, S. (2015) State of the global market for shark products. FAO Fisheries and Aquaculture Technical Paper No. 590. Rome, FAO. 187pp.

Dermawan, A., Sadili, D., Suharsono and Kasasiah, A. (2013) A review of the status of shark fisheries and shark conservation in Indonesia. Directorate of Marine and Aquatic Resources Conservation Directorate General of Marine, Coasts and Small Islands Ministry of Marine Affairs and Fisheries. p. 94.

Di Dario, F., Alves, C.B.M., Boos, H., Frédou, F.L., Lessa, R.P.T., Mincarone, M.M., Pinheiro, M.A.A., Polaz, C.N.M., Reis, R.E., Rocha, L.A., Santana, F.M., Santos, R.A., Santos, S.B., Vianna, M. and Fábio, V. (2014) A better way forward for Brazil's fisheries. *Sci. Transl. Med.,* **347**.

Diop, M. and Dossa, J. (2011) 30 years of shark fishing in West Africa. In: *Development of fisheries, catch trends, and their conservation status in Sub-Regional Fishing Commission member countries* Corlet/Condé-sur-Noireau, France.

Domingo, A. (2004) ¿Adonde fue el longimanus? In: *Elasmovisor*: Sociedade Brasileira para o Estudo de Elasmobrânquios.

Domingo, A., Miller, P., Forselledo, R., Pons, M. and Berrondo, L. (2007) Abundancia del tiburon loco (Carcharhinus longimanus) el el Atlantico Sur. *Col. Vol. Sci. Pap. ICCAT,* **60,** 561-565.

Driggers, W.B., Carlson, J.K., Cullum, B., Dean, J.M., Oakley, D. and Ulrich, G. (2004) Age and growth of the blacknose shark, Carcharhinus acronotus, in the western North Atlantic Ocean with comments on regional variation in growth rates. *Environmental Biology of Fishes,* **71,** 171-178.

Driggers, W.B., Carlson, J.K., Cortés, E. and Ingram Jr., G.W. (2011) Effects of wire leader use and species-specific distributions on shark catch rates off the southeastern United States. *IOTC-2011-SC14 – INF08.* *www.iotc.org/files/proceedings/2011/sc/IOTC-2011-SC14-INF08[E].pdf.*

Eddy, C., Brill, R. and Bernal, D. (2016) Rates of at-vessel mortality and post-release survival of pelagic sharks captured with tuna purse seines around drifting fish aggregating devices (FADs) in the equatorial eastern Pacific Ocean. *Fisheries Research,* **174,** 109-117.

Eriksson, H. and Clarke, S. (2015) Chinese market responses to overexploitation of sharks and sea cucumbers. *Biological Conservation,* **184,** 163-173.

Escobar-Sanchez, O., Galvan-Magana, F. and Rosiles-Martinez, R. (2010) Mercury and selenium bioaccumulation in the smooth hammerhead shark, Sphyrna zygaena Linnaeus, from the Mexican Pacific Ocean. *Bull. Environ. Contam. Toxicol.,* **84,** 488-491.

FAO (2012) Report of the fourth FAO expert advisory panel for the assessment of proposals to amend Appendices I and II of CITES concerning commercially-exploited aquatic species. In: *FAO Fisheries and Aquaculture Report No. 1032* Rome. p. 169.

Fernandez-Carvalho, J., Coelho, R., Santos, M.N. and Amorim, S. (2015) Effects of hook and bait in a tropical northeast Atlantic pelagic longline fishery: Part II—Target, bycatch and discard fishes. *Fisheries Research,* **164,** 312-321.

Fiedler, F.N., Port, D., Giffoni, B.B., Sales, G. and Fisch, F. (2017) Pelagic longline fisheries in southeastern/south Brazil. Who cares about the law? *Marine Policy,* **77,** 56-64.

Filmalter, J., Forget, F., Poisson, F., Vernet, A.L., Bach, P. and Dagorn, L. (2012) Vertical and horizontal behaviour of silky, oceanic white tip and blue sharks in the western Indian Ocean. *IOTC–2012–WPEB08–23.*

Fischer, J., Erikstein, K., D'Offay, B., Guggisberg, S. and Barone, M. (2012) Review of the implementation of the Internatinoal Plan of Action for the Conservation and Mangement of Sharks. Rome, Food and Agricultural Organization of the United Nations.

Flewelling, L.J., Adams, D.H., Naar, J.P., Atwood, K.E., Granholm, A.A., O'Dea, S.N. and Landsberg, J.H. (2010) Brevetoxins in sharks and rays (Chondrichthyes, Elasmobranchii) from Florida coastal waters. *Marine Biology,* **157,** 1937-1953.

Fong, Q.S.W. and Anderson, J.L. (2000) Assessment of the Hong Kong shark fin trade. *INFOFISH International,* **1,** 28-32.

Fontenau, A. (2011) Potential impact of gillnets fisheries on Indian ocean ecosystems? Indian Ocean Tuna Commission. IOTC-2011-WPEB07-INF32.

Francis, M.P. and Lyon, W.S. (2014) Review of commercial fishery interactions and population information for the oceanic whitetip shark, a protected New Zealand species. National Institute of Water & Atmospheric Research Ltd.

Frédou, F.L., Tolotti, M.T., Frédou, T., Carvalho, F., Hazin, H., Burgess, G., Coelho, R., Waters, J.D., Travassos, P. and Hazin, F.H.V. (2015) Sharks caught by the Brazilian tuna longline fleet: an overview. *Rev. Fish Biol. Fish.,* **25,** 365-377.

Gaither, M.R., Bowen, B.W., Rocha, L.A. and Briggs, J.C. (2015) Fishes that rule the world: circumtropical distributions revisited. *Fish and Fisheries***,** n/a-n/a.

Gallagher, A.J., Orbesen, E.S., Hammerschlag, N. and Serafy, J.E. (2014) Vulnerability of oceanic sharks as pelagic longline bycatch. *Global Ecology and Conservation,* **1,** 50-59.

García-Cortés, B. and Mejuto, J. (2002) Size-weight relationships of the swordfish (Xiphias gladius) and several pelagic shark species caught in the Spanish surface longline fishery in the Atlantic, Indian, and Pacific Oceans. *Col. Vol. Sci. Pap. ICCAT,* **54,** 1132-1149.

García-Cortés, B., Ramos-Cartelle, A., González-González, I. and Mejuto, J. (2012) Biological observations of oceanic whitetip shark (Carcharhinus longimanus) on Spanish surface longline fishery targeting swordfish in the Indian Ocean over the period 1993-2011. *IOTC-2012-WPEB08-25*.

García-Hernández, J., Cadena-Cárdenas, L., Betancourt-Lozano, M., García-De-La-Parra, L.M., García-Rico, L. and Márquez-Farías, F. (2007) Total mercury content found in edible tissues of top predator fish from the Gulf of California, Mexico. *Toxicol. Environ. Chem.,* **89,** 507-522.

Gelsleichter, J. and Walker, C.J. (2010) Pollutant exposure and effects in sharks and their relatives. Taylor and Francis Group, LLC. p. 37.

Goldman, K. and Cailliet, G. (2004) Age Determination and Validation in Chondrichthyan Fishes. In: *Biology of Sharks and Their Relatives*. pp. 399-447.

Gonzalez-Pestana, A., Kouri J, C. and Velez-Zuazo, X. (2014) Shark fisheries in the Southeast Pacific: A 61-year analysis from Peru. *F1000 Research,* **3,** 19.

Hall, M. and Román, M. (2013) Bycatch and non-tuna catch in the tropical tuna purse seine fisheries of the world. *Food and Agricultural Organizaiton of the United Nations, Rome 2013,* **568,** 262.

Hall, M. and Román, M.H. (2016) The fishery on fish-aggregating devices (FADS) in the Eastern Pacific Ocean - Update. Inter-American Tropical Tuna Commission Scientific Advisory Committee, Seventh Meeting, La Jolla, California (USA, 09-13 May 2016. DOCUMENT SAC-07-03e.

Harley, S., Caneco, B., Donovan, C., Tremblay-Boyer, L. and Brouwer, S. (2015) Monte Carlo simulation modelling of possiblemeasures to reduce impacts of longlining on oceanic whitetip and silky sharks. Western and Central Pacific Fisheries Commission Scientific Committee Eleventh Regular Session. WCPFC-SC11-2015/EB-WP-02.

Harley, S. and Pilling, G. (2016) Potential implications of the choice of longline mitigation approach allowed within CMM 2014-05. Western and Central Pacific Fisheries Commission Scientific Committee Twelfth Regular Session. WCPFC-SC12-2016/EB-WP-06.

Hasarangi, D.G.N., Maldeniya, R. and Haputhantri, S.S.K. (2012) A Review on shark fishery resources in Sri Lanka. *IOTC–2012–WPEB08–15 Rev_1***,** 15 p.

Hazen, E.L., Jorgensen, S., Rykaczewski, R.R., Bograd, S.J., Foley, D.G., Jonsen, I.D., Shaffer, S.A., Dunne, J.P., Costa, D.P., Crowder, L.B. and Block, B.A. (2012) Predicted habitat shifts of Pacific top predators in a changing climate. *Nature Climate Change,* **3,** 234-238.

Hazin, F.H.V., Hazin, H.G. and Travassos, P. (2007) CPUE and catch trends of shark species caught by Brazilian longliners in the Southwestern Atlantic Ocean. *Col. Vol. Sci. Pap. ICCAT,* **60,** 636-647.

Herrera, M. and Pierre, L. (2011) Review of the statistical data available for the bycatch species. IOTC–2011–WPEB07–08.

Hoelzel, A.R., Shivji, M.S., Magnussen, J. and Francis, M.P. (2006) Low worldwide genetic diversity in the basking shark (Cetorhinus maximus). *Biol. Lett.,* **2,** 639-642.

Howey-Jordan, L.A., Brooks, E.J., Abercrombie, D.L., Jordan, L.K.B., Brooks, A., Williams, S., Gospodarczyk, E. and Chapman, D.D. (2013) Complex Movements, philopatry and expanded depth range of a severely threatened pelagic shark, the oceanic whitetip (Carcharhinus longimanus) in the western North Atlantic. *PloS one,* **8,** 1-12.

Howey, L.A., Tolentino, E.R., Papastamatiou, Y.P., Brooks, E.J., Abercrombie, D.L., Watanabe, Y.Y., Williams, S., Brooks, A., Chapman, D.D. and Jordan, L.K.B. (2016) Into the deep: the functionality of mesopelagic excursions by an oceanic apex predator. *Ecol. Evol.*

Huang, H.-W. and Liu, K.-M. (2010) Bycatch and discards by Taiwanese large-scale tuna longline fleets in the Indian Ocean. *Fisheries Research,* **106,** 261-270.

Hutchinson, M.R., Itano, D.G., Muir, J.A. and Holland, K.N. (2015) Post-release survival of juvenile silky sharks captured in a tropical tuna purse seine fishery. *Marine Ecology Progress Series,* **521,** 143-154.

IATTC (2007) Proposal for a comprehensive assessment of key shark species caught in assocaition with fisheries in the eastern Pacific Ocean. Document SAR-8-15. Inter-American Tropical Tuna Commission Working Group to Review Stock Assessments. La Jolla, California.

IATTC (2011) Resolution C-11-10 - Resolution on the conservatino of oceanic whitetip sharks caught in association with fisheries in the Antigua Convention Area. Inter-American Tropical Tuna Commission 82nd Meeting, La Jolla, California (USA).

ICES (2014) Report of the Working Group on Elasmobranch Fishes (WGEF). Lisbon, Portugal. 681pp.

ICMBio (2014) Lista de Especies Ameacadas - Peixes Carcharhinus longimanus (Poey, 1861) - Tubarão-galha-branca. Ministerio do Meio Ambiente Instituto Chico Mendes de Conservacao de Biodiversidade. Accessed: http://www.icmbio.gov.br/portal/faunabrasileira/lista-de-especies/6526-especie-6526.

IOTC (2011a) Report of the seventh session of the IOTC Working Party on Ecosystems and Bycatch. Lankanfinolhu, North Malé Atoll, Republic of Maldives, IOTC–2011–WPEB07–R[E]. p. 99.

IOTC (2011b) Report of the 14th Session of the IOTC Scientific Committee. Mahé, Seychelles, Indian Ocean Tuna Commission. 259pp.

IOTC (2014) Report of the Seventeenth Session of the IOTC Scientific Committee. IOTC–2014–SC17–R[E]. 357.

IOTC (2015a) Status of the Indian Ocean oceanic whitetip shark (OCS: Carcharhinus longimanus). *IOTC–2015–SC18–ES18[E]*.

IOTC (2015b) Review of the statistical data available for bycatch species. Indian Ocean Tuna Commission. IOTC–2015–WPEB11–07. 39pp.

Jabado, R.W., Al Ghais, S.M., Hamza, W., Henderson, A.C., Spaet, J.L.Y., Shivji, M.S. and Hanner, R.H. (2015) The trade in sharks and their products in the United Arab Emirates. *Biological Conservation,* **181,** 190-198.

Jacquet, J., Alava, J.J., Ganapathiraju, P., Henderson, S. and Zeller, D. (2008) In hot soup: sharks captured in Ecuador's waters. *Environ. Sci.,* **5**.

Jayathilaka, R.A.M. and Maldeniya, R. (2015) Impact of policies on the conservation of sharks in the large pelagic fishery. IOTC–2015–WPEB11–18 Rev_1. National Aquatic Resources Research and Development Agency (NARA), Crow Island, Colombo 15, Sri Lanka.

John, M.E. and Varghese, B.C. (2009) Decline in CPUE of oceanic sharks in the Indian EEZ : urgent need for precautionary approach. Mobasa, Kenya, IOTC Working Party on Ecosystems and Bycatch.

Joung, S.-J., Liu, K.-M., Liao, Y.-Y. and Hsu, H.-H. (2005) Observed by-catch of Taiwanese tuna longline fishery in the South Atlantic Ocean. *J. Fish. Soc. Taiwan,* **32,** 69-77.

Joung, S.-J., Chen, N.-F., Hsu, H.-H. and Liu, K.-M. (2016) Estimates of life history parameters of the oceanic whitetip shark,Carcharhinus longimanus, in the Western North Pacific Ocean. *Mar. Biol. Res.***,** 1-11.

Kannan, K., Blankenship, A.L., Jones, P.D. and Giesy, J.P. (2000) Toxicity reference values for the toxic effects of Polychlorinated Biphenyls to aquatic mammals. *Hum. Ecol. Risk Assess.,* **6,** 181-201.

Kirby and Hobday (2007) Ecological risk assessment for the effects of fishing in the Western & Central Pacific Ocean: productivity-susceptibility anlysis. Western and Central Pacific Fisheries Commission, Scientific Committee Third Regular Session. 20pp.

Kohler, N.E., Casey, J.G. and Turner, P.A. (1998) NMFS cooperative shark tagging program, 1962-1993: an atlas of shark tag and recapture data. *Marine Fisheries Review,* **60,** 1-87.

Koopman, M. and Knuckey, I. (2014) Advice on CITES Appendix II Shark Listings. Fishwell Consulting Pty Ltd 2014.

Kyne, P.M., Carlson, J.K., Ebert, D.A., Fordham, S.V., Bizzarro, J.J., Graham, R.T., Kulka, D.W., Tewes, E.E., Harrison, L.R. and Dulvy, N.K. (2012) The conservation status of North American, Central American, and Caribbean Chondrichthyans. Vancouver, Canada, IUCN Species Survival Commission Shark Specialist Group.

Lack, M. and Meere, F. (2009) Pacific Islands Regional Plan of Action for sharks: guidance for Pacific Island countries and territories on the conservation and management of sharks. 123 pp.

Lack, M. and Sant, G. (2012) An overview of shark utilisation in the Coral Triangle region. TRAFFIC and WWF.

Lawson, T. (2011) Estimation of catch rates and catches of key shark species in tuna fisheries of the Western and Central Pacific Ocean using observer data. Western and Central Pacific Fisheries Commission, Scientific Committee Seventh Regular Session.

Lee, H.K., Kim, S.J., Jeong, Y., Lee, S., Jeong, W., Lee, W.C., Choy, E.J., Kang, C.K. and Moon, H.B. (2015) Polybrominated diphenyl ethers in thirteen shark species from offshore and coastal waters of Korea. *Mar. Pollut. Bull.,* **95,** 374-379.

Lessa, R., Santana, F.M. and Paglerani, R. (1999) Age, growth and stock structure of the oceanic whitetip shark, Carcharhinus longimanus, from the southwestern equatorial Atlantic. *Fisheries Research,* **42,** 21-30.

Liu, K.-M. and Tsai, W.-P. (2011) Catch and life history parameters of pelagic sharks in the Northwestern Pacific. Keelung, Chinese Taipei, ISC Shark Working Group Workshop. 12pp.

Liu, S.Y., Chan, C.L., Lin, O., Hu, C.S. and Chen, C.A. (2013) DNA barcoding of shark meats identify species composition and CITES-listed species from the markets in Taiwan. *PloS one,* **8,** e79373.

Lombardi-Carlson, L.A., Cortés, E., Parsons, G.R. and Manire, C.A. (2003) Latitudinal variation in life-history traits of bonnethead sharks, Sphyrna tiburo, (Carcharhiniformes:Sphyrnidae) from the eastern Gulf of Mexico. *Marine and Freshwater Research,* **54,** 875-883.

Madigan, D.J., Brooks, E.J., Bond, M.E., Gelsleichter, J., Howey, L.A., Abercrombie, D.L., Brooks, A. and Chapman, D.D. (2015) Diet shift and site-fidelity of oceanic whitetip sharks Carcharhinus longimanus along the Great Bahama Bank. *Marine Ecology Progress Series,* **529,** 185-197.

Martinez-Ortiz, J., Aires-da-Silva, A.M., Lennert-Cody, C.E. and Maunder, M.N. (2015) The Ecuadorian Artisanal Fishery for Large Pelagics: Species Composition and Spatio-Temporal Dynamics. *PloS one,* **10,** e0135136.

Mather, F.J. and Day, C.G. (1954) Observations of pelagic fishes of the tropical Atlantic. *Copeia,* **1954, No. 3,** 179-188.

Maufroy, A., Chassot, E., Joo, R. and Kaplan, D.M. (2015) Large-Scale Examination of Spatio-Temporal Patterns of Drifting Fish Aggregating Devices (dFADs) from Tropical Tuna Fisheries of the Indian and Atlantic Oceans. *PloS one,* **10,** e0128023.

Maunder, M.N. and Punt, A.E. (2004) Standardizing catch and effort data: a review of recent approaches. *Fisheries Research,* **70,** 141-159.

Mazzoleni, R.C. and Schwingel, P.R. (1999) Elasmobranch species landed in Itajaí Harbor, southern Brazil. *Notas TÉC. Facimar,* **3,** 111-118.

Megalofonu, P., Yannopoulos, C., Damalas, D., De Metrio, G., Deflorio, M., se la Serna, J.M. and Macias, D. (2005) Incidental catch and estimated discards of pelagic sharks from the swordfish and tuna fisheries in the Mediterranean Sea. *Fishery Bulletin,* **103,** 620-634.

Mejuto, J., García-Cortés, B. and Ramos-Cartelle, A. (2005) Tagging-recapture activities of large pelagic sharks carried out by Spain or in collaboration with the tagging programs of other countries. *Col. Vol. Sci. Pap. ICCAT,* **58,** 974-1000.

Miller, M.H., Carlson, J., Hogan, L. and Kobayashi, D. (2014) Status Review Report: Great Hammerhead Shark (Sphyrna mokarran). Final Report to National Marine Fisheries Service, Office of Protected Resources. June 2014. 116.

Molony, B. (2007) Commonly captured sharks and rays for consideration of the ecosystem and bycatch SWG at SC3. Western and Central Pacific Fisheries Commission Scientific Committee Third Regular Session. WCPFC-SC3-EB SWG/IP-19.

Moreno, G. and Herrera M. (IOTC Secretariat) (2013) Estimation of fishing capacity by tuna fishing fleets in the Indian Ocean. *Report presented at the 16th Session of the Scientific Committee of the Indian Ocean Tuna Commission. Busan, Republic of Korea, 2–6 December 2013. IOTC–2013–SC16–INF04.*

MRAG Asia Pacific (2016) Towards the quantification of illegal, unreported and unregulated (IUU) fishing in the Pacific Islands region. p. 101.

Mundy-Taylor, V. and Crook, V. (2013) Into the deep: Implementing CITES measures for commercially-valuable sharks and manta rays. Report prepared for the European Commission.

Murua, H., Coelho, R., Santos, M.N., Arrizabalaga, H., Yokawa, K., Romanov, E., Zhu, J.F., Kim, Z.G., Bach, P., Chavance, P., Delgado de Molina, A. and Ruiz, J. (2012) Preliminary Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the Indian Ocean Tuna Commission (IOTC). IOTC-2012-WPEB08-31 Rev_2. 16pp.

Murua, H., Abascal, F.J., Amande, J., Ariz, J., Bach, P., Chavance, P., Coelho, R., Korta, M., Poisson, F., Santos, M.N. and Seret, B. (2013a) Provision of scientific advice for the purpose of the implementation of the EUPOA sharks. Final Report. European Commission, Studies for Carrying out the Common Fisheries Policy (MARE/2010/11 -LOT 2).

Murua, H., Santos, M.N., Chavance, P., Amande, J., Abascal, F.J., Ariz, J., Bach, P., Korta, M., Poisson, F., Coelho, R. and Seret, B. (2013b) EU project for the provision of scientific advice for the purpose of the implementation of the EUPOA sharks: a brief overview of the results for Indian Ocean. *IOTC–2013–WPEB09–19 Rev_1***,** 21 pp.

Musyl, M.K., Brill, R.W., Curran, D.S., Fragoso, N.M., McNaughton, L.M., Nielsen, A., Kikkawa, B.S. and Moyes, C.D. (2011) Postrelease survival, vertical and horizontal movements, and thermal habitats of five species of pelagic sharks in the central Pacific Ocean. *Fishery Bulletin,* **109,** 341-368.

NMFS (2006) Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan. Highly Migratory Species Management Division, Office of Sustainable Fisheries. NOAA Fisheries. U.S. Department of Commerce.

NMFS (2008) Final Amendment 2 to the Consolidated Atlantic Highly Migratory Species Fishery Managment Plan. Silver Spring, MD: Office of Sustainable Fisheries, Highly Migratory Species Management Division. NOAA Fisheries. U.S. Department of Commerce. p. 726.

NMFS (2009a) Amendment 1 to the Consolidated HMS FMP. Essential Fish Habitat. Chapter 5. 59-263pp.

NMFS (2009b) Annual Report of the United States of America. U.S. Department of Commerce, NOAA Fisheries. 62pp.

NMFS (2011a) U.S. National Bycatch Report First Edition. U.S. Dep. Comm., NOAA Tech. Memo. NMFS-F/SPO-117C. 528pp.

NMFS (2011b) Final environmental assessment, regulatory impact review, and final regulatory flexibility analysis for a final rule to implement the 2010 International Commission for the Conservation of Atlantic Tunas recommendations on Sharks. United States Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Office of Sustainable Fisheries Highly Migratory Species Management Division.

NMFS (2011c) Shark finning report to Congress purusant to the Shark Finning Prohibition Act (Public Law 106-557). *U.S. Department of Commerce National Oceanic and Atmospheric Administration***,** 112 pp.

NMFS (2012) 2012 Stock Assessment and Fishery Evaluation report (SAFE) for Atlantic Highly Migratory Species. *Atlantic Highly Migratory Species Management Division. NOAA Fisheries. U.S. Department of Commerce*.

NMFS (2013) U.S. National Bycatch Report First Edition Update 1. L.R. Benaka, C. Rilling, E.E. Seney and H. Winarsoo (eds) U.S. Dep. of Commerce. p. 57.

NMFS (2014) 2014 Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species. *Atlantic Highly Migratory Species Management Division. NOAA Fisheries. U.S. Department of Commerce***,** 195 pp.

NMFS (2015) Improving international fisheries management: Report to Congress pursuant to section 403(a) of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. U.S. Department of Commerce. p. 107.

NMFS (2016) HMS commercial compliance guide: guide for complying with the Atlantic tunas, swordfish, shark, and billfish regulations. Office of Sustainable Fisheries, Highly Migratory Species Management Division: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service p. 77.

NMFS (2017) 2016 Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species. Silver Spring, MD, Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Atlantic Highly Migratory Species Management Division. 203pp.

Novianto, D., Rochman, F. and Nugraha, B. (2014) Species composition, CPUE and length frequency of oceanic sharks based on observer data from the Indonesian longline fishery in the Indian Ocean.

O'Meara, D., Harper, S., Perera, N. and Zeller, D. (2011) Reconstruction of Sri Lanka's fisheries catches 1950-2008. In: *Fisheries Centre Research Reports Fisheries Catch Reconstructions: Islands Part II.* S. Harper and D. Zeller (eds) British Columbia, Canada: Fisheries Centre, University of British Columbia.

Petersen, S., Nel, D. and Omardien, A. (2007) Towards an ecomsystem approach to longline fisheries in the Benguela: an assessment of impcats on seabirds, sea turtles, and sharks. WWF South Africa Report Series – 2007/Marine/001. World Wildlife Fund.

Piovano, S. and Gilman, E. (2016) Elasmobranch captures in the Fijian pelagic longline fishery. *Aquatic Conservation: Marine and Freshwater Ecosystems,* **2016,** 13.

PIRO (2015) Compliance guide: Fishing restrictions related to the oceanic whitetip shark, the silky shark and the whale shark. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service Pacific Islands Regional Office. p. 7.

Poisson, F., Filmalter, J.D., Vernet, A.-L., Dagorn, L. and Jech, J.M. (2014) Mortality rate of silky sharks (*Carcharhinus falciformis*) caught in the tropical tuna purse seine fishery in the Indian Ocean. *Canadian Journal of Fisheries and Aquatic Sciences,* **71,** 795-798.

Ramos-Cartelle, A., García-Cortés, B., Ortíz de Urbina, J., Fernández-Costa, J., González-González, I. and Mejuto, J. (2012) Standardized catch rates of the oceanic whitetip shark (*Carcharhinus longimanus*) from observations of the Spanish longline fishery targeting swordfish in the Indian Ocean during the 1998-2011 period. IOTC-2012-WPEB08-27. 15pp.

Rice, J. and Harley, S. (2012) Stock assessment of oceanic whitetip sharks in the western and central Pacific Ocean. Western and Central Pacific Fisheries Commission Scientific Committee Eighth Regular Session. WCPFC-SC8-2012/SA-WP-06 Rev 1. 53pp.

Rice, J., Tremblay-Boyer, L., Scott, R., Hare, S. and Tidd, A. (2015) Analysis of stock status and related indicators for key shark species of the Western Central Pacific Fisheries Commission. *Western and Central Pacific Fisheries Commission, Scientific Committee Eleventh Regular Session. WCPFC-SC11-2015/EB-WP-04-Rev 1***,** 146 pp.

Rodrigues, J., Freitas, D., Fernandes, Í. and Lessa, R. (2015) Estrutura populacional do tubarao estrangeiro (*Carcharhinus longimanus*) no Atlantico Sul. 3.

Roman-Verdesoto, M. and Orozco-Zoller, M. (2005) Bycatches of sharks in the tuna purse-seine fishery of th eastern Pacific ocean reported by observers of the Inter-American Tropical Tuna Commission, 1993-2004. La Jolla, California, Inter-American Tropical Tuna Commission.

Romanov, E. (2002) Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. *Fishery Bulletin,* **100,** 90-105.

Romanov, E., Bach, P. and Romanova, N.y. (2008) Preliminary estimates of bycatches in the western equatorial Indian Ocean in the traditional multifilament longline gears (1961-1989). Bangkok, Thailand: IOTC Working Party on Environment and Bycatch (WPEB). IOTC-2008-WPEB-10.

Romanov, E. and Romanova, N. (2009) Size distribution and length-weight relationships for some large pelagic sharks in the Indian Ocean. IOTC Working Party on Ecosystems and Bycatch (WPEB). Mombasa, Kenya. IOTC-2009-WPEB-06.

Romanov, E., Bach, P., Rabearisoa, N., Rabehagasoa, N., Filippi, T. and Romanova, N. (2010) Pelagic elasmobranch diversity and abundance in the Indian Ocean: an analysis of long-term trends from research and fisheries longline data. IOTC-2010-WPEB-16. 19pp.

Rose, D.A. (1996) An overview of world trade in sharks and other cartilaginous fishes. A TRAFFIC Network Report. 112pp.

Ruck, C. (2016) Global genetic connectivity and diversity in a shark of high conservation concern, the oceanic whitetip, *Carcharhinus longimanus*. Master of Science, Nova Southeastern University, 64pp.

Santana, F.M., Duarte-Neto, P.J. and Lessa, R.P. (2004) *Carcharhinus longimanus*. In: *Dinâmica de Populações e Avaliação de Estoques dos Recursos Pesqueiros da Região Nordeste. Vol II.* R.P. Lessa, M.F. de Nóbrega and J.L. Bezerra Jr. (eds): Universidade Federal Rural de Pernambuco Deoartanebti de Pesca. Laboratório de Dinâmica de Populações Marinhas - DIMAR.

Satria, F., Nugroho, W., Sadiyah, D., Nugraha, L., Barata, B. and Suryanto, A. (2011) National report Indonesia southern bluefin tuna fisheries. Bali, Benoa 19 - 28th July 2011. CCSBT – ESC/1107/SBT FISHERIES – Indonesia (revised).

Seki, T., Taniuchi, T., Nakano, H. and Shimizu, M. (1998) Age, growth and reproduction of the oceanic whitetip Shark from the Pacific Ocean. *Fisheries Science,* **64,** 14-20.

Semba, Y. and Yokawa, K. (2011) Trend of standardized CPUE of oceanic whitetip shark (*Carcharhinus longimanus*) caught by Japanese longline fishery in the Indian Ocean. IOTC–2011–WPEB07–35.

Sembiring, A., Pertiwi, N.P.D., Mahardini, A., Wulandari, R., Kurniasih, E.M., Kuncoro, A.W., Cahyani, N.K.D., Anggoro, A.W., Ulfa, M., Madduppa, H., Carpenter, K.E., Barber, P.H. and Mahardika, G.N. (2015) DNA barcoding reveals targeted fisheries for endangered sharks in Indonesia. *Fisheries Research,* **164,** 130-134.

Simpfendorfer, C. (2014) Information for the development of Non Detriment Findings for CITES listed sharks. Report to Department of the Environment. Centre for Sustainable Tropical Fisheries and Aquaculture & School of Earth and Environmental Sciences, James Cook University, Queensland, Australia. 39pp.

Smale, M.J. (2008) Pelagic shark fisheries in the Indian Ocean. In: *Sharks of the Open Ocean.* M.D. Camhi, E.K. Pikitch and E.A. Babcock (eds) Oxford, U.K.: Blackwell Publishing Ltd. pp. 247-259.

Smith, S.E., Au, D.W. and Show, C. (1998) Intrinsic rebound potentials of 26 species of Pacific sharks. *Marine and Freshwater Research,* **49,** 663-678.

Smith, S.E., Au, D.W. and Show, C. (2008) Intrinsic rates of increase in pelagic elasmobranchs. In: *Sharks of the open ocean: biology, fisheries and conservation.* M.D. Camhi, E.K. Pikitch and E.A. Babcock (eds): Blackwell Publishing Ltd.

Sosa-Nishizaki, O., Marquez-Farias, J.F. and Villavincencio-Garayzar, C.J. (2008) Case study: pelagic shark fisheries along the west coast of Mexico. In: *Sharks of the open ocean: biology, fisheries, and conservation.* M. Camhi, E.K. Pikitch and E.A. Babcock (eds): Blackwell Publishing. pp. 60-68.

SPC (2010) Non-target species interactions with the tuna fisheries of the Western and Central Pacific Ocean. In: *Scientific Committee Sixth Annual Session* Nuku'alofa Tonga: Western and Central Pacific Fisheries Commission. p. 59.

Storelli, M.M., Ceci, E., Storelli, A. and Marcotrigiano, G.O. (2003) Polychlorinated biphenyl, heavy metal and methylmercury residues in hammerhead sharks: contaminant status and assessment. *Marine Pollution Bulletin,* **46,** 1035-1039.

Strasburg, D. (1958) Distribution, abundance, and habits of pelagic sharks in the Central Pacific ocean. . *Fishery Bulletin 138 Washington, U.S. Govt. Print. Off.,* **58,** 335-361.

Tambourgi, M.R.d.S., Hazin, F.H.V., Oliveira, P.G.V., Coelho, R., Burgess, G. and Roque, P.C.G. (2013) Reproductive aspects of the oceanic whitetip shark, *Carcharhinus longimanus* (Elasmobranchii: Carcharhinidae), in the equatorial and southwestern Atlantic Ocean. *Brazilian Journal of Oceanography,* **61,** 161-168.

Taniuchi, T. (1990) The role of elasmobranchs in Japanese fisheries. In: *Elasmobranchs as living resources: advances in the biology, ecology, systematics, and the status of the fisheries.* J. Pratt, Harold L., S.H. Gruber and T. Taniuchi (eds): NOAA Dept. of Commerce. p. 12.

Testerman, C. (2014) Molecular ecology of globally distributed sharks. Doctoral Dissertation. Nova Southeastern University. Retrieved from NSUWorks, Oceanographic Center. (6) http://nsuworks.nova.edu/occ_stuetd/6.

Tolotti, M.T., Travassos, P., Frédou, F.L., Wor, C., Andrade, H.A. and Hazin, F. (2013) Size, distribution and catch rates of the oceanic whitetip shark caught by the Brazilian tuna longline fleet. *Fisheries Research,* **143,** 136-142.

Tolotti, M.T., Bach, P., Hazin, F., Travassos, P. and Dagorn, L. (2015a) Vulnerability of the Oceanic Whitetip Shark to Pelagic Longline Fisheries. *PloS one,* **10,** e0141396.

Tolotti, M.T., Bach, P., Romanov, E. and Dagorn, L. (2015b) Interactions of oceanic whitetip sharks with the tuna purse seine fishery in the Indian Ocean. *IOTC-2015-WPEB11-29.*

Tolotti, M.T., Filmalter, J.D., Bach, P., Travassos, P., Seret, B. and Dagorn, L. (2015c) Banning is not enough: The complexities of oceanic shark management by tuna regional fisheries management organizations. *Global Ecology and Conservation,* **4,** 1-7.

Valdés, J.A., Abierno, A.R. and Hueter, R.E. (2016) Catches of oceanic whitetip sharks (Carcharhinus longimanus) off the Northwest Coast of Cuba. Center for Marine Research, University of Havana, Cuba and Mote Marine Laboratory, Sarasota, Florida USA.

Vannuccini, S. (1999) Shark utilization, marketing, and trade. *FAO Fisheries Technical Paper 389,* **Accessed online: http://www.fao.org/docrep/005/x3690e/x3690e00.htm**.

Varghese, S.P., Vijayakumaran, K., Tiburtius, A. and Mhatre, V.D. (2015) Diversity, abundance and size structure of pelagic sharks caught in tuna longline survey in the Indian seas. *Indian Journal of Geo-Marine Science,* **44,** 11.

Varghese, S.P., Unnikrishnan, N., Gulati, D.K. and Ayoob, A.E. (2016) Size, sex and reproductive biology of seven pelagic sharks in the eastern Arabian Sea. *Journal of the Marine Biological Association of the United Kingdom,* **97,** 181-196.

Varkey, D.A., Ainsworth, C.H., Pitcher, T.J., Goram, Y. and Sumaila, R. (2010) Illegal, unreported and unregulated fisheries catch in Raja Ampat Regency, Eastern Indonesia. *Marine Policy,* **34,** 228-236.

Walsh, W., Bigelow, K. and Sender, K. (2009) Decreases in shark catches and mortality in the Hawaii-based longline fishery as documented by fishery observers. In: *Western and Central Pacific Fisheries Commission Scientific Committee Fifth Regular Session. WCPFC-SC5-2009/EB- IP-8.* Port Vila, Vanuatu. p. 36.

Walsh, W.A., Kleiber, P. and McCracken, M. (2002) Comparison of logbook reports of incidental blue shark catch rates by Hawaii-based longline vessels to fishery observer data by application of a generalized additive model. *Fisheries Research,* **58,** 79-94.

Walsh, W.A. and Clarke, S.C. (2011) Analyses of catch data for oceanic whitetip and silky sharks reported by fishery observers in the Hawaii-based longline fishery in 1995−2010. Pacific Islands Fisheries Science Center Administrative Report H-11-10. 76pp.

Ward-Paige, C.A. (2017) A global overview of shark sanctuary regulations and their impact on shark fisheries. *Marine Policy,* **82,** 87-97.

Ward-Paige, C.A. and Worm, B. (2017) Global evaluation of shark sanctuaries. *Global Environmental Change,* **47,** 174-189.

Webb, H., Hobday, A., Dowdney, J., Bulman, C., Sporcic, M., Smith, T., Furlani, D., Fuller, M., Williams, A. and Stobutzki, I. (2007) Ecological Risk Assessment for the Effects of Fishing: Eastern Tuna & Billfish Fishery: Longline Sub-fishery. Report for the Australian Fisheries Management Authority.

White, W.T. (2007) Biological observations on lamnoid sharks (Lamniformes) caught by fisheries in eastern Indonesia. *Journal of the Marine Biological Association of the UK,* **87,** 781.

Williams, P., Tuiloma, I. and Falasi, C. (2015) Status of ROP Data Management with tables on ROP longline coverage. Western and Central Pacific Fisheries Commission Scinetific Committee Eleventh Regular Session. Pohnpei, Federated States of Micronesia. p. 18.

WPFMC (2009) Fishery ecosystem plan for Pacific pelagic fisheries of the Western Pacific Region. Honolulu, Hawaii., Western Pacific Regional Fishery Management Council.

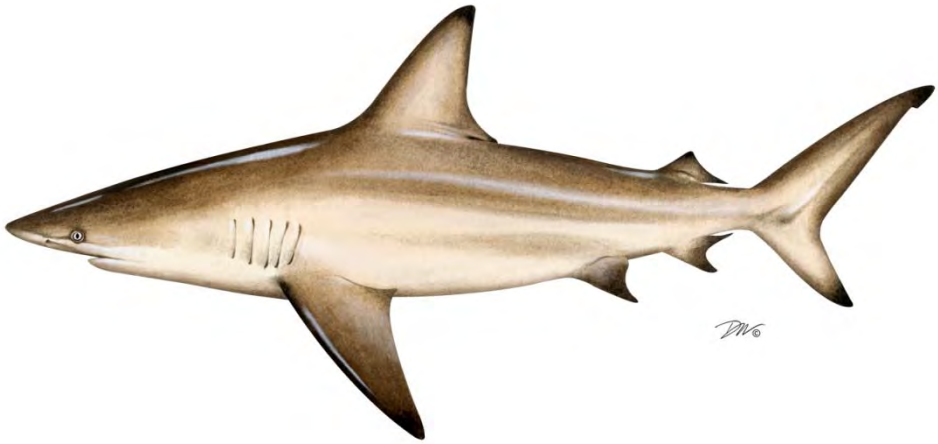
WPFMC (2012) Pelagic Fisheries of the Western Pacific 2012 Annual Report. Honolulu, Hawaii, Western Pacific Regional Fishery Management Council. 292pp.

Yokawa, K. and Semba, Y. (2012) Update of the standardized CPUE of oceanic whitetip shark (Carcharhinus longimanus) caught by Japanese longline fishery in the Indian Ocean. IOTC–2012–WPEB08–26.

2016 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN FOR

COASTAL SHARKS

2015 and 2016 FISHING YEAR



Coastal Sharks Plan Review Team

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I. Status of the Fishery Management Plan

Date of FMP Approval:	August 2008
Amendments	None
Addenda	Addendum I (September 2009) Addendum II (May 2013) Addendum III (October 2013) Addendum IV (August 2016)
Management Unit:	Entire coastwide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ
States With Declared Interest:	Maine, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
Active Boards/Committees:	Coastal Shark Management Board, Advisory Panel, Technical Committee, and Plan Review Team

a) Goals and Objectives

The Interstate Fishery Management Plan for Coastal Sharks (FMP) established the following goals and objectives.

GOALS

The goal of the Interstate Fishery Management Plan for Coastal Sharks is "to promote stock rebuilding and management of the coastal shark fishery in a manner that is biologically, economically, socially, and ecologically sound."

OBJECTIVES

In support of this goal, the following objectives proposed for the FMP include:

1. Reduce fishing mortality to rebuild stock biomass, prevent stock collapse, and support a sustainable fishery.
2. Protect essential habitat areas such as nurseries and pupping grounds to protect sharks during particularly vulnerable stages in their life cycle.
3. Coordinate management activities between state and federal waters to promote complementary regulations throughout the species' range.
4. Obtain biological and improved fishery related data to increase understanding of state water shark fisheries.
5. Minimize endangered species bycatch in shark fisheries.

b) Fisheries Management Plan Summary

The Atlantic States Marine Fisheries Commission (Commission) adopted its first fishery management plan (FMP) for coastal sharks in 2008. Coastal sharks are managed under this plan as six different complexes: prohibited, research, small coastal, non-sandbar large coastal, pelagic and smooth dogfish. The Board does not actively set quotas for any shark species. The Commission follows National Oceanic and Atmospheric Administration's (NOAA Fisheries) openings and closures for small coastal sharks, non- sandbar large coastal shark, and pelagic sharks. Species in the prohibited category may not be possessed or taken. Sandbar sharks may only be taken with a shark fishery research permit. All species must be landed with their fins attached to the carcass by natural means.

The FMP has been adapted through the following addenda:

Addendum I (2009) modified the FMP to allow limited smooth dogfish processing at sea (removal of fins from the carcass), as long as the total wet weight of the shark fins does not exceed 5 percent of the total dressed weight. In addition, smoothhound recreational possession limits and gill net check requirements for smoothhound fishermen were removed. These restrictions were removed because they were intended for large coastal sharks. The removal allowed smoothhound fishermen to continue operations while upholding the conservation measures of the FMP.

Addendum II (2013) modified the FMP to allow year round smooth dogfish processing at sea. If fins are removed the total wet weight of the shark fins may not exceed 12 percent of the total dressed weight. State-shares of the smoothhound coastwide quota were allocated. The goal of Addendum II was to implement an accurate fin-to-carcass ratio and prevent any one state from harvesting the entire smoothhound quota.

Addendum III (2013) modified the species groups in the FMP to ensure consistency with NOAA Fisheries (Table 1). The recreational size limit for the hammerhead species group was increased to 78" fork length.

Addendum IV (2016) was added to reflect measures outlined in the Shark Conservation Act into state regulations. It amends the Coastal Sharks FMP to allow smooth dogfish carcasses to be landed with corresponding fins removed from the carcass as long as the total retained catch, by weight, is composed of at least 25 percent smooth dogfish. Fishermen can retain smooth dogfish in an amount less than 25 percent of the total catch provided the smooth dogfish fins remain naturally attached to the carcass.

Table 1. List of commercial shark management groups

Species Group	Species within Group
Prohibited	Sand tiger, bigeye sand tiger, whale, basking, white, dusky, bignose, Galapagos, night, reef, narrowtooth, Caribbean sharpnoes, smalltail, Atlantic angel, longfin mako, bigeye thresher, sharpnose sevengill, bluntnose sixgill and bigeye sixgill sharks
Research	Sandbar sharks
Non-Blacknose Small Coastal	Atlantic sharpnose, finetooth, and bonnethead sharks
Blacknose	Blacknose sharks
Aggregated Large Coastal	Silky, tiger, blacktip, spinner, bull, lemon, and nurse
Hammerhead	scalloped hammerhead, great hammerhead and smooth hammerhead
Pelagic	Shortfin mako, porbeagle, common thresher, oceanic whitetip and blue sharks
Smoothhound	Smooth dogfish and Florida smoothhound

II. Status of the Stocks

Stock status is assessed by species or by species complex if there is not enough data for an individual assessment. Fourteen species have been assessed domestically, three species have been assessed internationally, and the rest have not been assessed. Table 2 describes the current stock status of several shark species along with references for the stock assessment.

The 2017 International Commission on the Convention of Atlantic Tunas (ICCAT) assessment of the North Atlantic population of shortfin mako indicates that the stock is overfished and overfishing is occurring. Multiple models were explored and new data sources integrated. Combined probability of overfishing occurring and the stock being in an overfished state was 90% across all models.

The 2017 Southeast Data and Assessment Review (SEDAR 54) stock assessment for sandbar sharks indicates the stock is overfished and not experiencing overfishing. This assessment used a new approach (Stock Synthesis) instead of the State Space Age Structure Production Model that was used in the previous assessment (SEDAR 21). A replication analysis conducted using the prior model (updated with data through 2015) resulted in the same stock status as the new model (overfished, no overfishing occurring).

The 2016 stock assessment update (SEDAR 21) for Atlantic dusky sharks indicates the stock is overfished and experiencing overfishing. This latest review functioned an update to the 2011

assessment, so no new methodology was introduced. However, all model inputs were updated with more recent data (i.e. 2010-2015 effort, observer, and survey data).

In 2015, a benchmark stock assessment (SEDAR 39) was conducted for the smoothhound complex, including smooth dogfish, the only species of smoothhound occurring in the Atlantic. The assessment indicates Atlantic smooth dogfish (*Mustelus canis*) are not overfished and not experiencing overfishing.

The North Atlantic blue shark (*Prionace glauca*) stock was assessed by ICCAT's Standing Committee on Research and Statistics (SCRS) in 2015. Similar to results of the 2008 stock assessment, ICCAT's 2015 analysis The assessment indicated the stock is not overfished and not experiencing overfishing, as was also concluded in the 2008 stock assessment. However, scientists acknowledge there is a high level of uncertainty in the data inputs and model structural assumptions; therefore, the assessment results should be interpreted with caution.

SEDAR 34 (2013) assessed the status of Atlantic sharpnose (*Rhizoprionodon terraenovae*) and bonnethead (*Sphyrna tiburo*) sharks. The Atlantic sharpnose stock is not overfished and not experiencing overfishing. The stock status of bonnethead shark stocks (Atlantic and Gulf of Mexico) is unknown. A benchmark assessment is recommended for both stocks.

A 2011 benchmark assessment (SEDAR 21) of dusky (*Carcharhinus obscures*), sandbar (*Carcharhinus plumbeus*), and blacknose (*Carcharhinus acrontus*) sharks indicates that dusky and blacknose sharks are overfished and experiencing overfishing. Sandbar sharks continued to be overfished. As described in the Magnuson-Stevens Act, NOAA Fisheries must establish a rebuilding plan for an overfished stock. As such, the rebuilding date for dusky sharks is 2108, sandbar sharks is 2070, and blacknose sharks is 2043. A dusky stock assessment update is scheduled for 2016.

Porbeagle sharks (*Lamna nasus*) were assessed by the ICCAT's SCRS in 2009. The assessment found the Northwest Atlantic stock is increasing in biomass, however the stock is considered to be overfished with overfishing not occurring. NOAA Fisheries established a 100-year rebuilding plan for porbeagle sharks; the expected rebuilding date is 2108.

A 2009 stock assessment for the Northwest Atlantic and Gulf of Mexico populations of scalloped hammerhead sharks (*Sphyrna lewini*) indicated the stock is overfished and experiencing overfishing. This assessment was reviewed by NOAA Fisheries and deemed appropriate to serve as the basis for U.S. management decision. In response to the assessment findings, NOAA Fisheries established a scalloped hammerhead rebuilding plan that will end in 2023.

SEDAR 11 (2006) assessed the Large Coastal Sharks (LCS) complex and blacktip sharks (*Carcharhinus limbatus*). The LCS assessment suggested that it is inappropriate to assess the LCS complex as a whole due to the variation in life history parameters, different intrinsic rates of increase, and different catch and abundance data for all species included in the LCS complex.

Based on these results, NMFS changed the status of the LCS complex from overfished to unknown. As part of SEDAR 11, blacktip sharks were assessed for the first time as two separate populations: Gulf of Mexico and Atlantic. The results indicated that the Gulf of Mexico stock is not overfished and overfishing is not occurring, while the current status of blacktip sharks in the Atlantic region is unknown.

Table 2. Stock Status of Atlantic Coastal Shark Species and Species Groups

Species or Complex Name	Stock Status		References/Comments
	Overfished	Overfishing	
Pelagic			
Porbeagle	Yes	No	Porbeagle Stock Assessment, ICCAT Standing Committee on Research and Statistics Report (2009); Rebuilding ends in 2108 (HMS Am. 2)
Blue	No	No	ICCAT Standing Committee on Research and Statistics Report (2015)
Shortfin mako	Yes	Yes	ICCAT Standing Committee on Research and Statistics Report (2017)
All other pelagic sharks	Unknown	Unknown	
Aggregated Large Coastal Sharks (LCS)			
Atlantic Blacktip	Unknown	Unknown	SEDAR 11 (2006)
Aggregated Large Coastal Sharks - Atlantic Region	Unknown	Unknown	SEDAR 11 (2006); difficult to assess as a species complex due to various life history characteristics/ lack of available data
Non-Blacknose Small Coastal Sharks (SCS)			
Atlantic Sharpnose	No	No	SEDAR 34 (2013)
Bonnethead	Unknown	Unknown	SEDAR 34 (2013)
Finetooth	No	No	SEDAR 13 (2007)
Hammerhead			
Scalloped	Yes	Yes	SEFSC Scientific Review by Hayes et al. (2009); Rebuilding ends in 2023 (HMS Am. 5a)
Blacknose			
Blacknose	Yes	Yes	SEDAR 21 (2010); Rebuilding ends in 2043 (HMS Am. 5a)
Smoothhound			
Atlantic Smooth Dogfish	No	No	SEDAR 39 (2015)
Research			
Sandbar	Yes	No	SEDAR 54 (2017)
Prohibited			
Dusky	Yes	Yes	SEDAR 21 (2016); Rebuilding ends in 2108 (HMS Am. 2)
All other prohibited sharks	Unknown	Unknown	

III. Status of the Fishery

Specifications (Opening, closures, quotas)

NOAA Fisheries sets quotas for coastal sharks through the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan. The opening dates, closures dates and quotas are

detailed in Table 3. All non-prohibited coastal shark management groups, except aggregated large coastal and hammerheads shark groupings, opened on January 1, 2015. NOAA Fisheries closes commercial shark fisheries when 80% of the available quota is reached. Commercial shark dealer reports indicate the following commercial fisheries exceeded 80% of the available quota and had an early closure: blacknose, non-blacknose small coastals, aggregated large coastal and hammerhead fisheries. When the fishery closes in federal waters, the Interstate FMP dictates that the fishery also closes in state waters.

Table 3. Commercial quotas and opening dates for 2015 and 2016 shark fishing season

2015 Season

Species Group	Region	2015 Annual Quota (mt dw)	Season Opening Dates	Closing Date
Aggregated Large Coastal Sharks (LCS)	Atlantic	168.9	June 1, 2015	
Hammerhead Sharks	Atlantic	27.1	June 1, 2015	
Non-Blacknose Small Coastal Sharks (SCS)	Atlantic	176.1	January 1, 2015	June 7, 2015; Re-opened August 18
Blacknose Sharks	Atlantic	17.5	January 1, 2015	June 7, 2015
Blue Sharks	No regional quotas	273.0	January 1, 2015	
Porbeagle Sharks	No regional quotas	1.7	January 1, 2015	
Pelagic Sharks other than Porbeagle or Blue	No regional quotas	488.0	January 1, 2015	
Shark Research Quota (Aggregated LCS)	No regional quotas	50.0	January 1, 2015	
Sandbar Research Quota	No regional quotas	116.6	January 1, 2015	

2016 Season

Species Group	Region	2016 Annual Quota (mt dw)	Season Opening Date	Closing Date
Aggregated Large Coastal Sharks (LCS)	Atlantic	168.9	January 1, 2016	
Hammerhead Sharks	Atlantic	27.1		
Non-Blacknose Small Coastal Sharks (SCS)	Atlantic	264.1		May 29, 2016
Blacknose Sharks	Atlantic	15.7		May 29, 2016
Blue Sharks	No regional quotas	273.0		
Porbeagle Sharks	No regional quotas	1.7		
Pelagic Sharks other than Porbeagle or Blue	No regional quotas	488.0		
Shark Research Quota (Aggregated LCS)	No regional quotas	50.0		
Sandbar Research Quota	No regional quotas	90.7		

Commercial Landings

Commercial landings of Atlantic large coastal sharks species in 2016 were 465,936 pounds (lbs) dressed weight (dw), 25% decrease from 2015 landings and 20% decrease from 2014 landings (Table 4). Commercial landings of small coastal shark species in 2016 were 210,067 lbs dw, a 40% decrease from 2015 landings and 21% lower than 2014 landings (Table 5). 2016 Landings are a new low in landings for the time series over the last 9 years. Commercial landings of Atlantic pelagic sharks was 239,655 lbs dw, which represents an increase of 11% from 2015 landings but below the 2014 landings which were a time series peak (Table 6). The increase in pelagic shark landings can be attributed to an increase in the commercial harvest of Atlantic shortfin mako sharks.

Table 4. Commercial landings of authorized Atlantic large coastal sharks by species (pounds dw), 2008-2016. Source: HMS SAFE Report, 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Great hammerhead	0	0	0	0	371	7,406	13,538	36,892	20,454
Scalloped hammerhead	0	0	0	0	15,800	27,229	24,652	13,197	12,329
Smooth hammerhead		4,025	7,802	110	3,967	1,521	601	304	125
Unclassified	21,631	62,825	43,345	35,618	9,617	0	0	0	0
Hammerhead Total	**21,631**	**66,850**	**51,147**	**35,728**	**29,755**	**36,156**	**38,791**	**50,393**	**32,908**
Blacktip	258,035	229,267	246,617	176,136	215,403	256,277	282,009	229,823	248,470
Bull	43,200	61,396	56,901	49,927	24,504	33,980	32,372	33,737	31,417
Lemon	22,530	30,909	25,316	45,448	21,563	16,791	13,047	18,158	19,205
Nurse	10	0	71	0	81	0	0	24	0
Silky	306	1,386	1,049	992	29	186	289	1,246	446
Spinner	1,265	20,022	13,544	4,113	10,643	26,892	25,716	33,002	55,610
Tiger	14,119	15,172	43,145	36,425	23,245	16,561	29,062	28,460	14,896
Unclassified	187,670	70,894	2,229	50,711	53,705	0	0	0	0
Aggregated LCS Total	**527,135**	**429,046**	**388,872**	**363,766**	**349,345**	**350,687**	**382,495**	**344,450**	**370,044**
Sandbar	63,035	54,141	84,339	94,295	46,446	46,868	82,308	112,610	62,984
Hammerhead, Aggregated LCS, Sandbar Total	**611,801**	**550,037**	**524,358**	**493,775**	**425,374**	**433,710**	**464,803**	**507,453**	**465,936**

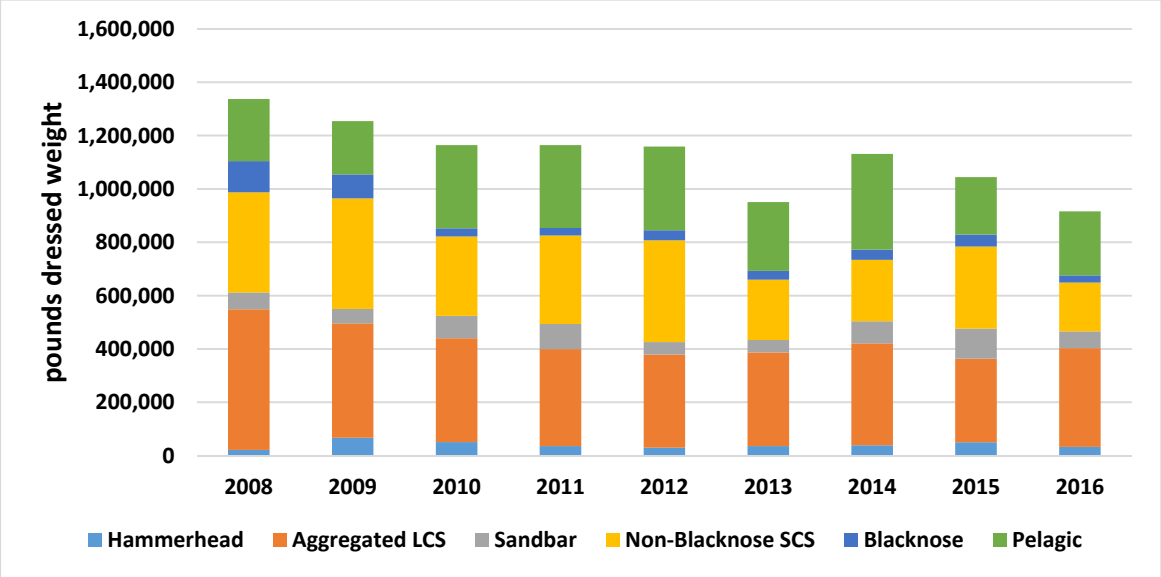
Table 5. Commercial landings of authorized Atlantic small coastal sharks by species (lbs dw), 2008-2016. Source: HMS SAFE Report, 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Blacknose	117,197	90,023	30,287	28,373	37,873	33,382	38,437	45,405	26,842
Bonnethead	61,549	53,912	9,069	28,284	19,907	22,845	13,221	5,885	1,688
Finetooth	28,872	63,359	76,438	52,318	15,922	19,452	19,026	8,712	5,647
Atl. Sharpnose	261,788	262,508	211,190	214,382	345,625	183,524	198,568	293,128	175,890
Unclassified	23,077	34,429	851	36,639	492	0	0	0	0
SCS Total	**490,483**	**504,231**	**327,835**	**359,996**	**419,819**	**259,203**	**269,252**	**353,130**	**210,067**

Table 6. Commercial landings of authorized pelagic sharks by species off the Atlantic coast of the United States (lbs dw), 2008-2016. Source: HMS SAFE Report, 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Blue	3,229	4,793	9,135	13,370	17,200	9,767	17,806	1,114	607
Porbeagle	5,259	3,609	4,097	5,933	4,250	54	6,414	0	0
Shortfin Mako	120,255	141,456	220,400	207,630	198,841	199,177	218,295	141,720	160,829
Unclassified	39,661	9,383	0	0	0	0	0	0	0
Oceanic	1,899	933	796	2,435	258	62	22	0	0
Thresher	47,528	33,333	61,290	47,462	63,965	48,768	116,012	72,463	78,219
Unclassified	14,819	6,650	16,160	33,884	28,932	0	0	0	0
Pelagic Total	**232,650**	**200,157**	**311,878**	**310,714**	**313,446**	**257,828**	**358,549**	**215,297**	**239,655**

Figure 1: Commercial landings of coastal sharks off the east coast of the United States by species complex, 2008-2016. Source: HMS SAFE Report, 2017.



Recreational Landings

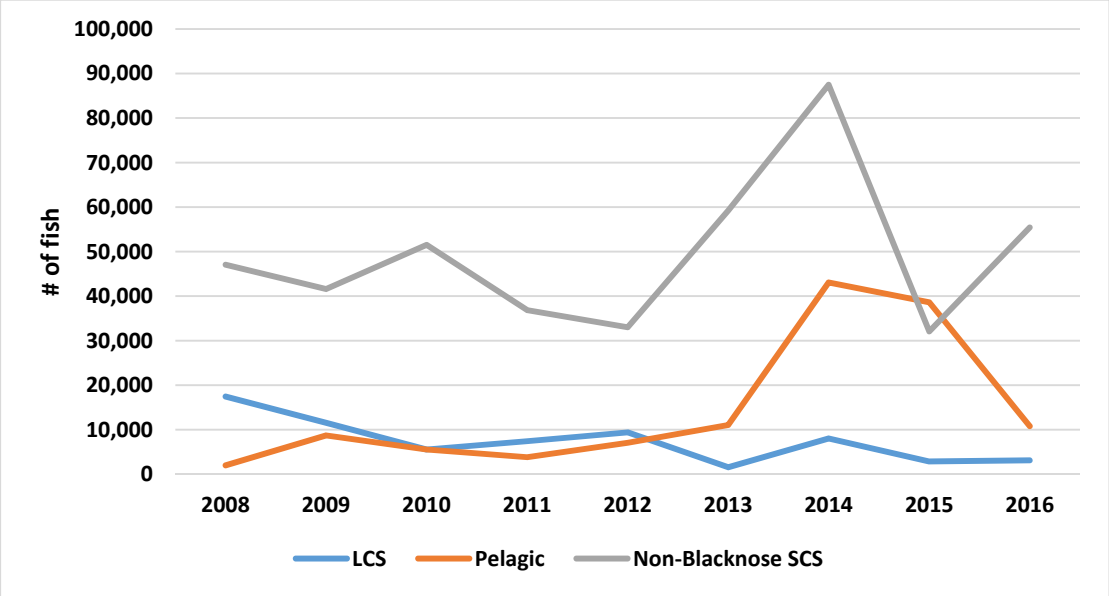
Approximately 69,543 sharks were harvested during the 2016 recreational fishing season, below 2015 landings but similar to 2013 and 2015 harvest levels (Table 7). The non-blacknose small coastal shark group comprised 55% of the overall recreational harvest, specifically Atlantic sharpnose, and bonnethead.

Table 7. Estimated recreational harvest of all Atlantic shark species by species group in numbers of fish, 2008-2016. Source: Updated based HMS SAFE Report, 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Aggregated LCS	17,441	11,536	5,540	7,397	9,386	1,547	8,010	2,852	3,100
Hammerhead	4	574	13	178	41	600	900	1	0
Pelagic*	1,972	8,694	5,529	3,806	7,034	11,057	43,047	38,470	10,789
Blacknose	2	947	0	573	0	70	4,146	1,211	223
Non-Blacknose SCS	47,059	41,577	51,529	36,851	33,005	59,208	87,480	32,065	55,426
Sandbar	4,210	6,461	2,193	1,125	857	399	1,873	1,252	5
Prohibited	1,502	506	4	23	15	16	2	0	0
Total	72,190	70,295	64,808	49,952	50,338	72,895	145,461	75,983	69,543

*Pelagic sharks include Gulf of Mexico landings.

Figure 2: Estimated recreational harvest for LCS, SCS and pelagic species by species group, in numbers of fish, 2008-2016. Source: HMS SAFE Report, 2017.



IV. Status of Research and Monitoring

Under the Interstate Fishery Management for Coastal Sharks, the states are not required to conduct any fishery dependent or independent studies; however, states are encouraged to

submit any information collected while surveying for other species. This section describes the research and monitoring efforts through the 2016 fishing year, where available.

The Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) appears in multiple state monitoring efforts, a brief description is below. The survey monitors the presence of young-of-year and juvenile sharks along the east coast. It is managed and coordinated by NOAA's Northeast Fisheries Science Center (NEFSC) through the Apex Predators Program based at the NEFSC's Narragansett Laboratory in Rhode Island. Longline and gillnet sampling, along with mark-recapture techniques are used to determine relative abundance, distribution and migration of sharks utilizing nursing grounds from Massachusetts to Florida. In 2016, COASTSPAN program participants were the University of North Florida (samples Georgia and North Florida state waters) and the South Carolina Department of Natural Resources. In addition, the survey is conducted in summer months in Narragansett and Delaware Bays, and in Massachusetts waters. Standardized indices of abundance from COASTPAN surveys are used in the stock assessments for large and small coastal sharks.

Massachusetts

Movement and Habitat Studies: With external funding from private and federal grants, *MarineFisheries* personnel continued in 2015 and 2016 to collaborate with federal and academic researchers on the study of broad and fine-scale movements of numerous shark species using pop-up satellite tags (PSAT), real-time satellite tags (SPOT), acoustic transmitters, and conventional tags. These species include white (data through 2016), basking, blue, shorfin mako, tiger, and sand tiger sharks (data through 2015).

Basking Shark: Since 2004, 57 basking sharks have been tagged with PSAT tags and 10 with SPOT tags. The broad- and fine-scale horizontal and vertical movements of this species are being examined by Tobey Curtis as part of his PhD project at University of Massachusetts–Dartmouth, School for Marine Science and Technology (SMAST). In 2015, Tobey conducted a quantitative analysis of the broad-scale movements of PSAT-tagged basking sharks as they relate to international boundaries and Exclusive Economics Zones.

White Shark: Our efforts to study the movement ecology of white sharks off Massachusetts and the eastern seaboard of the US continued in 2016. An additional 23 white sharks were tagged in 2015, bringing the total number tagged since 2009 to 102 individuals. These sharks were tagged with one or more of the following technologies: PSAT, SPOT, coded acoustic transmitters, autonomous underwater vehicle transponders, active acoustic transmitters, and NOAA Fisheries conventional tags. Tagged sharks ranged from roughly 7.5 to 18.5 feet in total length.

Work continued on a five-year study initiated in 2014 to quantify the regional population size and relative abundance of white sharks in Massachusetts waters. With funding and logistical support from local non-profits, aerial and vessel surveys were conducted from mid-June through October off the eastern coast of Cape Cod. During 40 vessel surveys, a total of 572 white sharks comprising 147 individuals were sighted and cataloged in 2016; 40% were re-sighted from previous years. As was the case in 2015, the distribution of white sharks shifted throughout the season in 2016 (Figure 1).Throughout the summer and fall, 36

white sharks were detected by *MarineFisheries'* acoustic receivers. This quantitative study is being conducted by UMass-SMAST student Megan Winton as part of her PhD research.

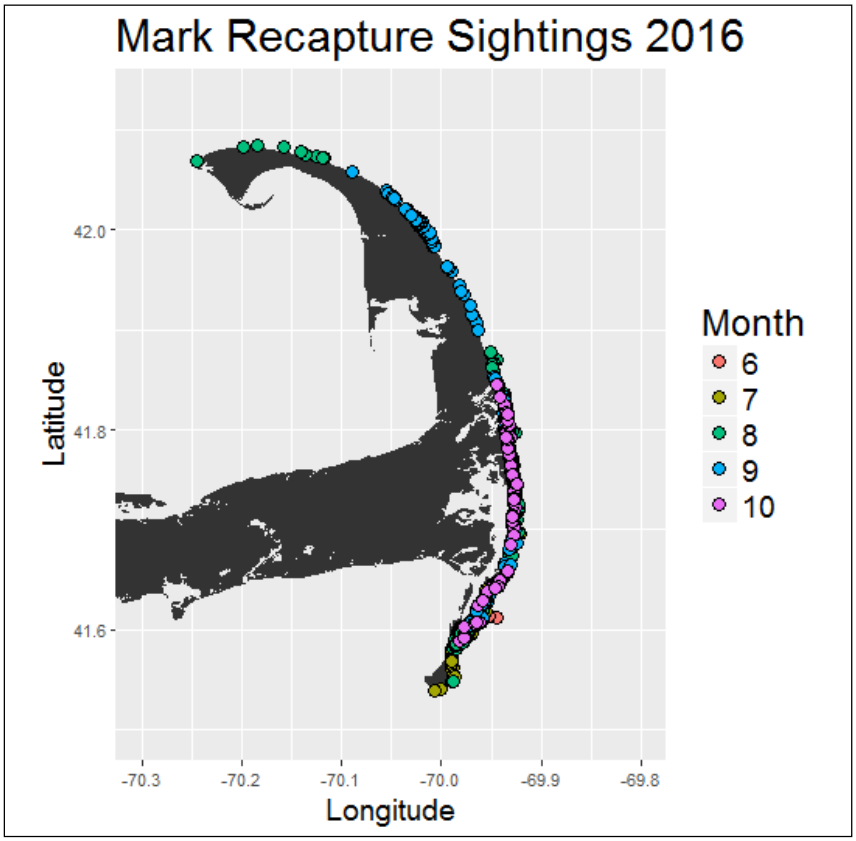


Figure 1. Monthly distribution of white sharks sighted off the coast of Cape Cod in 2016.

Blue and Shortfin Mako Sharks: In cooperation with the MIT/WHOI PhD student Camrin Braun, blue and shortfin mako sharks were tagged with SPOT and PSAT tags during the summer of 2015 to study the fine-scale movements of these species as they relate to eddy fields in the North Atlantic.

Post-release Survivorship Studies: In 2015, work continued with University of Massachusetts researcher Diego Bernal and PhD student Heather Marshall to study the physiological effects of longline capture in sandbar and dusky sharks. Funding for the study was obtained from the Saltonstall-Kennedy Program. In 2015, a manuscript resulting from this research was published in *Fisheries Research*:

Marshall, H, L., G. Skomal , P.G. Ross, and D. Bernal. 2015. At-vessel and post-release mortality of the dusky (Carcharhinus obscurus) and sandbar (C. plumbeus) sharks after longline capture. Fisheries Research. 172:373-384.

Life History: Working with NOAA Fisheries and WHOI researchers, Project personnel generated age and growth estimates for the white shark in the western North Atlantic. Using bomb-

produced radiocarbon, vertebral growth bands were counted and validated as annual. In 2015, this research was published in *Marine and Freshwater Research*:

Natanson, L.J. and G.B. Skomal. 2015. Age and growth of the white shark, Carcharodon carcharias, in the western North Atlantic Ocean. Marine and Freshwater Research, DOI: dx.doi.org/10.1071/MF14127.

Publications: Four other peer-reviewed papers, with *MarineFisheries* personnel as a co-author, were published in 2015:

Ashe, J.L., K.A. Feldheim, A.T. Fields, E.A. Reyier, E.J. Brooks, M.T. O'Connell, G.B. Skomal, S.H. Gruber, and D.D. Chapman. 2015. Local population structure and context-dependent isolation by distance in a large coastal shark. Marine Ecology Progress Series, 520:203-216, doi: 10.3354/meps11069.

Braun, C.D., et al. 2015. Movements of the reef manta ray (Manta alfredi) in the Red Sea using satellite and acoustic telemetry. Marine Biology 162:2351-2362.

Legare, B, J. Kneebone, B. DeAngelis, and G. Skomal. 2015. The spatiotemporal dynamics of habitat use by blacktip (Carcharhinus limbatus) and lemon (Negaprion brevirostris) sharks in nurseries of St. John, United States Virgin Islands. Marine Biology, DOI 10.1007/s00227-015-2616-x.

Skomal, G.B., E.M. Hoyos-Padilla, A. Kukulya, and R. Stokey. 2015. Subsurface observations of white shark predatory behaviour using an autonomous underwater vehicle. Journal of Fish Biology 87:1293-1312.

Rhode Island

Fishery independent monitoring is limited to coastal shark species taken in the RI Division of Fish & Wildlife, Marine Fisheries Section monthly and seasonal trawl survey. During the 2015 and 2016 calendar year the only coastal shark species captured in the trawl survey was smooth dogfish (*Mustelus canis*). A summary of fishery independent monitoring for coastal sharks is summarized in Table 8 & 9 below.

Table 8. Total number of smooth dogfish caught per month and during the seasonal trawl surveys during the 2015 fishing year. Smooth dogfish are the only coastal shark captured by the RI DFW trawl survey during the 2015.

					Average	
Year	Month	Tows conducted	Total weight (kg)	Total number	Number per tow	kg per tow
Monthly Coastal Trawl Survey			-	-	-	-
2015	JAN	12	0	0	0	0
2015	FEB	0	0	0	0	0
2015	MAR	12	0	0	0	0
2015	APR	13	0	0	0	0
2015	MAY	13	0	0	0	0
2015	JUN	13	6.9	4	0.31	0.53
2015	JUL	13	16.4	27	2.08	1.26
2015	AUG	13	23.5	28	2.15	1.81
2015	SEP	13	5.8	7	0.54	0.44
2015	OCT	13	16.4	13	1.00	1.27
2015	NOV	13	0	0	0	0
2015	DEC	13	0	0	0	0
Seasonal Coastal Trawl Survey			-	-	-	-
2015	Spring	43	0	0	0	0
2015	Fall	43	58.98	54	1.26	1.37

Table 9. Total number of smooth dogfish caught per month and during the seasonal trawl surveys during the 2016 fishing year. Smooth dogfish are the only coastal shark captured by the RI DFW trawl survey during the 2016.

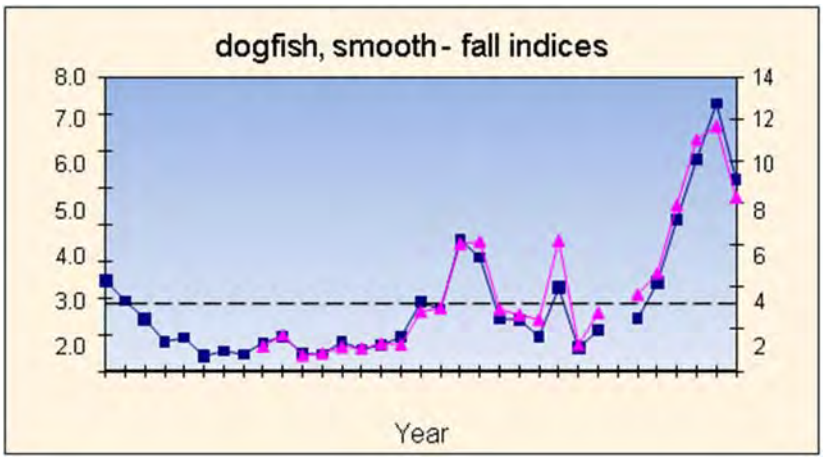
Year	Time Period	Species	Number of Tows	Total Weight (kg)	Total Number Caught
Monthly Coastal Trawl Survey					
2016	MAY	Smooth Dogfish	13	0.0	0
2016	JUN	Smooth Dogfish	11	0.0	0
2016	JUL	Smooth Dogfish	12	0.0	0
2016	AUG	Smooth Dogfish	13	0.0	0
2016	SEP	Smooth Dogfish	13	11.4	4
2016	OCT	Smooth Dogfish	13	13.5	17
2016	NOV	Smooth Dogfish	13	38.6	52
2016	DEC	Smooth Dogfish	13	5.6	4
2016	JAN	Smooth Dogfish	13	8.4	7
2016	FEB	Smooth Dogfish	13	33.9	23
2016	MAR	Smooth Dogfish	13	0.0	0
2016	APR	Smooth Dogfish	13	0.0	0
Seasonal Coastal Trawl Survey					
2016	Spring	Smooth Dogfish	44	5.0	2
2016	Fall	Smooth Dogfish	44	35.7	26

Connecticut

The Connecticut Department of Energy and Environmental Protection monitors the abundance of marine resources in nearby coastal waters with the Long Island Sound Trawl Survey. Spring (April, May and June) and fall (September and October) surveys are conducted each year. Other than smooth dogfish, coastal sharks are not encountered by the Long Island Sound Trawl Survey. Smooth dogfish are caught most often in the fall and the fall indices are presented below. See the link below for the latest Long island Sound Trawl Survey report.

Table 10. Long Island Trawl Survey Fall Smooth Dogfish indices (geometic mean catch/tow)

Year	Kg/tow	Count/tow
1996	1.16	0.80
1997	1.09	0.59
1998	1.32	0.72
1999	1.27	0.93
2000	2.85	1.88
2001	3.02	1.69
2002	6.09	3.58
2003	6.18	3.10
2004	2.95	1.44
2005	2.70	1.41
2006	2.46	0.94
2007	6.23	2.27
2008	1.25	0.63
2009	2.8	1.13
2010	-	-
2011	3.66	1.43
2012	4.69	2.41
2013	7.93	4.13
2014	11.05	5.78
2015	11.70	7.30
2016	8.30	5.24



New York

While NY DEC does not currently conduct fishery-independent monitoring programs for Atlantic Coastal Sharks, a research permit was issued in 2015 and 2016 for the collection of information on sand tiger sharks (*Carcharias taurus*) and blue sharks (*Prionace glauca*). In 2015, 18 sand tiger sharks and two blue sharks were caught and released; in 2016, 23 sand tiger sharks, 1 smooth dogfish, 7 sandbar sharks, 1 shortfin mako, and 1 blue shark were caught and released. In both years, information on each (morphometrics and sex) as well location, date, biological samples collected, telemetry gear deployed, and final disposition of the animals were recorded.

New Jersey

New Jersey does not currently conduct any fishery-independent monitoring programs specifically for Atlantic Coastal Sharks, but does receive sharks from the State's Ocean Stock Assessment Survey. In 2015, the Survey caught approximately 157lbs of Atlantic Angel Sharks, 59lbs of Atlantic Sharpnose Sharks, 24lbs of Dusky Sharks, 769lbs of Sand Tiger Sharks, 41lbs of Sandbar Sharks, 9,567lbs of Smooth Dogfish, and 451lbs of Thresher Sharks. In 2016, the Survey caught approximately 125lbs of Atlantic Angel shark, 8lbs of Atlantic Sharpnose, 2,015lbs of Sand Tiger, 4,097lbs of Smooth Dogfish, and 22lbs of Thresher. Sharks from the New Jersey Ocean Stock Assessment Survey have collected by a 30-meter otter trawl every January, April, June, August, and October since 1989. Tows are approximately 1 nautical mile and are performed via a stratified random sampling design. Latitudinal strata are identical to those used by the National Marine Fisheries Service groundfish survey. Longitudinal boundaries are defined by the 18-30, 30-60, and 60-90 foot isobaths. Smooth Dogfish are cumulatively weighed and measured by total length in centimeters. All other shark species are sorted by gender, weighed individually, and measured by total length in centimeters.

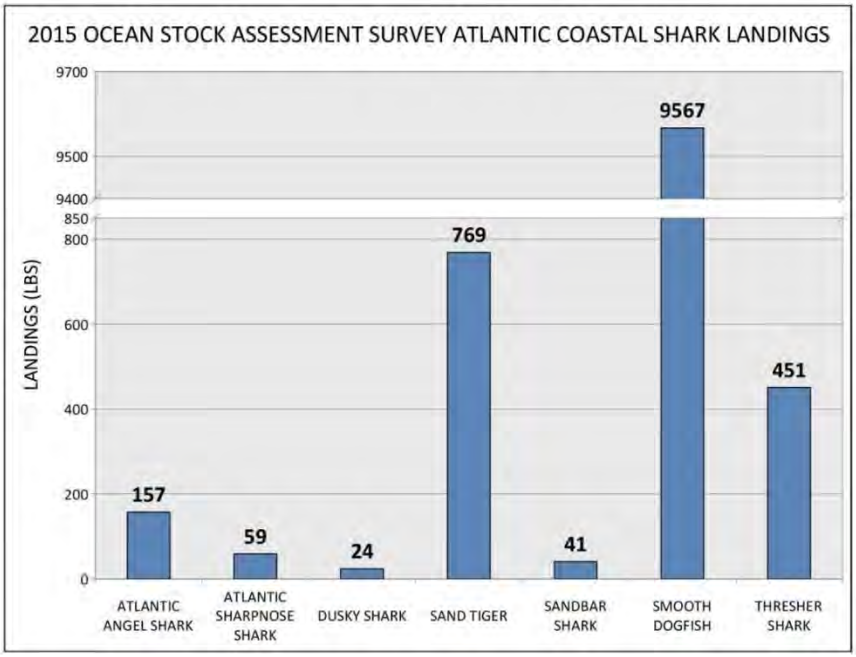


Figure 3. NJ 2015 Ocean Stock Assessment Survey- Atlantic Coastal Sharks

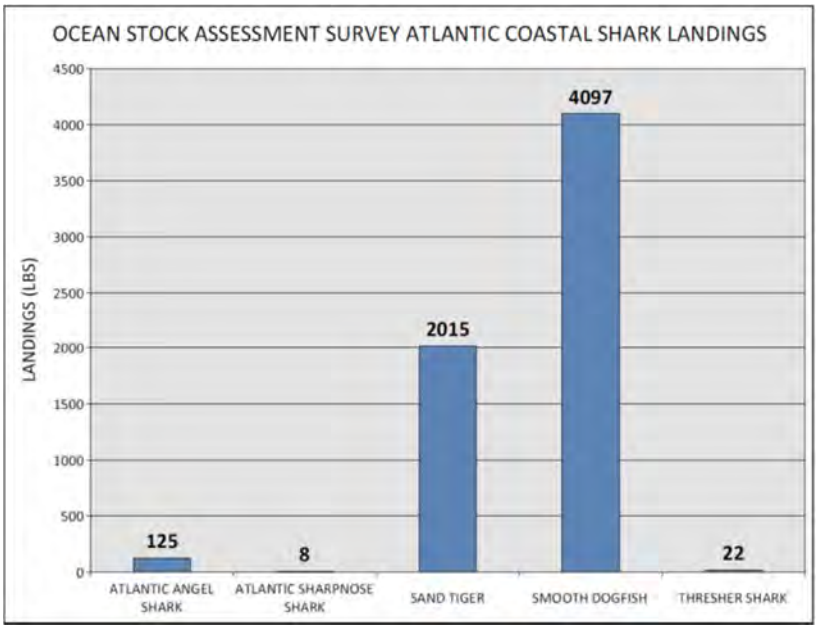


Figure 4. NJ 2016 Ocean Stock Assessment Survey- Atlantic Coastal Sharks

Delaware

Delaware conducts a 30' adult trawl survey and a 16' juvenile trawl survey in the Delaware Bay. In the adult trawl survey, Smoothhound are the most common shark species caught (Figure 5), with Sand Tiger Shark (Figure 6) and Sandbar Sharks (Figure 7) taken in low numbers. Thresher, Atlantic Angel, Atlantic Sharpnose (Figure 8) and Dusky shark were caught in the past, but rarely. Sand Tiger Shark catch per nautical mile increased in 2016 and was the highest number taken since 1983. Sandbar Shark catch per nautical mile increased in 2016 but remained high for the recent time series. Smoothhound catch per nautical mile increased slightly in 2016. In the juvenile trawl, the species caught were sand tiger shark (Figure 9), Sandbar Sharks (Figure 10) and Smoothhound (Figure 11). With the exception of Smoothhound, the capture of coastal sharks in the juvenile trawl is a rare occurrence.

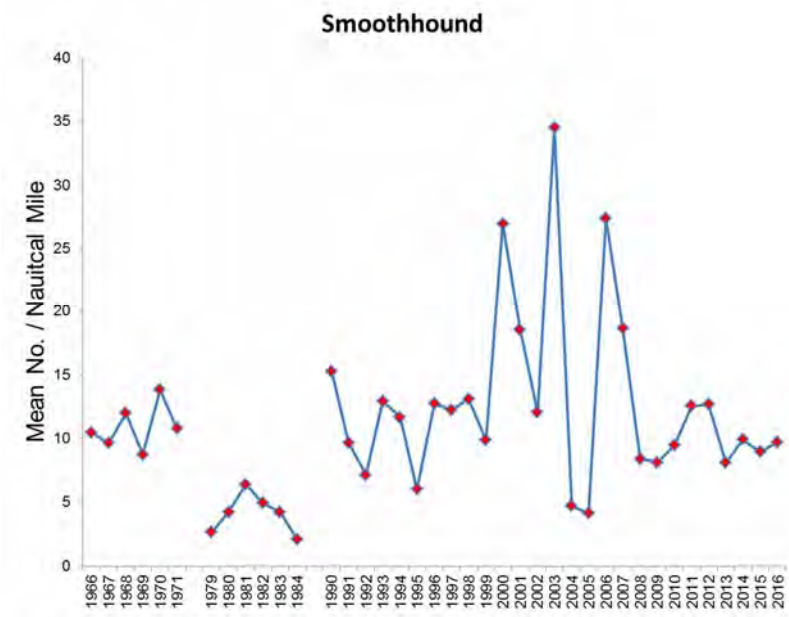


Figure 5. Smoothhound relative abundance (mean number per nautical mile), time series (1966 – 2016) as measured in 30-foot trawl sampling in the Delaware Bay.

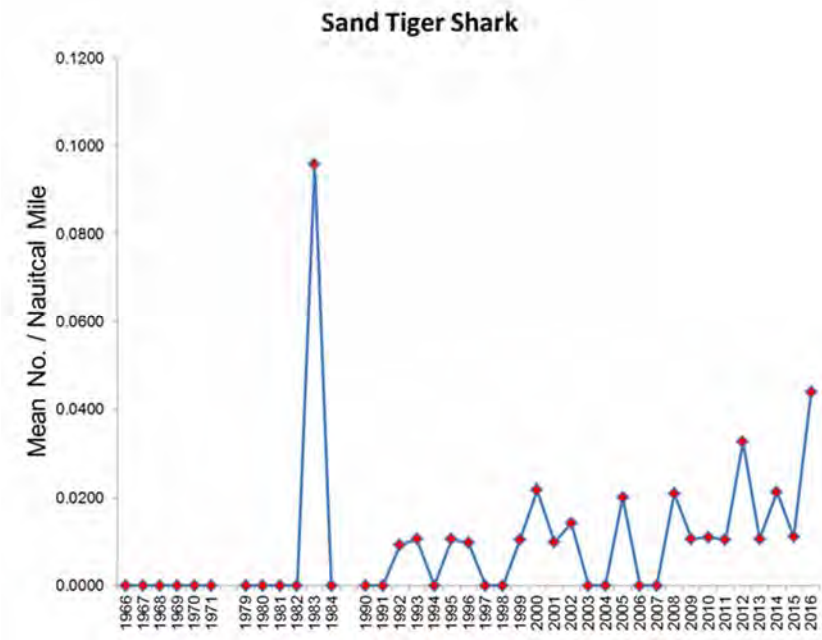


Figure 6. Sand Tiger Shark relative abundance (mean number per nautical mile), time series (1966 – 2016) as measured in 30-foot trawl sampling in the Delaware Bay.

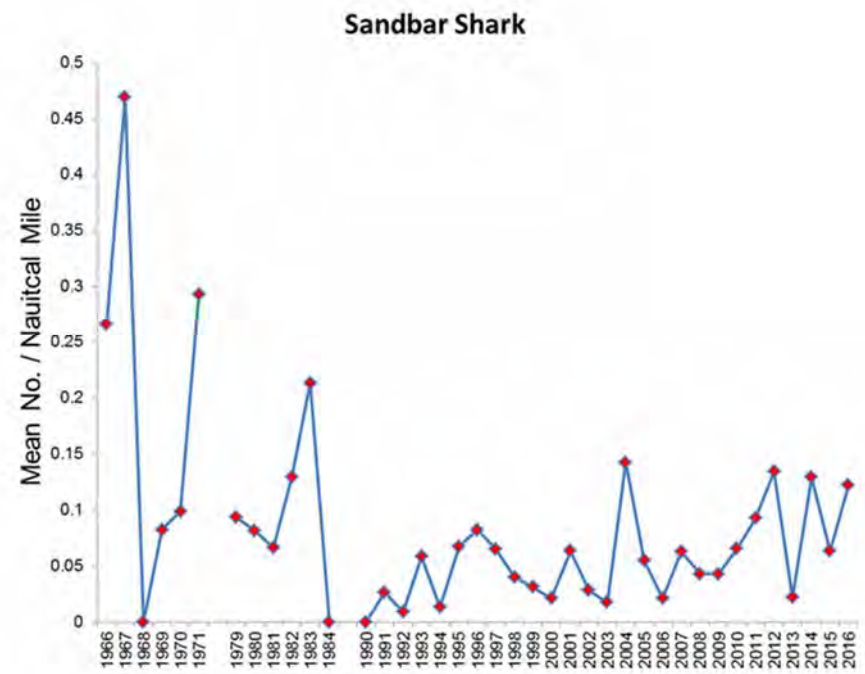


Figure 7. Sandbar Shark relative abundance (mean number per nautical mile), time series (1966 – 2016) as measured in 30-foot trawl sampling in the Delaware Bay.

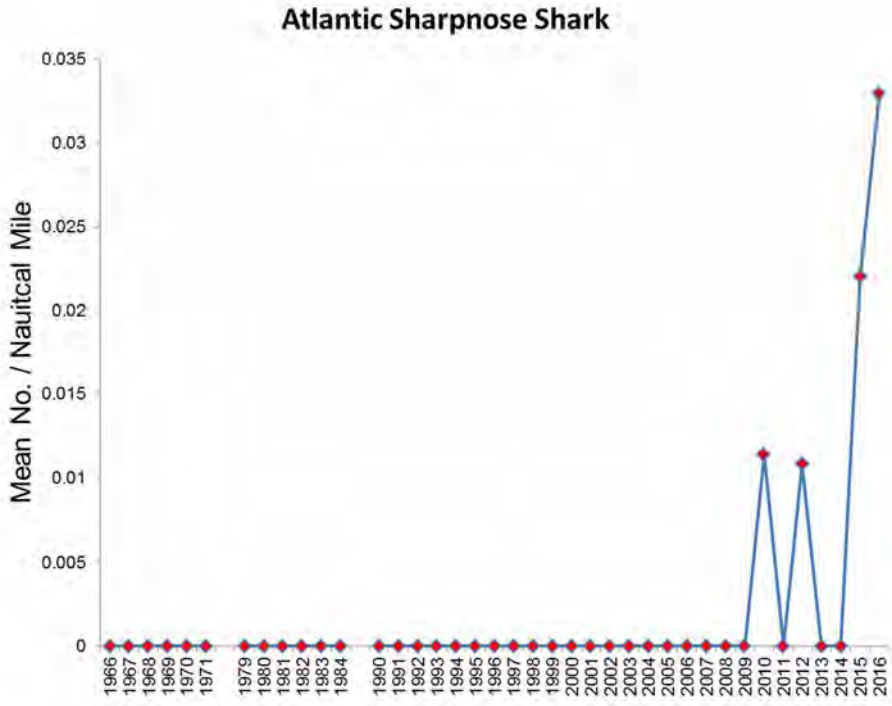


Figure 8. Atlantic Sharpnose Shark relative abundance (mean number per nautical mile), time series (1966 – 2016) as measured in 30-foot trawl sampling in the Delaware Bay.

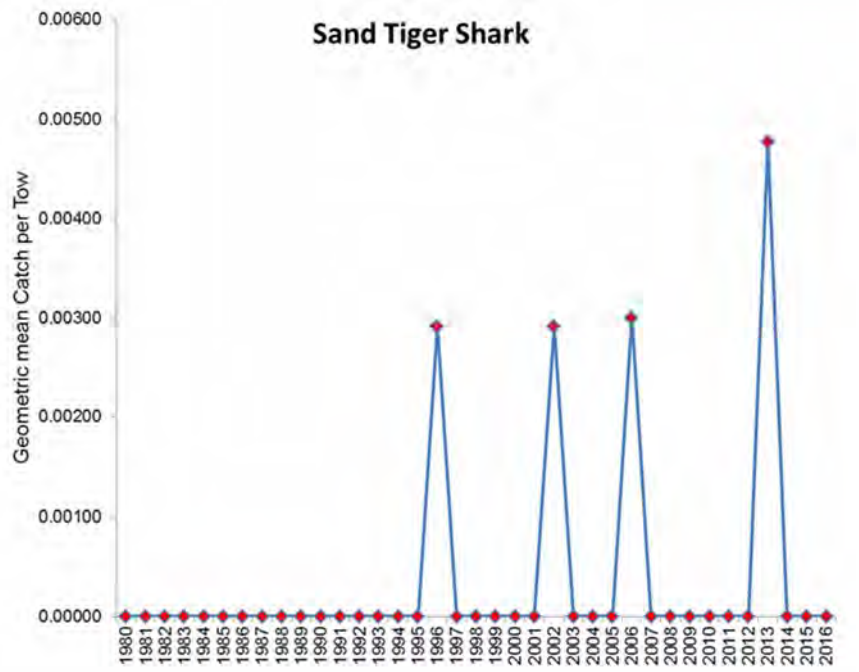


Figure 9. Index of Sand Tiger Shark, time series (1980 – 2016) as measured by 16-foot trawl sampling in the Delaware estuary.

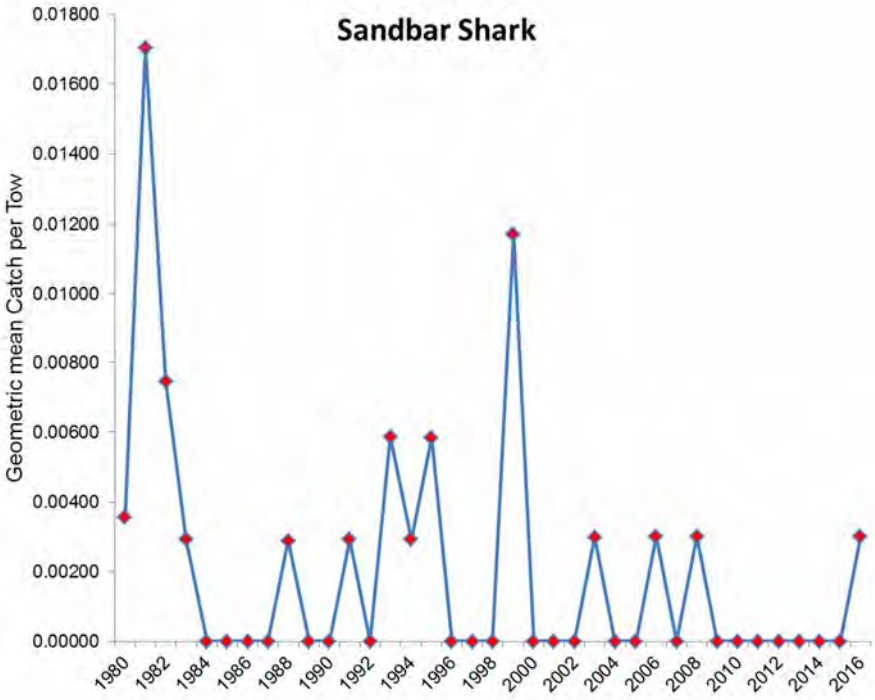


Figure 10. Index of Sandbar Shark, time series (1980 – 2016) as measured by 16-foot trawl sampling in the Delaware estuary.

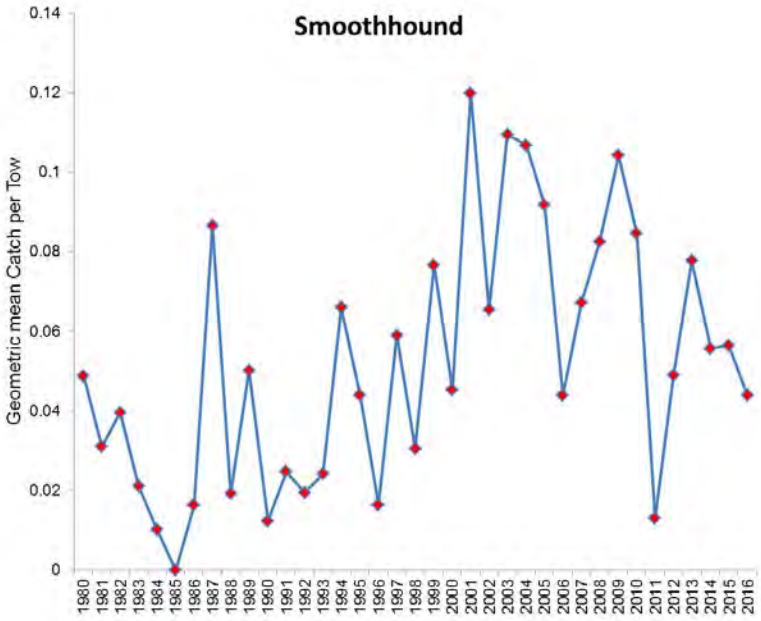


Figure 11. Index of young-of-the-year Smoothhound abundance, time series (1980 – 2016) as measured by 16-foot trawl sampling in the Delaware estuary.

Maryland

There was no specific at sea sampling program for coastal sharks in Maryland. Limited biological sampling of catch onboard a commercial offshore trawler targeting horseshoe crabs occurred at night in June, July, August, and October. While sharks were encountered through a scientific permit, information regarding species and number encountered are confidential.

Virginia

The Virginia Institute of Marine Science Shark Research Program began in 1973 and is one of the longest running longline surveys in the world. The program has provided data on habitat utilization, age, growth, reproduction, trophic interactions, basic demographics, and relative abundance for dominant shark species. Cruise times have been variable over the time series, but generally sampling has occurred monthly from May through October. The survey utilizes a fixed station design with nine core sampling locations, although additional auxiliary locations have been sampled frequently over the years.

Beginning in 2012 a separate longline survey, conducted by the Virginia Institute of Marine Science designed specifically to target YOY sandbar sharks in the lower Chesapeake Bay and Eastern Shore, was initiated. The new survey follows a stratified random sampling design, rather than a fixed survey design, and falls under the broader COASTSPAN umbrella survey.

North Carolina

The North Carolina Division of Marine Fisheries (NCDMF) conducts both fishery-dependent and independent sampling within state waters. Fishery-dependent sampling of North Carolina commercial fisheries has been ongoing since 1982 (conducted under Title III of the Interjurisdictional Fisheries Act and funded in part by the U.S. Department of Commerce, National Marine Fisheries Service). Predominate fisheries sampled included the ocean gill net, estuarine gill net, ocean trawl, long haul seine/swipe net, beach seine and pound net fisheries.

A total of 9 fishery-dependent samples containing sharks were collected from the ocean gill net, ocean trawl and estuarine gill net fisheries in 2016 (Table 11). This sample number is down compared to the 64 samples obtained in 2015, this is due in large part to a change in staff in the Manteo office, where most shark catches are landed. Whole weights and lengths for sharks other than spiny dogfish are rarely obtained during sampling. Sharks are typically dressed or processed when sampling occurs therefore the number of processed individuals and aggregate weights are obtained during sampling. Atlantic sharpnose and smoothhound sharks were the most abundant species in dependent sampling by numbers and weight (Table 12).

Table 11. North Carolina fishery-dependent shark sampling summary by month for the 2016 fishing year.

Month	# of Samples
January	2
February	1
March	1
April	1
May	3
June	0
July	0
August	0
September	0
October	0
November	0
December	0
Total	9

Table 12. North Carolina fishery-dependent shark sampling summary by species, number of individuals, and sum of sample weight (lb) for the 2015 fishing year.

Species	# Indv.	Sum of Sample Wgt. (lb)
Atlantic Sharpnose Shark (*R. terraenovae*)	29	93
Smoothhound Shark (*M. canis*)	41	230
Thresher Shark (*A. vulpinus*)	30	502
Total	100	825

Fishery-Independent

The NCDMF initiated a fishery-independent red drum longline survey in 2007 for developing an index of abundance for adult red drum (*S. ocellatus*); this project also allows for capture and tagging of Atlantic coastal sharks in cooperation with the North East Fisheries Science Center's (NEFSC) Cooperative Shark Tagging Program. The red drum longline survey in the Pamlico Sound resulted in a catch of 3 sharks in 2016. Two species of shark were captured; two blacktip (*C. limbatus*), and one bonnethead (S. tiburo). Only one (1) of the blacktip sharks was measured and tagged with M-tags from the NOAA Fisheries Cooperative Shark Tagging Program.

The NCDMF initiated a fishery-independent gill net survey in 2001 and expanded its coverage in 2008 to include the Cape Fear and New Rivers and the near shore (0-3 miles) Atlantic Ocean from New River Inlet south to the South Carolina state line. The Atlantic Ocean portion of the survey was discontinued in June of 2015 due to low catches of target species, none of which were sharks (see next paragraph). The objective of this project is to provide annual, independent, relative abundance indices for key estuarine species in the near shore Atlantic Ocean, Pamlico Sound, Pamlico, Pungo, Neuse, New, and Cape Fear Rivers. The survey employs a stratified random sampling design and utilizes multiple mesh gill nets (3.0 inch to 6.5 inch stretched mesh, by ½ inch increments). Sharks from the 2016 Pamlico Sound independent gill net survey catch included: two (2) smooth dogfish, one (1) Atlantic sharpnose, one (1) bonnethead, six (6) sandbar and 12 bull sharks [(C. leucas) Table 13]. Catch from the 2016 Cape Fear, New and Neuse River independent gill net survey catch included: 55 Atlantic sharpnose, and seven (7) bonnethead shark (Table 14).

Table 13. Species, number of individuals, minimum, maximum and average total length [TL (mm)] of sharks caught in the 2016 North Carolina Pamlico Sound gill net survey.

Species	Number Measured	Min of TL (mm)	Max of TL (mm)
Atlantic Sharpnose Shark	1	932	932
Bonnethead Shark	1	714	714
Bull Shark	12	665	1,288
Sandbar Shark	6	448	945
Smooth Dogfish	2	594	861
Total	22		

Table 14. Species, number of individuals, minimum, maximum, and average total length [TL (mm)] of sharks caught in the 2016 North Carolina Cape Fear, Neuse and New River gill net survey.

Species	Number Measured	Min of TL (mm)	Max of TL (mm)
Atlantic Sharpnose Shark	55	290	516
Bonnethead Shark	7	855	1,122
Total	62		

South Carolina

Data related to the presence and movement of sharks in South Carolina's coastal waters will continue to be collected as encountered within the context of existing fishery dependent or fishery independent programs conducted by the SCDNR. Currently, data are collected from estuarine waters by the SCDNR Cooperative Atlantic States Shark Pupping and Nursery Habitat survey (COASTSPAN) and the SCDNR trammel net survey. The COASTSPAN survey monitors the presence and abundance of young-of-year and juvenile sharks in the estuaries and bays of South Carolina. The survey operates from April-September using gillnets, longlines, and drumlines to sample index stations. Species captured are measured, sexed, tagged, released, and physical and water quality parameters are recorded (Table 14).

The SCDNR trammel net survey is designed to sample recreationally important species in shallow estuarine waters. Sharks are not a target species, but their abundance as well as length and sex data are recorded (Table 15). Stations selected based on suitable habitats are randomly sampled using a multi-panel gillnet to encircle a section of marsh. Species captured are

measured, sexed if possible, select species (no sharks) are tagged and released and physical and water quality data are recorded.

The presence and abundance of juvenile and adult coastal sharks in the bays, sounds and coastal waters of South Carolina are documented by the Adult Red Drum and Coastal Shark Longline survey. This survey uses a stratified-random approach to sample for adult red drum and coastal sharks. The survey operates annually from August to December using longlines to sample suitable habitat for targeted species. Species captured are measured, sexed, tagged and released, and physical and water quality parameters are recorded. Species encountered and tagged for all surveys are reported in Table 15. The data gathered from these programs are shared with the NMFS apex predators program and are utilized in stock assessments and management decisions in South Carolina.

Table 15. Number of sharks captured by South Carolina Department of Natural Resources' Cooperative Atlantic States Shark Pupping and Nursery Habitat Survey (COASTSPAN), the Trammel Net Survey, and Adult Red Drum and Coastal Sharks Longline survey in 2016

	COASTSPAN		Trammel Net		Adult Red Drum and Coastal Sharks	
Shark Species	Captured	Tagged	Captured	Tagged	Captured	Tagged
Atlantic Sharpnose	241	0	188	0	909	0
Blacknose	10	8	0	0	107	103
Blacktip	139	97	20	0	55	46
Bonnethead	144	113	242	0	14	14
Bull	17	16	0	0	7	4
Finetooth	454	271	124	0	69	59
Great Hammerhead	1	1	0	0	1	0
Lemon	17	15	4	0	1	1
Nurse	-	0	0	0	6	0
Sandbar	141	127	1	0	106	94
Sand Tiger	8	8	0	0	0	0
Scalloped Hammerhead	67	2	0	0	3	0
Smooth Dogfish	1	1	0	0	0	0
Spinner	1	0	0	0	26	24
Tiger	15	13	0	0	5	4
Total	1256	672	579	0	1309	349

Georgia

Although a directed fishery for sharks does not exist in Georgia waters, there are a several fishery dependent sampling surveys conducted by the Coastal Resources Division that could result in the incidental capture of coastal sharks. In 2016, coastal sharks were found in the following fishery independent surveys.

Sampling for the *Adult Red Drum Survey (via SEAMAP)* Sampling occurs in inshore and nearshore waters of southeast Georgia and in offshore waters of northeast Florida. Sampling occurs from mid-May through the end of December. Sampling gear consists of a bottom set 926m, 600lb test monofilament mainline configured with 60, 0.5 m gangions made of 200lb test monofilament. Each gangion consists of a longline snap and a 15/0 circle hook. Thirty hooks of each size are deployed during each set. All hooks are baited with squid or mullet. Soak time for each set is 30 minutes. During 2016, CRD staff deployed 175 sets consisting of 10,500 hooks and 87.5 hours of soak time. A total of 825 sharks, representing 9 species were captured (Table 16).

Sampling for the *Shark Nursery Survey (via COASTSPAN)* The University of North Florida assumed field operations for this survey in 2016. Data for the complete time series are maintained by the National Marine Fisheries Service's Apex Predator Program in Narragansett, RI (contact: Cami McCandless).

Each month the *Ecological Monitoring Trawl Survey (EMTS)*, a 40-foot flat otter trawl with neither a turtle excluder device nor bycatch reduction device is deployed at up to 42 stations across six estuaries. At each station, a standard 15 minute tow is made. During this report period, 482 tows/observations were conducted, totaling 120.41 hours of tow time. A total of 247 sharks, representing 5 species, were captured during 2016 (Table 16).

Monitoring of estuarine finfish and crustaceans in the lower salinity, upriver sectors of selected estuaries is done monthly as part of the *Juvenile Trawl Survey* conducted onboard the research vessel *Navigator*. A 20-foot, semi-balloon otter trawl is towed for 5 minutes at up to 18 stations within three Georgia estuaries. In 2016, 130 tows (observations) were conducted, totaling 10.75 hours of tow time. No sharks were observed during the 2016 season.

The Marine Sportfish Population Health Survey (MSPHS) is a multi-faceted ongoing survey used to collect information on the biology and population dynamics of recreationally important finfish. Currently two Georgia estuaries are sampled on a seasonal basis using entanglement gear. During the June to August period, young-of-the-year red drum in the Altamaha/Hampton River and Wassaw estuaries are collected using gillnets to gather data on relative abundance and location of occurrence. During the September to November period, fish populations in the Altamaha/Hampton River and Wassaw estuaries are monitored using monofilament trammel nets to gather data on relative abundance and size composition. In 2016, a total of 216 gillnet and 150 trammel net sets were made, resulting in the capture of 119 individuals representing five species of coastal sharks (Table 16).

Table 16. Numbers of coastal sharks captured in Georgia fishery independent surveys in 2016 by species and by survey.

	SEAMAP	EMTS	MSPHS
Atlantic sharpnose shark	539	188	21
Blacknose shark	180	---	---
Bonnethead	44	54	82
Blacktip shark	11	2	5
Sandbar shark	22	---	---
Tiger shark	4	---	---
Spinner shark	2	---	---
Scalloped Hammerhead	6	2	---
Lemon shark	---	---	3
Finetooth shark	17	1	8
All Species Combined	825	247	119

V. Status of Management Measures and Issues

Fishery Management Plan

Coastal Sharks are managed under the Interstate FMP for Coastal Sharks, which was implemented in August 2008, Addendum I (2009), Addendum II (2013), and Addendum III (2013).The FMP addresses the management of 40 species and establishes a suite of management measures for recreational and commercial shark fisheries in state waters (0 – 3 miles from shore). In 2016, Smooth dogfish was added to NOAA Fisheries' Atlantic Highly Migratory Species FMP through Amendment 9; as part of the Amendment, a new requirement that smooth dogfish harvest need to make up at least 25% of the retained catch in order for fishermen to be able to remove their fins at sea. The Commission later in the year approved Addendum IV (2016) to maintain consistency between state and federal FMP.

ASMFC will continue to respond to changes in the Atlantic Highly Migratory Species FMP and make changes as necessary to the interstate FMP.

VI. Implementation of FMP Compliance Requirements for 2015 and 2016

Addendum III to the Coastal Sharks FMP was implemented in March 2014. All states must demonstrate through the inclusion of regulatory language that the following management measures were implemented.

i. Recreational Minimum Size Limits

This modifies Section 4.2.4 Recreational Minimum Size Limits in the FMP.

Sharks caught in the recreational fishery must have a minimum fork length of 4.5 feet (54 inches) with the exception of smooth hammerhead, scalloped hammerhead, great hammerhead, smoothhound, Atlantic sharpnose, blacknose, finetooth, and bonnethead.

Smooth hammerhead, scalloped hammerhead and great hammerhead must have a minimum fork length of 6.5 feet (78 inches).

Smoothhound, Atlantic sharpnose, blacknose, finetooth and bonnethead do not have recreational minimum size limits.

Table 4.4. Recreational minimum size limits, 2015 and 2016.

No Minimum Size	Minimum Fork Length of 4.5 Feet		Minimum Fork Length of 6.5 Feet
Smoothhound	Tiger	Shortfin mako*	
Atlantic sharpnose	Blacktip	Porbeagle	Scalloped hammerhead
Finetooth	Spinner	Thresher	Smooth hammerhead
Blacknose	Bull	Oceanic whitetip	Great hammerhead
Bonnethead	Lemon	Blue	
	Nurse		

***Per emergency rule measures implemented in March 2018 in response to the 2017 Assessment, minimum size limit (fork length) for Shortfin makos is now 83 inches or 6.9 feet**

ii. Commercial Species Groupings

This modifies Section 4.3.3 Commercial Species Groupings (and the appropriate sub-sections, outlined below). Two new species groups ('Blacknose' and 'Hammerhead') are created.

This FMP establishes eight commercial 'species groups' for management (Table 1): Prohibited, Research, Smoothhound, Non-Blacknose Small Coastal, Blacknose, Aggregated Large Coastal, Hammerhead and Pelagic. These groupings apply to all commercial shark fisheries in state waters.

VII. PRT Recommendations

State Compliance
All states with a declared interest in the management of sharks have submit compliance reports and have regulations in place that meet or exceed the requirements of the Interstate Fisheries Management Plan for Coastal Sharks and associated addenda.

De Minimis Status
This FMP does not establish specific *de minimis* guidelines that would exempt a state from

regulatory requirements contained in this plan. *De minimis* shall be determined on a case-by case basis. *De minimis* often exempts states from monitoring requirements in other fisheries but this plan does not contain any monitoring requirements.

De minimis guidelines are established in other fisheries when implementation and enforcement of a regulation is deemed unnecessary for attainment of the fishery management plan's objectives and conservation of the resource. Due to the unique characteristics of the coastal shark fishery, namely the large size of sharks compared to relatively small quotas, the taking of a single shark could contribute to overfishing of a shark species or group. Therefore, exempting a state from any of the regulatory requirements contained in this plan could threaten attainment of this plans' goals and objectives.

States that have been granted *de minimis* status are Maine and Massachusetts. New Hampshire has renounced management interest and is therefore no longer a member of the coastal shark management board. These states do not land sharks in any significant quantity and very few of the species managed by this plan are ever encountered in their state waters. These states can continue to have *de minimis* status until their landings patterns change or they request a discontinuation.

In some cases, it is unnecessary for states with *de minimus* status to implement all regulatory requirements in the FMP.

A. Massachusetts has implemented all regulations with two exceptions, it is exempt from the possession limit and closures of the aggregated large coastal and hammerhead shark fisheries.

B. Maine has implemented the following regulations to comply with the goals and objectives of the FMP:
   - Require federal dealer permits for all dealers purchasing a permitted species
   - Prohibit the take or landings of prohibited species
   - Close the fishery for porbeagle sharks when the NMFS quota has been harvested
   - Prohibit the commercial harvest of porbeagle sharks in state waters
   - Require that head, fins and tails remain attached to the carcass of all shark species, except smoothhound, through landing

Research Priorities

Species-Specific Priorities

- Investigate the appropriateness of using vertebrae for ageing adult sandbar sharks. If appropriate, implement a systematic sampling program that gathers vertebral samples from entire size range for annual ageing to allow tracking the age distribution of the catch as well as updating of age-length keys.[1]

[1] Recent bomb radiocarbon research has indicated that past age estimates based on tagging data for sandbar sharks may be correct and that vertebral ageing may not be the most reliable method for mature individuals. See Andrews *et al.* 2011.

- Determine what is missing in terms of experimental design or/and data analysis to arrive at incontrovertible conclusions on the reproductive periodicity of sandbar sharks
- Continue work on reconstruction of historical catches of sandbar sharks, especially catches outside of the US EEZ
- Investigate the length composition of the F3 Recreational and Mexican fisheries for sandbar sharks more in depth as this fishery is estimated to have a large impact on the stock mainly due to selecting age-0 fish.
- Research to estimate the degree of connectivity between the portions of the sandbar stock within the US and outside of the US EEZ. •
- Study the distribution and movements of the sandbar stock relative to sampling coverage. It is possible that none of the indices alone track stock-wide abundance trends.
- Develop and conduct tagging studies on dusky and blacknose stock structure with increased international collaboration (e.g., Mexico) to ensure wider distribution and returns of tags. Expand research efforts directed towards tagging of individuals in south Florida and Texas/Mexico border to get better data discerning potential stock mixing.

General Priorities

- Generally update age and growth and reproductive studies for all species currently assessed, especially for studies with low sample sizes or over 20 years old.
- Determine gear-specific post-release mortality estimates for all species currently assessed
- Determine life history information for data-poor species that are currently not assessed
- Examine female sharks during the pupping periods to determine the proportion of reproductive females. Efforts should be made to develop non-lethal methods of determining pregnancy status
- Expand or develop monitoring programs to collect appropriate length and age samples from the catches in the commercial sector by gear type, from catches in the recreational sector, and from catches taken in research surveys to provide reliable length and age compositions for stock assessment
- Continue investigations into stock structure of coastal sharks using genetic, conventional and electronic tags to determine appropriate management units
- Evaluate to what extent the different CPUE indices track population abundance (e.g., through power analysis)
- Explore modeling approaches that do not require an assumption that the population is at virgin level at some point in time.
- Increase funding to allow hiring of additional HMS stock assessment scientists. There are currently inadequate staff to conduct stock assessments on more than one or two stocks/species per year.

References

Andrews et al. 2011. Bomb radiocarbon and tag-recapture dating of sandbar shark (*Carcharhinus plumbeus*). Fisheries Bulletin. 109: 454-465.

Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species. 2014. NOAA Fisheries, December 18, 2015.
< http://www.nmfs.noaa.gov/sfa/hms/hmsdocument_files/SAFEreports.htm>

APPENDIX 1. OVERVIEW OF COASTAL SHARK REGULATIONS

Coastal Sharks FMP Regulatory Requirements

1. Recreational seasonal closure (Section 4.2.1)

    a. Recreational anglers are prohibited from possessing silky, tiger, blacktip, spinner, bull, lemon, nurse, scalloped hammerhead, great hammerhead, and smooth hammerhead in the state waters of Virginia, Maryland, Delaware and New Jersey from May 15 through July 15—regardless of where the shark was caught.

    b. Recreational fishermen who catch any of these species in federal waters may not transport them through the state waters of VA, MD, DE, and NJ during the seasonal closure.

2. Recreationally permitted species (Section 4.2.2)

    a. Recreational anglers are allowed to possess aggregated large coastal sharks, hammerheads, tiger sharks, SCS, and pelagic sharks. Authorized shark species include: aggregated LCS (blacktip, bull, spinner, lemon, and nurse); hammerhead (great hammerhead, smooth hammerhead, scalloped hammerhead); tiger sharks; SCS (blacknose, finetooth, Atlantic sharpnose, and bonnethead sharks); and, pelagic sharks (blue, shortfin mako, common thresher, oceanic whitetip, and porbeagle). Sandbar sharks and silky sharks (and all prohibited species of sharks) are not authorized for harvest by recreational anglers.

3. Landings Requirements (Section 4.2.3)

    a. All sharks (with exception) caught by recreational fishermen must have heads, tails, and fins attached naturally to the carcass. Anglers may still gut and bleed the carcass by making an incision at the base of the caudal peduncle as long as the tail is not removed. Filleting sharks at sea is prohibited.

    b. All sharks (with exception) harvested by commercial fishermen within state boundaries must have the tails and fins attached naturally to the carcass through landing. Fins may be cut as long as they remain attached to the carcass (by natural means) with at least a small portion of uncut skin. Sharks may be eviscerated and have the heads removed. Sharks may not be filleted or cut into pieces at sea.

    c. Exception: Fishermen holding a valid state commercial permit may process smooth dogfish sharks at sea out to 50 miles from shore, as long as the total weight of smooth dogfish shark fins landed or found on board a vessel does not exceed 12 percent of the total weight of smooth dogfish shark carcasses landed or found on board.

4. Recreational Minimum Size Limits (Section 4.2.4)

    a. Sharks caught in the recreational fishery must have a fork length of at least 4.5 feet with the exception of Atlantic sharpnose, blacknose, finetooth, bonnethead

and smoothhound which have no minimum size. Hammerhead species must have a fork length of 6.5 feet.

5. Authorized Recreational Gear (Section 4.2.5)
    a. Recreational anglers may catch sharks only using a handline or rod & reel. Handlines are defined as a mainline to which no more than two gangions or hooks are attached. A handline must be retrieved by hand, not by mechanical means.

6. Possession limits in one twenty-four hour period (Section 4.2.7 and 4.3.6)
    a. Recreational and commercial possession limits as specified in Table 9.
    b. Smooth dogfish harvest is not limited in state waters and recreational shore-anglers may harvest an unlimited amount of smooth dogfish.

7. Commercial Seasonal Closure (Section 4.3.2)
    a. All commercial fishermen are prohibited from possessing silky, tiger, blacktip, spinner, bull, lemon, nurse, scalloped hammerhead, great hammerhead, and smooth hammerhead in the state waters of Virginia, Maryland, Delaware and New Jersey from May 15 through July 15. Fishermen who catch any of the above species in a legal manner in federal waters may transit through the state waters listed above is allowed if all gear is stowed.

8. Quota Specification (Section 4.3.4)
    a. When NOAA Fisheries closes the fishery for any species, the commercial landing, harvest, and possession of that species will be prohibited in state waters until NOAA Fisheries reopens the fishery.

9. Permit requirements (Section 4.3.8)
    a. State: Commercial shark fishermen must hold a state commercial license or permit in order to commercially catch and sell sharks in state waters.
    b. Federal: A federal Commercial Shark Dealer Permit is required to buy and sell any shark caught in state waters.
    c. Display and research permit is required to be exempt from seasonal closure, quota, possession limit, size limit, gear restrictions, and prohibited species restrictions. States are required to include annual information for all sharks taken for display throughout the life of the shark.

10. Authorized commercial gear (Section 4.3.8.3)
    a. Commercial fishermen can only use one of the following gear types (and are prohibited from using any gear type not listed below) to catch sharks in state waters.
        i. **Rod & reel**

ii. **Handlines.** Handlines are defined as a mainline to which no more than two gangions or hooks are attached. A handline is retrieved by hand, not by mechanical means, and must be attached to, or in contact with, a vessel.
iii. **Small Mesh Gillnets.** Defined as having a stretch mesh size smaller than 5 inches.
iv. **Large Mesh Gillnets.** Defined as having a stretch mesh size equal to or greater than 5 inches.
v. **Trawl nets.**
vi. **Shortlines.** Shortlines are defined as fishing lines containing 50 or fewer hooks and measuring less than 500 yards in length. A maximum of 2 shortlines are allowed per vessel.
vii. **Pounds nets/fish traps.**
viii. **Weirs.**

11. Bycatch Reduction Measures (Section 4.3.10)
    a. Any vessel using a shortline must use corrodible circle hooks. All shortline vessels must practice the protocols and possess the recently updated federally required release equipment for pelagic and bottom longlines for the safe handling, release, and disentanglement of sea turtles and other non-target species; all captains and vessel owners must be certified in using handling and release equipment.
12. Smooth Dogfish
    a. Each state must identify their percentage of the overall quota (Addendum II, 3.1)
    b. Smooth dogfish must make up at least 25%, by weight, of total catch on board at time of landing. Trips that do not meet the 25% catch composition requirement can land smooth dogfish, but fins must remain naturally attached to the carcass. (Addendum IV, 3.0; modifies Addendum II Section 3.5)

Table 10. Possession/retention limits for shark species in state waters

Recreational	*Shore-angler*	1 shark (of any species except prohibited) per person per day; plus one Atlantic sharpnose, bonnethead and smoothhound
	Vessel-fishing	1 shark (of any species except prohibited) per vessel per trip; plus one Atlantic sharpnose, bonnethead and smoothhound per person, per vessel
Commercial	*Directed permit*	Variable possession limit for aggregated large coastal sharks and hammerhead shark management groups, the Commission will follow NMFS for in-season changes to the possession limit. The possession limit range is 0-55, the default is 45 sharks per trip. No limit for SCS or pelagic sharks.
	Incidental permit	3 aggregated LCS per vessel per trip, 16 pelagic or SCS (combined) per vessel per trip

Atlantic States Marine Fisheries Commission

Atlantic Striped Bass Management Board

May 1, 2018
1:15 – 2:45 p.m.
Arlington, Virginia

Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*M. Armstrong*) 1:15 p.m.

2. Board Consent 1:15 p.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2018

3. Public Comment 1:20 p.m.

4. Provide Guidance to Stock Assessment Subcommittee Regarding Biological Reference Point Development for the 2018 Benchmark Stock Assessment **Final Action** 1:30 p.m.
   - Board Guidance Work Group Report (*M. Appelman*)
   - Advisory Panel Report (*M. Appelman*)
   - Provide Guidance to Stock Assessment Subcommittee (*M. Armstrong*)

5. 2018 Benchmark Stock Assessment Progress Update (*K. Drew*) 2:40 p.m.

6. Other Business/Adjourn 2:45 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW
Atlantic Striped Bass Management Board Meeting

May 1, 2018
1:15 – 2:45 p.m.
Arlington, Virginia

Chair: Mike Armstrong (MA) Assumed Chairmanship: 02/18	Technical Committee Chair: Nicole Lengyel (RI)	Law Enforcement Committee Rep: Kurt Blanchard (RI)
Vice Chair: Vacant	Advisory Panel Chair: Louis Bassano (NJ)	Previous Board Meeting: February 7, 2018
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, NMFS, USFWS (16 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting, public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Provide Guidance to Stock Assessment Subcommittee Regarding Biological Reference Point Development for the 2018 Benchmark Stock Assessment (1:30 p.m. – 2:40 p.m.) Final Action

Background

- In October 2017, the Stock Assessment Subcommittee requested guidance from the Board regarding the development of biological reference points (BRP) that best meet the objectives of the FMP. The Board decided to establish a work group (Guidance WG) to develop guidance recommendations for Board consideration.
- The Guidance WG developed and distributed a survey to the Board and Advisory Panel to solicit the necessary feedback from all members regarding what they value most from the striped bass resource and fishery, and regarding overall satisfaction with the status of the stock and management under Amendment 6.
- The Guidance WG reviewed survey results and developed BRP guidance recommendations for Board consideration **(Board Materials).**
- The Advisory Panel also reviewed survey results and the WG's draft BRP recommendations, and developed its recommendations for Board consideration as well **(Supplemental Materials).**

Presentations

- Board Guidance WG Report M. Appelman

• Advisory Panel Report by M. Appelman
Board Actions for Consideration • Provide Guidance to Stock Assessment Subcommittee Regarding BRP Development

5. 2018 Benchmark Stock Assessment Progress Update (2:40 p.m. – 2:45 p.m.)
Background • A benchmark stock assessment is currently underway and schedule for peer review in November 2018 at the 66th SAW/SARC.
Presentations • Benchmark Stock Assessment Progress Update by K. Drew

6. Other Business/Adjourn

Atlantic Striped Bass

Activity level: High

Committee Overlap Score: Medium (TC/SAS/TSC overlaps with BERP, Atlantic menhaden, American eel, horseshoe crab, shad/river herring)

Committee Task List

- TC – June 15th: Annual compliance reports due
- TC/SASC/TSC – All Year: benchmark stock assessment
    - May 2018: Modeling Workshop I
    - May 2018: Updated data submission for Assessment through 2017
    - July/Aug. 2018: Modeling Workshop II
    - Sept. 2018: Final SASC call/webinar to approve stock status determination
    - 1st week of Oct. 2018: All Draft Report components due to staff
    - 2nd week of Nov. 2018: Assessment Report due to external peer-review panel
    - Nov. 27-30, 2018: Peer review (SAW/SARC 66)

TC Members: Nicole Lengyel (RI, TC Chair), Kevin Sullivan (NH, Vice Chair), Alex Aspinwall (VA), Alexei Sharov (MD), Carol Hoffman (NY), Charlton Godwin (NC), Edward Hale (DE), Ellen Cosby (PRFC), Gail Wippelhauser (ME), Gary Nelson (MA), Heather Corbett (NJ), Jeremy McCargo (NC), Kurt Gottschall (CT), Luke Lyon (DC), Michael Kaufmann (PA), Peter Schuhmann (UNCW), Winnie Ryan, Gary Shepherd (NMFS), Steve Minkkinen (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Max Appelman (ASMFC)

SAS Members: Edward Hale (DE, Chair), Gary Nelson (MA, Vice Chair), Alexei Sharov (MD), Hank Liao (ODU), Justin Davis (CT), Michael Celestino (NJ), John Sweka (USFWS), Gary Shepherd (NMFS), Katie Drew (ASMFC), Max Appelman (ASMFC)

Tagging Subcommittee (TSC) Members: Stuart Welsh (WVU, Chair), Heather Corbett (NJ, Vice Chair), Angela Giuliano (MD), Beth Versak (MD), Chris Bonzak (VIMS), Edward Hale (DE), Gary Nelson (MA), Ian Park (DE), Jessica Best (NY), Carol Hoffman (NY), Gary Shepherd (NMFS), Josh Newhard (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Max Appelman (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC STRIPED BASS MANAGEMENT

The Westin Crystal City
Arlington, Virginia
February 7, 2018

TABLE OF CONTENTS

INDEX OF MOTIONS

1. **Approval of agenda** by consent (Page 1).

2. **Approval of proceedings of October 2017** by consent (Page 1).

3. **Move to approve Option B, in Maryland's conservation equivalency proposal for its summer/fall recreational striped bass fishery in the Chesapeake Bay. Season, May 16 to December 15. Size and bag, 2 fish at 19 inch minimum, with only 1 fish allowed greater than 28 inches. Non-offset circle hooks required when fishing with bait, non-artificial lures. Additionally, Maryland will collect enforcement, compliance and other relevant information during 2018, and will report back to the Board with a conservation equivalency effectiveness review in February, 2019** (Page 15). Motion by Mike Luisi; second by John Clark. Motion carried (Page 25).

4. **Move to adjourn** by consent (Page 25).

TTENDANCE

Board Members

Patrick Keliher, ME (AA)
Steve Train, ME (GA)
G. Ritchie White, NH (GA)
Doug Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Raymond Kane, MA (GA)
Mike Armstrong, MA, Chair
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
David Borden, RI (GA)
Jay McNamee, RI (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Mark Alexander, CT (AA)
Matt Gates, CT, proxy for Sen. Miner (LA)
James Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Boyle (LA)
Heather Corbett, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Andrew Shiels, PA, proxy for J. Arway (AA)
Loren Lustig, PA (GA)
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Rachel Dean, MD (GA)
~~David Blazer, MD (AA)~~
Mike Luisi, MD, Administrative proxy
Rob O'Reilly, VA, proxy for John Bull (AA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Catherine Davenport, VA (GA)
~~Steve Murphey, NC (AA)~~
Michelle Duval, NC, Administrative proxy
Doug Brady, NC (GA)
David Bush, NC, proxy for Rep. Steinburg (LA)
Bryan King, DC
Martin Gary, PRFC
Derek Orner, NMFS
Sherry White, USFWS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Nicole Lengyel, Technical Committee Chair

Staff

Robert Beal
Toni Kerns
Katie Drew
Max Appelman
Jessica Kuesel
Mark Robson
Megan Ware

Guests

Bob Ballou, RI DEM
Chris Batsavage, NC DMF
Mark Bolton, ND DMR
Jeff Brust, NJ DFW
Jeff Deem, VMRC
Greg DiDomenico, GSSA
Lynn Fegley, MD DNR
Angela Giuliano, MD DNR
David Gouveia, NOAA
Ken Hastings, Mason Springs Cons.
Wilson Laney, US FWS
Arnold Leo, E. Hampton, NY
Dan McKiernan, MA DMF
Robert Newberry, DelMarVa Fishermen Assn.
Kelly Place, VA
Gray Rodding, DC
Jack Travelstead, CCA
Beth Versak, MD DNR
Chris Wright, NMFS

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Wednesday February 7, 2018, and was called to order at 3:00 o'clock p.m. by Chairman Michael Armstrong.

CALL TO ORDER

CHAIRMAN MICHAEL ARMSTRONG: Good afternoon. I would like to adjourn the Striped Bass Management Board. I am Mike Armstrong, your new Chair. Thank you for that great honor for the next two years. You may want to hold that applause; for I'd say two years or so. Did I just adjourn it? That's awesome. We're all done; thank you.

APPROVAL OF AGENDA

CHAIRMAN ARMSTRONG: All right, first order of business, the approval of the agenda. Are there any additions, revisions, seeing none?

APPROVAL OF PROCEEDINGS

CHAIRMAN ARMSTRONG: Moving on to approve the proceedings from October, 2017; changes, comments okay that is approved unanimously.

PUBLIC COMMENT

CHAIRMAN ARMSTRONG: It brings us to public comment. I have a couple people on the list. Anyone else who would like to provide public comment can; even though you're not on the list, concerning a topic that we're not discussing today but concerning striped bass. Could I have Ken Hastings?

MR. KEN HASTINGS: Good afternoon, my name is Ken Hastings; I'm a recreational fisherman from Maryland. I noticed in looking over the agendas for this meeting this week that the Policy Board tomorrow is going to discuss some interesting topics relative to uncertainty; and specifically for recreational fishing harvest. I've always been amazed, and sometimes somewhat frustrated at the casual way, in my view that uncertainty has been handled by this Commission when talking about striped bass. At one point I remember a staffer saying that in this business even the uncertainty was uncertain. I took that home with me and slept on it for a while; and it never got any better. But I'm happy to see that the Commission, in filling out this survey for the Policy Board, is highlighting these problems. I'm looking forward to less uncertainty in the future relative to striped bass. Thank you.

CHAIRMAN ARMSTRONG: Thank you for those comments. I look forward to a good meeting tomorrow on uncertainty. Next we have Captain Robert Newberry.

CAPTAIN ROBERT NEWBERRY: Mr. Chairman thank you, Captain Robert Newberry, Chairman DelMarVa Fisheries Association. I have a comment that is kind of based around a question. Four years ago we went into a situation where we took a 20 percent reduction on our commercial fishery; and also the equivalence on our recreational. We were told by our department at that time, and other individuals that we would be getting this back after two years. The question and the comment, I said I think it's about time we got those back and can anybody answer me on the Commission when we might possibly get the 20 percent return and back to our initial size of the fish?

CHAIRMAN ARMSTRONG: Nicole could you address or Max? We have Amendment 4 in place and that will continue until it's changed.

MR. MAX APPELMAN: Addendum IV will remain in place until further action is taken.

CAPTAIN NEWBERRY: That will be set by when they do the stock assessment, correct?

MR. APPELMAN: That seems to be the current timeline.

CAPTAIN NEWBERRY: All right, thank you.

REVIEW AND CONSIDER THE MARYLAND CONSERVATION EQUIVALENCY PROPOSAL

CHAIRMAN ARMSTRONG: Okay, which brings

us to Agenda Item 4; to Review and Consider the Maryland Conservation Equivalency Proposal/Overview.

This will be a final action item. I would first like to have Mike speak to the proposal; tell us why and the details, okay Mike.

PROPOSAL OVERVIEW

MR. MICHAEL LUISI: I have the feeling I'm going to have to get awfully comfortable behind the microphone here over the next hour. But I do appreciate the opportunity to address the Board kind of outside the standard; which would be that the Technical Committee, the AP, the LEC report out to us.

The reason why I asked to do that and worked with staff on presenting to you in this way, was that I really wanted to emphasize to all of you that the proposal that we've put together that we're going to take a look at and hopefully make a decision on by the end of the day. It's a proposal that addresses a really serious problem that we have in our state right now; which is mortality and waste that is associated with discards.

This is even exacerbated to some degree through the summertime, fall/summer fishery, when anglers are using bait, chumming and live-lining, and in some cases even what we're seeing is that there is an increased use of treble hooks in order to catch fish. As we all know it's even worse than a J hook, as far as gut hooking the fish.

You know the number of released fish we had in our state sharply increased as a result of the changes that we made when we implemented within the recreational fishery Addendum IV. We increased the size limit from 18 to 20 inches; and kind of left everything else on the table, as far as the consistency that we had for many, many years.

After our attempt, we discussed with the Board and we had initial approval of Addendum V; which would have offered for liberalization to all states, both commercial and recreational. There was a 10 percent liberalization being discussed. That didn't go anywhere. That is what puts us here today.

One of the things I wanted to bring to everybody's attention was that this is not Maryland's, it is not our interest to continue on the path of Addendum V; which we would see as a liberalization, an additional mortality on top of what we currently have in place. This is a conservation equivalency proposal. We made a commitment to our stakeholders to address this ongoing and really severe problem that we have; and this proposal I think gets us to that. Now, as with everything that we do, things change. Ideas that are generated throughout the process alter the path that you may have started down. To clarify for simplicity, Max has put together what we had presented to the Technical Committee; as far as all of the different options that we're exploring with our stakeholders.

What you see before you on the board addresses what our current status quo is. Current status quo is a May 16 to December 20th season, with a two-fish-bag limit and a minimum of 20 inches, with only one fish being greater than 28. We are proposing to get the minimum size down to 19; and we explored a number, this is only a portion of what we explored, regarding different ways we could try to address this problem of mortality.

The idea here was that we would have a minimum size of 19 inches for some portion of the year; and then revert back to the 20 inches. Everything with the exception of the first option did just that. We would have both a 19 and a 20 inch limit for different portions of the year. Through our discussions with stakeholders, we were getting advice that closing the month of December was not a viable alternative for us.

Not only that; but we made a commitment when we began this process, not to bring before the Board options that increased total removals. If you look at the last two or three options there at the bottom of the table. Under the different percent removals, those options

would increase the total removals by between 2 and 6 percent.

We didn't believe those to be something that we wanted to have that conversation with the Board. Max, can you go to the next slide? We have removed those from any additional consideration. That leads me to the last two options which have the December closure. In communications with our stakeholders, both private anglers and charterboat captains, those are not going to work for us either.

That takes us down to one remaining viable option; and I wanted to bring this before you at this time, so that we don't get wrapped up and confused in all the other options in the proposal, when we begin the conversation after the reports. Max, I don't know if you have one last slide. This last slide would be what it would be.

This is the option that we were pursuing; and we're looking for the Board's support. We can talk about the details of it a little bit later, but Mr. Chairman again; thank you for allowing me, there has been a lot going on a lot of conversations and discussion over this. I wanted to bring everybody up to speed on where Maryland currently stands; and what the expectation for the rest of the meeting would be, as far as what options we would be looking to approve.

TECHNICAL COMMITTEE REPORT

CHAIRMAN ARMSTRONG: I think we'll go to the Technical Committee review; so all these options were submitted to the Technical Committee. What I'm going to have them do is review the general way they looked at all of them; in case there are options to mix and match things that is not on the table for the Maryland proposal, just so we know what we're dealing with.

MS. NICOLE LENGYEL: Today I'll be presenting the TC report on the conservation equivalency proposal submitted by Maryland that was just reviewed briefly for their 2018 recreational management measures. I'm going to start off by briefly touching on the conservation equivalency language that is contained in Addendum IV. Then I'll touch briefly on the Maryland proposal, but we just got a really nice overview of that so I won't spend too much time on it. Finally, I'll review the comments provided by the Technical Committee. The language written in Addendum IV that pertains to conservation equivalency states Amendment 6, Section 4.6 allows for states to submit alternative regulations that are conservationally equivalent to regulations approved in this document for Board review and approval.

However, Addendum IV did not approve a set of regulations for the Chesapeake Bay. Addendum IV specifically states the Chesapeake Bay jurisdictions will submit a management program that achieves at least a 20.5 percent reduction from 2012 harvest; including estimated dead discards in the Chesapeake Bay recreational fishery for Technical Committee review and Board approval.

As a result, the Technical Committee had some difficulty as it was unclear to the TC how to interpret conservation equivalency under Addendum IV. The Maryland conservation equivalency proposal puts forward a number of alternative management measures to be implemented in 2018; with the primary goal of reducing dead discards.

All options propose a reduced size limit of 19 inches during all or part of the summer and fall months. By reducing the minimum size from 20 inches to 19 inches during that time, direct harvest will increase but dead discards would decrease. The estimated change in total removals relative to current levels ranges from a 1 percent decrease to a 6 percent increase.

The TC had several comments on the proposal. In general the TC concluded that the data sources and methodologies used in the proposal are appropriate; with the exception of Option B that includes the mandatory use of circle hooks. The TC supports the implementation of circle hook requirements to improve post release survival rates; but does

not endorse such requirements for conservation equivalency proposals at this time, due to uncertainty in realized mortality reductions, due to angler response and other variables such as challenges of enforceability.

The proposal demonstrates that the proposed measures, excluding Option B, may have minimal impact on total removals relative to current regulations. However, the typical caveats regarding size limit analysis would still apply here; such as angler behavior changes and population size structure changes.

The 2011 year class has also been a factor in recent years; and the 2014 year class will also likely be a factor in the coming years. Some additional comments from the TC are that the proposal did not follow all of the CE criteria set by the Technical Committee; as outlined in the two memos supplied. Specifically, a longer time series of data was used, 2000 to 2014, this did not include the most recent three years. Additional info is also needed on the specific type of circle hook that would be required; and which anglers the circle hook provision would apply to.

Although the proposal did not have a specific analysis to demonstrate a 20.5 percent reduction relative to 2012, implementation of Options A, G, and H are likely to result in minimal change from current levels, thus being conservationally equivalent to current regulations, but not the measures stipulated in Addendum IV. Interpretation of whether this proposal meets the letter or spirit of the conservation equivalency policy is a decision for the Board. With that I'll take any questions.

CHAIRMAN ARMSTRONG: Are there any questions for Nicole? John.

MR. JOHN G. McMURRAY: I don't know if this is a question for Nicole or Mike. But could we put the slide up with Option B? The circle hook requirement Option B, assuming a 9 percent discard mortality rate. There is no increase in removals. But under 27 percent it says not applicable.

I would just assume that the discard rate is higher; which there is reason to believe that it is, given where that fishery occurs and the gear that's used. Would we expect to see a negative value there? I'm wondering why it's left out; and I have a second question after that one is answered.

MS. LENGYEL: That specific option was left out because they didn't provide the analysis in the proposal on it.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: You are correct, John in that if we were to run the same analysis under a 27 percent mortality it would have been a negative number. Going into this analysis we had some uncertainty about what the Technical Committee, how they would view the 27 percent based on the information that we used to generate that value in the analysis.

Knowing that there would be a greater level of support for the 9 percent; given that it's the standard in the assessment, we left it where it is. But I think we can all look at that and understand that the savings could be much greater if, and I'm saying that we know for certain that the mortality is higher in certain times of the year.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: Thanks for that answer, Mike. My second question was about the time series used; because that was flagged in the presentation. Was there a reason more recent years weren't used?

MR. LUISI: We used the 14 year time series, given that for all 14 years we had consistent regulations. The analysis was a little different from the standard, let's take a look at the last three years and try to project forward. We used an analysis that looked back in time. What we basically said was had we had a 20 inch limit during all of those years; what would the projected discards and harvest have been.

Then we went back from there, in order to get us close to that equivalency. It was just a different technique.

CHAIRMAN ARMSTRONG: David.

MR. DAVID V. BORDEN: Just to kind of follow up on that question. I was going to ask that as my first question. But the second question is if the analysis were rerun with the Addendum IV timeline in it, how does that change the result?

MS. LENGYEL: We were not provided with the analysis; so we can't comment on that. I don't believe that Maryland has supplied that.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: I didn't do the analysis; but thinking about the data used. We did an averaging over those 14 years to account for the variability in change that would have resulted from length frequencies for each year. What more or less fish would have been available to us had our rules been different during those 14 years. The averaging accounted for all that variability. I would expect that had we only used a couple years there would have just been more error in the estimate that would have come forth. But that was not something we explored.

CHAIRMAN ARMSTRONG: Yes.

MR. ANDY SHIELS: I believe what I read in Maryland's proposal that talked about the 2015 year class being the one that's really strong; and that's going to be coming on. But in the slide I think it was pointed out it was the 2014 year class. Can you confirm if that is accurate?

MS. LENGYEL: It was 2015 was a high year recruitment, and so that translates into a 2014 year class.

CHAIRMAN ARMSTRONG: Doug and then Ritchie.

MR. DOUGLAS E. GROUT: Mike, we had some conversations that I wanted to bring forward to the Board and ask you these questions. In the mandatory circle hook proposal, the analysis said that you made certain assumptions which are not specified in the proposals. I was wondering if you could provide answers to these two questions. In the assumptions what was the percentage of recreational anglers and charter boat anglers that you assume are using bait versus other type of terminal tackle?

You've had the circle hook study that you implemented, and had some very good analysis done about the benefits of circle hooks, what 15 or more years ago. I know up on your website you've certainly been encouraging the use of circle hooks. My question is, do you have or could you get a feel of how many people are already using circle hooks in Maryland, and if that was part of the assumption?

MR. LUISI: Thanks for the questions, Doug. The answer to your first question, we use a 75 to 25 percent ratio during the Wave 3 and 4 periods for bait versus the artificial. I apologize, but I'm looking out to folks from my staff in the audience that is helping me with this one. The second, so you're talking more about a baseline of what we're starting with, as far as circle hook use. That is not something that we were able to estimate. It was not part of this equation.

MR. GROUT: You assumed that nobody was using circle hooks at all in the analysis.

MR. LUISI: I don't think that would have been a fair assumption. We know that circle hook use is happening. We're trying to characterize the increase in use through our determination of that ratio. We took a look at how we would maximize the use up to a 75 percent use during that time. That's assuming 100 percent bait users are using circle hooks. There are other people who don't use bait, they're using artificial throughout all times of the year.

CHAIRMAN ARMSTRONG: Go ahead, Doug.

MR. GROUT: What I'm asking, in the analysis you assumed that 75 percent of the people were using bait. There is a mortality associated with that; as long as they're not using circle

hooks. But in the analysis, did you assume that of all the people who are using bait were any of those using circle hooks? Without having a figure there I would have to assume that you just assumed that everybody was using J hooks or treble hooks or whatever.

MR. LUISI: That would be right.

CHAIRMAN ARMSTRONG: Ritchie, then Michelle.

MR. G. RITCHIE WHITE: I'm still trying to understand the conservation equivalency in relation to Addendum IV. Even though regulations were not part, because regulations in the Bay were not set that those aren't part of conservation equivalency. The mortality, the 20 percent drop in mortality is part of Addendum IV.

If this is 0 percent and the Bay did not accomplish 20 percent reduction in mortality, then how is that conservation equivalent? I'm trying to understand how you make the leap from if they weren't reaching their goal, and they're staying even with that or the same as that. How is that equivalent to Addendum IV?

CHAIRMAN ARMSTRONG: Ritchie, I think that is part of the crux of this argument; so I'm going to shove it off until after we go through the Law Enforcement also. But we'll come back to it very importantly.

MR. WHITE: But isn't that a Technical Committee question?

CHAIRMAN ARMSTRONG: No, they've already stated they will not offer an opinion on that so it's a Board decision.

DR. MICHELLE DUVAL: Yes just a quick question for Mike, and Mike I apologize if this was in the proposal and I'm just failing to see it. But in terms of circle hook use. I mean there are non-offset circle hooks, there are offset circle hooks. Have you all determined what type of circle hook requirement you would have? Would it be non-offset, non-stainless circle hooks? Then again I guess maybe the second piece of that is Doug mentioned information on your website encouraging the use of circle hooks, and I was wondering if you all had any other plans with regard to sort of public outreach and education should this proposal move forward.

CHAIRMAN ARMGSTRONG: Yes, Mike.

MR. LUISI: Okay thanks for the questions, Michelle. We would go through a regulatory process to identifying that circle hook. The circle hook would be a non-offset circle hook. We currently have rules in place in Maryland; and this is a good point to bring this up. We have circle hook requirements for intentional striped bass fishing in the preseason prior to the trophy season that happens in the third week of April when that begins.

We've defined that circle hook as one for which it's offset. A J hook can't be used in those waters if its point to shank length is greater than one-half inch. We would go through the process if we were to be approved here. We wouldn't deviate from the non-offset. That is going is the condition that we would use. That is the basis of the analysis that we use to get to where we are.

But we would need to have those conversations with stakeholders; and internally determine what that smaller hook size could still be for use of J hooks, because we have a white perch, a croaker and a spot fishery, and those top/bottom rig fishermen that are using little pieces of bloodworm. The intention is not to affect them to the degree that they wouldn't be able to harvest either. That would all be in process if we were to be approved; that I think got both your questions, no?

DR. DUVAL: Just additional public outreach and education efforts, I didn't know if you all had discussed that.

MR. LUISI: Yes absolutely. We would do everything we could within the Agency to

promote the use, to get the information out there. We've also had tremendous support from groups like the Chesapeake Bay Foundation and Coastal Conservation Association, and other angling organizations that we would look to help get the most information we could out to the public. We have, and you know the season doesn't start until the middle of May. We would undergo that process; along with our regulatory process, which we would have to still complete.

CHAIRMAN ARMSTRONG: I have Rob, Adam then Pat.

MR. ROB O'REILLY: I've got a couple questions here. Do you happen to know which size is recruiting to the fishery? It used to be rule of thumb that for an 18 inch size limit about 25 percent at age 3 can recruit to the fishery. We're looking now at the difference between 20 inches and 19 inches.

I would think that it's really going to be, if the 2015 year class is the one that has some promise, right? It looks like it's going to be effective in 2019, more so in 2018 as far as the discards go, or vice versa. Can you comment on that? Then I have one follow up if I may, Mr. Chair.

MR. LUISI: Okay to your question, Rob. The 2015 year class, with conversations that I've had with folks at the Agency, some will recruit to the 19 inch size limit but it will be a small proportion. In my opinion those undersized fish are still going to be interacted with. You know they are at that point where they're going to school; and they're going to be with other 19 and 20 inch fish. The intention here is to take a proactive approach; and actively initiate regulatory change that's going to help protect those fish to the extent we can, before they become harvestable.

MR. O'REILLY: In looking at the Maryland releases and harvest, pretty clear that after about 2007, you know the Maryland harvest did come to a little lower plateau, as did the discards. Then in 2015 and '16 discards, the B2s, not the dead discards but the B2s are up a lot. What I'm looking at is those are the time periods, so 2015 and '16.

Switch that now to maybe 2018, '19 or 2019, '20. That's where it looks like there is going to be some discard problems. If that year class is above average; which I assume that's the case, it's above average, and that's the really time period to look for. I don't see this as a 2018 situation; I see this as having probably benefits into the couple of years after that even more so. I have that part here that I looked at, and then Virginia follows the same trend on harvest and discards, but at a lower level. It's definitely something that is systematic in the Chesapeake Bay, so thank you for the time.

MR. LUISI: Rob, to your point. I would say that while we are looking at the implementation of this for 2018, I think the expectation would be that we would be able to come back to this Board and show the Board that we have done what we've said we were going to do regarding enforcement and compliance.

We would hope that the Board would continue to support this effort. While it may not have the greatest impact initially, in 2019 we would hope that we would be able to maintain these regulations in moving forward, not the expectation that this is just a one-year deal.

CHAIRMAN ARMSTRONG: Adam, Pat and Doug, we're getting a little into the weeds now. I think what I prefer to do, and it may be helpful to listen to the AP and the Law Enforcement first, and then come back to the details if a motion is made. Okay, because I don't want to lose momentum and then move on and then try and come back; okay if you can hold your questions.

LAW ENFORCEMENT COMMITTEE REPORT

CHAIRMAN ARMSTRONG: At this point, Mark Robson could you give the Law Enforcement report.

MR. MARK ROBSON: The Law Enforcement Committee was able to meet by teleconference

on January 8, and reviewed the various options for this conservation equivalency proposal. We had 15 members of the Law Enforcement Committee participating. We offer these couple of comments specific to the proposal to reduce the size limit for the summer/fall season in the Bay.

Generally, there were no specific objections to the Maryland proposals for this reduced size limit. We heard information from Maryland and from surrounding states regarding other fisheries and similar situations. The members of the LEC do as usual; caution that to the extent possible whenever you look at these conservation equivalency proposals to keep an eye towards consistency between contiguous states or states that are sharing water bodies.

It's something that we've commented on in previous conservation equivalency discussions; particularly for striped bass. I think the Law Enforcement Committee would continue to press that point that even though you may want to alter size or bag limits, try to look wherever you can for consistency among jurisdictional regulations in those water bodies.

Regarding the use of circle hooks, again the Law Enforcement Committee would not have any real specific objections to circle hooks. Certainly I think they all understand the potential conservation value of the use of such gear. But they do urge caution that managers and scientists shouldn't place too much reliance on strict enforcement of the use of circle hooks as a way of meeting your conservation or your harvest reduction goals.

Certainly to the extent that even in law enforcement, where outreach or education can be used, and has been mentioned here in this particular case, if there is going to be a high level of angler compliance with the use of circle hooks, certainly you could achieve your goals. But it's a difficult enforcement issue; when you're looking at officers on the water or at the docks, trying to enforce a very specific gear use regulation for a specific species, without really being able to address flagrant violation of that use of gear. They just urge caution; that you don't rely too much on strict enforcement to meet those goals for harvest reduction. Obviously, the use of circle hooks is going to be something that and even in law enforcement would help to participate in dealing with the education and outreach component. Those were the two issues that we really focused on in our discussions and that was the extent of our deliberations.

ADVISORY PANEL REPORT

CHAIRMAN ARMSTRONG: Any questions for Mark? Seeing none; Max, could you give the AP report, please?

MR. APPELMAN: I'll be presenting the Advisory Panel report on behalf of the AP. The AP met via teleconference on January 12 of this year. Their goal of that call was to review Maryland's conservation equivalency proposal. They also were able to review the TC and LEC comments; and then to draft their own comments for Board consideration.

Up on the screen is a list of the members that were in attendance. The AP was sympathetic to the fact that there is a real problem in the Chesapeake Bay with dead discards. It's the APs understanding that there is a large presence of sublegal fish in the Bay; which makes it difficult to avoid high discard rates.

Because of this underlying tone of the proposal, majority of the APs discussion really focused on that mandatory circle hook requirement to improve post release survival and reduce dead discards. The AP feels strongly that circle hooks provide a true conservation benefit; and that all striped bass fisheries, not just within the Chesapeake Bay should implement a mandatory circle hook requirement.

Although not a part of the proposal, the AP did add several times that the use of treble hooks should actually be banned as well. Some AP members did express concerns regarding the precedence of approving the implementation of a mandatory circle hook requirement to achieve conservation equivalency.

But overall the views of the AP are that they believe the conservation benefits outweigh those concerns. Regarding AP recommendations, the AP supports Option B, 19 inch minimum size limit from May 16 to December 15, with a mandatory circle hook requirement. However, the AP stressed that the requirement must be clearly defined.

They went on to state that the realized conservation benefit is heavily dependent on the type of circle hook required. Some suggestions came from the AP for a non-offset circle hook; and the notion that larger hooks are generally associated with a higher post release survival, the thought being that the larger the circle hook the less likely to be ingested.

One last note before I conclude this brief presentation. An AP member, Mr. Paquette, he represents Massachusetts, submitted comments after the AP call, and after reviewing the draft AP Report. Typically when that happens, the individual is asked to address the Board as a member of the public or to submit his comments separately.

But since Mr. Paquette was unable to participate due to unforeseen circumstances, it was decided to include his comments as an appendix to the AP report instead of having him address this Board or submit his comments separately. In a nutshell, Mr. Paquette's comments echo the APs comments regarding the high level of discards in the Bay, and that the circle hook requirement could help with that issue. However, regarding AP recommendations, Mr. Paquette is opposed to the CE proposal overall, stating that inconsistent terminology within the tackle industry, and uncertainties regarding angler behavior are real challenges, this shouldn't be overlooked.

Again, I really want to just make it clear that the AP did not have a chance to hear these comments, respond to these comments, address these comments in their discussion, and that they were received after the AP call and after having viewed the AP draft report. Thank you.

CONSIDER MARYLAND CONSERVATION EQUIVALENCY PROPOSAL

CHAIRMAN ARMSTRONG: Ritchie.

MR. WHITE: I would just like to make a comment that I had a call from an AP member. He was kind of concerned about having this meeting with no Technical Committee report. I guess this meeting took place before the Technical Committee was done and had finished their report. I hope in the future that we're able to coordinate, so that APs can have the benefit of the Technical Committee.

MR. APPELMAN: Quick response to that. The Technical Committee did meet prior to the AP; but the draft report of the TC was still in development. I gave as much insight from the TCs discussion as I could at that time; but you're correct, the report had not been released yet, and so there was no formal report for the AP to review.

CHAIRMAN ARMSTRONG: Pat and then Eric.

MR. PATRICK C. KELIHER: Mr. Chairman, I think my comments are going to crossover both AP and Law Enforcement; and get into angler behavior. Would you like me to hold those? It's a little bit of all of the above rattling through my brain right now.

CHAIRMAN ARMSTRONG: Why don't we hold off? We will begin an omnibus discussion soon. Eric.

MR. ERIC REID: My question is about a comment the AP made about the treble hooks, and probably double-hooks as well. Since Maryland's proposal really only talks about what the bait fishermen will use, and I'm assuming it is natural bait not artificial bait. Has there been any discussion about banning treble hooks in the fishery in total, including jig fishing and everything else?

To me the treble hook is a real problem. Circle hooks and angler behavior aren't really going to match up. But there is going to be a component of that fishery that's going to use a treble hook, because they're using jigs or whatever. Is there any conversation about not allowing that?

MR. APPELMAN: At the Board level I haven't heard much. I know there is a piece in there in Amendment 6 that through an addendum process we could address that question. Certainly at the AP call, it was brought up a lot. Amongst those industry members it is certainly on their plate.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: I'll just speak directly to the question. If we were to go forward with this option as we're discussing. It would eliminate a treble hook from being used with anything non-artificial. But we have not discussed jig fishing and other forms of artificial lures, and removing treble hooks. The information that we have to base that on is that there is just far less deep hooking and gut hooked more. The mortality is far less with an artificial lure. That's just what's been communicated to us from our stakeholders.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: Just to go a little further in addressing Eric's question. There is a really big difference between fishing bait on a treble hook and fishing a plug with a treble hook. If it's not obvious, the difference is that that fish ingests that bait, it kind of swipes at a plug or a jig with a treble hook. Discard mortality in my anecdotal experience is far lower, and there are certainly a lot of plugs that you can't put J hooks on, it just don't work. That would be my response to that.

MR. REID: I respectfully disagree with John on whether the effectiveness with a J hook or a treble hook on a plug reduces the efficiency of the plug is not in question here. What we're trying to reduce is discards. I spent plenty of time on charterboats when I was much younger than I am now; and the first thing we would do is take treble hooks off, because we didn't want to get them in our hands. The question is can you get rid of treble hooks in the fishery; and if the answer is yes, great. If the answer is no, okay.

CHAIRMAN ARMSTRONG: That may be an issue this Board wants to take up at a later date. I would prefer it at least two years from now; but we can do that. Are there any other questions for any of the Committees? Adam, do you want to speak to your points?

MR. ADAM NOWALSKY: You're still entertaining a TC specific question as well?

CHAIRMAN ARMSTRONG: Yes, I think we can begin that discussion now.

MR. NOWALSKY: I find it very fortuitous first that this Board meeting was preceded earlier today by our Strategic Planning discussion. While they weren't explicitly on the agenda, we had our mission happened to come up, which states promoting cooperative management to avoid physical waste. Yet that's exactly the reason why we're here today; and why Maryland has brought this proposal forward specifically to do that avoid this physical waste.

My specific TC related question is that on Page 2 of their document they decided that a number of the proposals they considered conservationally equivalent to the current regulations; and that made me wonder. Had these proposals come forward a number of years ago, when we were addressing the Addendum IV changes that were required, would these proposals have passed muster and been approved had they come forth at that time?

DR. KATIE DREW: They would not have, because they could not have demonstrated a 20.5 percent reduction relative to 2012. It's hard to say for sure; but none of what they showed us indicated that it would have reduced harvest relative to 2012, which was in the plan and that's what was required. Because the

regulations that we put into place with this 20 inch, did not actually result in the reduction of harvest that we had expected; in part because of that large year class coming through. You got a higher harvest. Those regulations didn't work out; which is why you can have a minimal change from current regulations, in terms of removals, which the TC does feel is legit, but not a reduction relative to 2012, which is what is mandated in the Plan.

MR. NOWALSKY: I'm just trying to understand. It was my thought that we're saying that they don't meet the 20.5 percent reduction based on information we've gathered since we put those measures in place, is my understanding. We would not have had that information two and a half years ago, and as such we would have deemed them, as the TC says, conservationally equivalent at that time. We approved it then, why would we not have approved these new measures then?

DR. DREW: I think the other issue is that they didn't use the same set of years that we were using at the same time. Whether or not this analysis would have shown something different, I can't say; if they had been using this wider set of years, compared to the three years that everybody else used during the conservation equivalency program.

But, I find it extremely hard to believe that Maryland would have come to us proposing 20 inches; when they could have gotten away with 19 inches. I think using the data that they had at the time, it indicated that 19 inches was not going to get you the reduction that you needed. Whether it's this different set of data, they did not include the most recent couple of years, so we can't say anything really about the influence of that 2015 year class, I'm sorry the 2011 year class.

If you had included that data would this proposal look differently? We can't say relative to that. I think the issue is really that the management plan, Addendum IV, because it doesn't have specific regulations in place, it opens up this sort of gray area in terms of how you're interpreting the results, and that had the 20 inches been written into the plan.

If they had come to us and said we're demonstrating that current regulations, the 20 inches there is no change. We would have said yes that is conservationally equivalent and that is equivalent to what is in the plan, so we're good to go. But that is not what's in the plan; and that's why we're kicking it to the Board for that question of how you're interpreting conservation equivalency.

CHAIRMAN ARMSTRONG: Okay, Mike.

MR. LUISI: While we're speaking about the plan; maybe I could ask you your thoughts on the objectives of that plan. It was clear in my understanding that one of the objectives was to reduce fishing mortality to the target; within a period of time. Another objective was to protect to the practical extent possible the 2011 year class.

Those were two pieces to that plan that I believe we have accomplished. The last assessment indicated that fishing mortality on a coastwide basis was below the target level by 10 percent; and the 2011 year class is really out of the Bay at this point. I would just make the comment that when I look back at that Plan and working through that Plan.

I don't think it was ever anybody's expectation that we would maintain some form of a constant harvest strategy; while we have the influence of year class strengths that we do. It would suggest to me that this conversation about finding or maintaining a harvest level at or below the 2012 harvest, it wasn't something that was going to happen. We had a 2011 year class expanding in the Bay to the degree that it did. While we may not have met the letter of the Plan, I believe that our potential harvest was reduced dramatically, as a result of those increases that we took. I think we all made a really solid good faith effort in putting together the regulations that we did as a result of Addendum IV; and I'll leave it at that Mr. Chairman, thanks.

CHAIRMAN ARMSTRONG: We've segued into exactly the spot I would like to be. This frames the question we need to begin with. Conservation equivalency, are we measuring it against the minus 20.5 percent or against what was actually achieved by the rules that were put in by Maryland in good faith?

Do we consider that water over the dam, or do we go back to that? If we go back to that they will not achieve anywhere close to conservation equivalency. I would like to discuss that; because that is really a non-starter to go forward, unless we have some consensus on that. Doug.

MR. GROUT: I'll give you my thoughts on that if you give me a chance to ask my original question.

CHAIRMAN ARMSTRONG: Please.

MR. GROUT: If I can ask the question first and then I'll give you my thoughts on which standard that we need to apply it to. The question is for Mike. In our conservation equivalency guidance document for state proposals, state conservation equivalency proposals. One of the things that we ask for in the proposals is that they include a plan; describing the monitoring schedule, reporting requirements, and documentation of the process of evaluating the impacts of the conservation equivalency measures.

I've always taken this as evaluating it after we put it in place. If we were to approve this, I didn't see anything in the proposal stating what your mechanisms for providing information to evaluate whether it actually accomplished the goals that you had put forward.

MR. LUISI: If I can ever get off the hot seat and get to the motion that I drafted a couple hours ago, I think it will answer your question. Part of our plan would be if this were to be adopted by the Board that we would work throughout this upcoming year to provide Law Enforcement compliance and other necessary data that we could discuss with members of the charterboat association, and our folks that are collecting information on APAIS.

There are certainly avenues that we can take to put forth a report that we would bring back to the Board, so that we can understand. It's accountability on our part as well. We will learn from a report like that or from a data collection practice, where we might be not hitting the mark. That will give us an opportunity to reach for that mark in a better way.

MR. GROUT: Okay I appreciate that although, at least according to our guidance, we're supposed to have that information during the proposal period. But that's great to hear that you have that plan and I hope if we approve this that process is going to be outlined, maybe by the next meeting, now to my thoughts on which standard we need to apply to.

From my personal perspective, we knew last year that according to the Technical Committee's analysis of whether we had achieved our reduction that in the overall coastwide, we had achieved that reduction. But we also knew that in the Chesapeake Bay area there had actually been an increase. Yet this Board at that time a year ago did not try to implement some management action to try and get the Chesapeake Bay states to actually achieve a 20.5 percent reduction. To me, I think the Board made a decision a year ago. Again, this is just my personal opinion that what had been accomplished coastwide was good enough, regardless of whether most of the conservation benefit came out of the coastal states.

CHAIRMAN ARMSTRONG: Mike, were you, okay. Rob.

MR. O'REILLY: I guess I'm responding to your question. If anyone would like to listen to the 8.5 hour tape of the meeting that decided what Addendum IV was going to look like. I think they would find out that the intent was, as we heard from someone in the public today, it was not supposed to extend this long.

I understand what Doug is saying. I also understand that things have probably been better on the coast for the most part; with the movement out of the 2011 year class. But the intent was for most people going through that there were talks of, well one year. We'll get it done in one year. The reality was three years.

A lot of talk about well this will take about three years. If you remember how the options worked; depending on how you did your options, when you would reduce F to the target. Three years was the max. We've passed the three years. We're supposed to be talking about cooperation a lot today.

If we are below the target, although somewhat below not a lot below; but that's the last report we have. We know we have an assessment coming up, which is a little bit of assurance for anything that goes forward. But really, we do need to start working on not being hemmed in by Addendum IV.

I imagine if I had Addendum IV in front of me, it would probably not have an exit strategy. I think that's one of the problems; it may not have an exit strategy. Regardless, we've always had the ability to have adaptive management and conservation equivalency. We need to start thinking about that.

You can probably understand that I'm thinking we do need to do what Mike had said in one of his comments. We're following year classes; 18 years in Chesapeake Bay, we had a cooperative agreement with all the jurisdictions. That was taken out by Addendum IV; no longer exists. The basis for our management was exploitable biomass, but also that depended on the year classes.

I think we're kind of static here. I think we have enough to be comfortable about a proposal that isn't asking for the moon. It's asking to trade some discards for harvest. I mean this is going to be a big issue for us going forward; as far as how we treat these proposals. I think we do sort of say despite the fact that the coastal states did contribute more to the reduction in F, nonetheless that reduction has happened, so thank you.

CHAIRMAN ARMSTRONG: John, your forbearance just for a second. Max wanted to comment on that.

MR. APPELMAN: Just a couple points of clarification. I've heard this brought up a lot over the last few speakers. There are two different kinds of timelines being talked about. One was in regards to reducing fishing mortality below the target. That is specified in the plan. The target for that reduced rate was by 2016. That is one timeline that's mentioned in the Addendum. But regarding the regulations themselves, there is no sunset provision written in there.

Just making those two points clear, and then another just to bring it up that the Board did initiate an addendum early last year, talking about relaxing regulations across the coast. The outcome of that process was that it would hold off on altering the management program until after the results of the 2018 benchmark; so just refreshing the Board's minds about that experience.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: I've been going back and forth on this with myself; not with anybody else, because it makes me a little uncomfortable that this conservation equivalency proposal is not compliant with Addendum IV. But if we're going to go back and require Maryland to be compliant, then we're looking at changing their current regulations, in a way that would likely be pretty catastrophic to the industry if I understand their concerns correctly.

I don't think that was the intent of the Board when we had the information presented to us in November of 2016. I don't think that is the intent of the Board now. Really, the way I look at this is we have a choice between status quo and between having a proposal that will be conversationally equivalent, and will require a

gear use that's been proven over and over again to reduce discards. I think just intuitively, regardless of whether this is a wash. I think on the water there is going to be conservation benefit. Right now I support the proposal.

CHAIRMAN ARMSTRONG: Pat.

MR. KELIHER: The state of Maine instituted circle hook requirements several years ago. What the Law Enforcement Committee expressed is exactly what we've seen on the water in the state of Maine. It is sometimes difficult to enforce. Maine Marine Patrol does a lot of work associated with angler education; in order to ensure we have compliance.

We've not written a lot of cases in regards to circle hooks. Frankly, we still have conflict in the state or disagreement in the state whether we should maintain the circle hook regulations. But I think overall we certainly, regardless of the conflict and the disagreement, overall we certainly have lowered discards, so we'll be expecting a lower length limit now of course, just in jest, Mr. Chairman.

My question to Mike is really, it revolves around angler behavior. The last several Striped Bass Board meetings we've had members of the charterboat fleet come up and say, you know we catch our fish and we bring our clients home. We don't continue to catch and release, which is a foreign concept to me, somebody who ran a charterboat for eight years and caught and released many, many fish every day.

I'm just wondering if I could hear from Mike. What is the culture on the water with the charterboat fleet? Do they catch, retain and go home after an hour if they paid for a six hour trip? I'm still trying to get an idea in regard to how the overall benefit of this is going to work. I think lastly, I just want to echo John McMurray. There is a benefit here, and Adam touched on it, the issue of waste. I am leaning towards supporting this proposal because of those two things; with the direct understanding of the challenges from an enforcement standpoint. But with a caveat that I'm not going to support anything that has offset circle hooks included in it.

They should be an inline circle hook. I'll just quickly read the state's definition. The state's definition is the point of the hook has to be 90 degrees to the shank, and may not be offset. It's a very simple definition that does work for us from an enforcement standpoint. But I would like to hear from Mike on angler behavior.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: We've learned more about behavior in the past few years; as charterboat captains have had to make adjustments for these increases in size limit, and culling through the fish that they have to in order to provide for their clients has been an issue. We continually get told, and again I'll speak for the charterboat captains.

Private anglers are a little different beast. But the charterboat association continues to tell us that if they do catch their fish for their clients, and they have more time left on their trip, they'll go do something else. They're not going to stay on a school of striped bass and just catch and release. They're going to move to bottom fishing; or they decide to just go home.

It's different from an eight hour trip that's chartered, and you're out there for eight hours and not a minute more. It's just a different mentality, it's a different culture. What's happened as a result of the changes we made a few years ago is that charterboat operators have had to stay out much longer and cull through hundreds of fish, in order to catch a few to bring home to their clients.

We believe that they will return to that culture more so. I'll just say that live lining has become a very popular component to charterboat operations; and spot are not cheap. Once you go through the spot that you need to use, in order to catch striped bass. The idea is that we're going to save the rest for tomorrow's trip and go find something else to do. I hope that

answered your question, Pat.

CHAIRMAN ARMSTRONG: Go ahead, Pat.

MR. KELIHER: This won't come as a surprise to Mike, because we chatted about it briefly. But herein lies the enforcement problems associated with the use of circle hooks, when you shift to another species that doesn't require circle hooks. I think Maryland is going to have to really do their due diligence associated with the other fisheries associated in those areas. I think based on conversations with Mike, not to put him on the spot. They have ideas in this regard, to headwater fisheries and other areas. It creates a challenge; but it's not something that can't be overcome.

CHAIRMAN ARMSTRONG: Mike, I think this is a good moment to focus the discussion. Why don't you put out a motion?

MR. LUISI: I provided it to Max just a bit ago. Okay, so I'll read the motion. Move to approve Option B, in Maryland's conservation equivalency proposal for its summer/fall recreational striped bass fishery in the Chesapeake Bay. Season, May 16 to December 15. Size and bag, 2 fish at 19 inch minimum, with only 1 fish allowed greater than 28 inches.

Non-offset circle hooks required when fishing with bait, non-artificial lures. Additionally, Maryland will collect enforcement, compliance and other relevant information during 2018, and will report back to the Board with a conservation equivalency effectiveness review in May, 2019. If I get a second, Mr. Chairman, I can speak more so than what I have already to a few of the details in there.

CHAIRMAN ARMSTRONG: Do we have a second; John Clark? Go ahead, Mike.

MR. LUISI: Okay, so I'll just clarify that the season that we're proposing is five days less than the current season. I just wanted to put it there for the record. Currently we have a season that goes to December 20. The bag and size limit that's clear enough, there has been some question about circle hooks. I spoke earlier about the need to define a circle hook. We have a current definition, as does the state of Maine.

We would look to adding that seasonal period to that current regulation or perhaps adjusting it for the smaller hooks that are used for bottom fishing. Again, I've already spoken to the report. You know there are some questions in that report as to what we would be able to supply. But I'm happy to bring back to the Board's attention perhaps sometime during the year, to provide a progress update on the report that we would be preparing.

CHAIRMAN ARMSTRONG: I had Marty. Did you still want to speak?

MR. MARTY GARY: I guess this can fit in at any time. I know Mike was anxious to get that motion out, so this discussion could evolve. But I wanted to ask a question, and I guess it would be best posed to Nicole or Katie, if you could. Maybe it would help us understand the magnitude of the problem.

Listening to Adam talking about the physical waste, and then listening to Rob talk about that 8.5 hour meeting; that we advanced Addendum IV, with one of the goals to protect that 2011 year class. As Mike said that year class has now emigrated into the exploitable range. I'm wondering if Katie or Nicole would be able to quantify. You look at the total removals.

Back at that 8.5 hour meeting that Rob talked about, the Bay jurisdictions raised their concerns over discard mortality. I'm just wondering what we learned from the total removals, the percentage of what those discards are now that that fourth biggest year class, the 2011 year class has moved into the exploitable range.

What did we learn from that? I'll end by saying I listened to Andy Shiels talk about the 2015 year class; which is the eighth biggest year class,

the 2014s were slightly above average. The 2015 year class is the eighth biggest average. We don't get these very often. We have a real opportunity; and I think the question is do we implement some conservation measures to save some of those fish? I think it might be of value if Katie or Nicole were able to quantify what percentage of total removals were discards from the '11s now that they've moved on?

DR. DREW: That's a good question and that's not something we have right at our fingertips. Actually that is probably something that will come up as we develop the catch at age for the assessment coming up. I think we would agree that definitely part of the reason that the Bay did not achieve the reductions that we expected on paper was because of the strong 2011 year class; which was a strong year class after a number of weak year classes that we based that analysis on.

For sure, they did not achieve the reduction that they expected, because in part of this large year class moving through that was suddenly available to the fishery. But however, they probably did, changing that size limit did reduce how much they would have taken compared to taking no changes at all.

I think we would expect a similar situation with the – right now what the assessment says is that the 2014 year class is a very strong one, and so they would be Age 1 in 2015 and so on. I don't think we've had a chance to see what the 2015 year class numbers look like from the model perspective. But I think the indices suggest it's a good one.

Certainly they will be abundant and available to these fisheries in the Bay; and we'll probably see a similar effect in terms of removals. But I couldn't say what percentage right now of that 2011 year classes was harvested, versus were dead discards, versus passed on to the fishery out on the coast.

CHAIRMAN ARMSTRONG: John Clark, did you have your hand up?

MR. JOHN CLARK: Well thank you, Mr. Chair, to second the proposal, but also I obviously support this. I think that we need to be flexible here; considering that many things have been said already. In considering the waste, let's just think about all the times we've had fishermen from the Chesapeake come to these meetings asking for relief; because there is so much discarding that has been going on.

It seems that we kind of set Maryland up for failure almost; by holding them to that 2012. I would say that for the whole Chesapeake. I think this is a commonsense proposal. I think a little bit of flexibility here will probably; as they've said it won't increase mortality, so I think we're good.

CHAIRMAN ARMSTRONG: Ritchie.

MR. WHITE: Doug's comments earlier about Addendum IV, gives me comfort in being able to support this. The one change I think would be important to make; and I hope Mike might make this without requiring an amendment, is to have the report back to us in February, as opposed to May. If the information he brings to us is far different than what he expects, then we would have the ability to make some adjustments prior to the season beginning. I would request that from Mike if he's willing to do that. If not, I'll ask for an amendment later.

CHAIRMAN ARMSTRONG: Do you want to respond to that Mike?

MR. LUISI: Yes that's fine. I'm okay John, if you're okay with that to changing it to February rather than May. I think we'll be collecting the information throughout the year; and bait fishing doesn't happen after October. But we should be able to have something provided for that Board meeting.

CHAIRMAN ARMSTRONG: Okay, John.

MR. McMURRAY: I want to address the gear specifically; because Patrick brought up that concern in his minority report in the AP report. We could certainly define a circle hook; and to

some extent we've done that here. But a big part of this is making it readily available, because right now you walk into most tackle shops, at least up by me, and there are a dozen different kinds, a dozen different labels that say circle hook on them, and maybe one or two are actually inline circle hooks.

What I would like to see from Maryland is some sort of plan to make them available; and maybe even consider distributing the hooks yourself. Maybe CCA or some other organization will step up and take that role. But to me accessibility is really important, because a lot of people aren't going to know what an inline circle hook is, and they're not going to know what that means.

CHAIRMAN ARMSTRONG: Roy.

MR. ROY W. MILLER: There may be no need for my comments; since I've yet to hear any opposition to the proposal. But I'll go ahead and quickly make them anyway. I feel it would be consistent on the part of our state to support this proposal; because I'll remind the Board that a number of years ago we brought forth a proposal for circle hooks for catch and release striped bass fisheries on the spawning grounds of the Delaware Estuary.

Those measures were implemented by the Delaware Estuary jurisdictions; not because we had to do that, but because we felt it was a good move conservation wise. I feel it would be inconsistent on our part to not support this proposal.

CHAIRMAN ARMSTRONG: Dennis.

MR. DENNIS ABBOTT: I know you're a new Chairman and all of that but you should give people the first bite of the apple before you go back to some of the other folks two or three times. You'll learn as time goes on.

CHAIRMAN ARMSTRONG: Ouch.

MR. ABBOTT: Seriously. I came to this meeting thinking that I probably wouldn't support this proposal that we expected to be brought forth. But I guess I've changed my mind. But listening to all the testimony, would it not be wise assuming we approve this and Maryland implements this and comes back and provides us with a report.

Would we not be remiss in considering an addendum to make this universal throughout the range? We talked this morning about utilization of the resource. What better utilization could we do if we could eliminate discards throughout the range of the striped bass? I'll just throw that out, and like I say I think we might be remiss in not taking that type of action. I don't think we've ever done anything like that about terminal gear. But maybe the time has come for us to consider that.

CHAIRMAN ARMSTRONG: I think you may be right. We will be reviewing the benchmark at that meeting; and there is a potential we'll be moving an amendment forward, which could include the circle hook option. Jay.

MR. JASON McNAMEE: I'll be quick, and it's not necessarily very substantive, but the one concern I have now, it's sort of the second half of the motion as we sort of loop back. It doesn't imply that this review will go to the Technical Committee. I'm cognizant of the fact that they're in a benchmark process. I think that is potentially the real solution here; is letting them complete the benchmark, get that information. I just want to be cognizant of that and not pitch anymore work at the Technical Committee; let them get through that work first.

CHAIRMAN ARMSTRONG: Michelle and I apologize. I think I skipped over you. Dennis does not approve of that.

DR. DUVAL: I know that it was not at all intentional on your part; so I forgive you. I'm inclined to support this. I'm sympathetic to the discard issues that Maryland is facing. You know we've had similar discard issues in the South Atlantic that have been brought about by changes in size limits; specifically our black sea

bass fishery south of Cape Hatteras, where we implemented a size limit change for all the right reasons, in order to achieve our rebuilding target.

Since then that size limit has remained in place; and we have had many anglers calling me, calling other Council members, upset about the fact that they're having to discard so many fish, in order to get a legal size black sea bass. You know there are a number of other nuances related to that.

One of those is one of the ones that has been considered here; in terms of differential seasonal discard mortality rates. I think given the analysis that Maryland has put forward; and the Technical Committee's statement that this doesn't appear to change the total removals. I think I'm comfortable moving forward with this; the way this motion is constructed.

CHAIRMAN ARMSTRONG: I have Bryan then Rob then Eric. Yes, Doug. Oh, well I've heard from you before; you're at the bottom. Marty.

MR. GARY: My fellow Commissioner Bryan from District of Colombia and I conferred over this. The issue I wanted to bring up to you all for consideration was that I distributed a letter. I understand it was late last week that I sent it to Bob, and the staff at ASMFC, and I think you may have just gotten it here when you sat down to the table. But what that letter requests is an opportunity for the Potomac River Fisheries Commission, and I'll let Bryan speak for his jurisdiction, the District of Colombia.

We are contiguous to Maryland; and we have a long history of regulatory consistency with Maryland on our recreational charter striped bass seasons. District does not have a charter season; but they do have a recreational. During the timeframe for which this motion is made, I don't wish to further complicate this motion. But if it did meet the Board's acceptance, in terms of not complicating things too much that would be desirable for our constituency and our Commission. I guess the question is if that is appropriate I would like to amend this motion to include the Potomac River Fisheries Commission; and my colleague Bryan may want to do the same thing.

MR. BRYAN KING: Yes that is to include both jurisdictions PRFC and DC.

CHAIRMAN ARMSTRONG: That's a motion, do we have a second? Emerson. Why don't we get the motion up first? While they're crafting that Bryan or Marty do you want to speak to the motion?

MR. GARY: I don't know the definitive date of this regulatory consistency history that has occurred over time; but I'm fairly certain it extends well back into the 1990s, and perhaps consistent right from the start when the moratoria in the Chesapeake Bay was lifted in 1990. I'm virtually sure almost from the start Potomac River Fisheries Commission recreational and charter regulations had been a mirror image of Maryland's.

I can let Bryan speak for his jurisdiction. I don't know the timing on that. But again, the intent would be for folks that are transiting from one jurisdiction into another. It is more often the case for folks emanating from Maryland and then coming back to Maryland than say the northern neck; but it does happen in both sides of the river. But we do have a lot of transiting going back and forth; and so from a law enforcement perspective, from a stakeholder, constituent perspective, confusion between disparate regulations. It's something that we would desire.

CHAIRMAN ARMSTRONG: Okay there are a lot of moving parts now, but I had Rob, Eric and Doug, I'm sorry Bryan did you want to? I had Rob, Eric, and Doug that wanted to provide comments before we had this amendment. Do you still want to weigh in, Rob?

MR. O'REILLY: Yes, so concerning the amended motion, I will be abstaining and I wanted to qualify that. Virginia can't simply say include us. I've known about this proposal for a while; and it has changed shape, and the original

proposal, you know was to have Maryland go to 19 inches. I have to be faithful to the Virginia anglers who represent our advisors, who do not support this proposal.

It is very lean times in Virginia for about the last nine years. If you saw the data side by side, you would probably say what's going on? It has been a hard time in Virginia. I think overall the reason to abstain is you may have heard my comments earlier were complementary of what Maryland was doing, and the techniques they had, and that is cooperative.

But still at the same time, you know this is problematic to not support the motion. My path is to abstain, stay faithful to the intent of the Virginia fishermen, and I think really just to say it again. Somehow the 18 years that was spent with cooperative management in Chesapeake Bay that has been decimated by Addendum IV.

Somehow for the future that needs to be reinvigorated; because it's not only to the benefit of Chesapeake Bay, it's to the benefit of the coastal states as well. We are, in the old language we're a producer area, the largest producer area. There are others, I'm aware of that. You know really I've been lamenting the loss of cooperative Chesapeake Bay management; ever since 2014. That is another reason to abstain here. It's a little bit of a protest; quite frankly that we can't really do cooperative management the way we should.

CHAIRMAN ARMSTRONG: Eric, okay, Doug.

MR. GROUT: I had my opportunity for asking questions. I appreciate that. I would like to give the opportunity to provide some comments on this. As I mentioned before, I do believe that we should be holding the standard as to what is currently in place; as far as the conservation equivalency. I totally support Maryland's desire to try and get the discards reduced in some manner. When we were originally, and doing this through circle hooks is a very positive step here.

But when we were first provided with this proposal there were a number of options that they put forward for technical consideration. They considered it and provided their opinions on it. Until I had a conversation last Friday, I didn't realize that Maryland's constituents had asked them to remove all the proposals that actually ended up with a calculated either neutral or reduction in harvest losses on this.

Personally I have been struggling with this. I was hoping that we could come to some kind of a compromise; and the definition of compromise is we all don't get what we want. But putting forward just one option here sort of says this is what we're offering and that's it. I don't think that is in the spirit of compromising.

I think some of the other proposals in combination with a circle hook would have gotten my full support. I personally will not support this; because of what the TC says about the ability to calculate this, and also knowing that I think they use some positive assumptions here on how many people are currently using circle hooks in the Bay.

CHAIRMAN ARMSTRONG: Before we kind of focus the discussion on the motion to amend, we need to come to a consensus that we as a Board agree that Maryland is going to use the current regulations and/or removals, rather than going back to the Amendment 4. Max could you read what was written?

MR. APPELMAN: I just wanted to clarify, seeing how this discussion is going. For staff and for the Technical Committee, it is the consensus of the Board that Maryland is using current regulations and removals as the basis for conservation equivalency here, and not the requirements of Addendum IV.

If this were to pass, you know sort of opening the doors for other states to submit conservation equivalency proposals using current removals and/or regulations as their basis as well. For Technical Committee, for staff to know that going into it would be helpful.

CHAIRMAN ARMSTRONG: Dennis.

MR. ABBOTT: I don't know if I should question the validity of this Amendment. It seems like it's not germane to the main motion; just because they happen geographically to be next door, shouldn't allow them to piggyback on a proposal submitted by an adjacent jurisdiction. I can understand the proximity and all of that; but I don't think we've ever had something like this, where a conservation equivalency has been put forward just by amending a main motion to add that jurisdiction. I would look for guidance on that.

CHAIRMAN ARMSTRONG: As do I. But when they gave me this job they said I don't have to follow Robert's Rules, I follow Mike's rules. But I'll confer.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Jay had his hand up over there. I don't know if he has anything really insightful to say or if it's an entirely different issue. My understanding is that by adding PRFC and DC, let me go the other way. If those two jurisdictions were added to the analysis that Maryland conducted early on in this process; and they had carried through the data from those two additional jurisdictions.

Mike Luisi and I chatted offline before the meeting; and I think Mike indicated that really adding those jurisdictions would not have affected the conservation impact of circle hooks, and the other provisions that are up on the screen right now. My understanding is that there is sort of a no impact by adding these two jurisdictions.

In fact there might be the value that Marty and Bryan brought up, which is the consistency in regulations between jurisdictions. There is less of a patchwork of regulations throughout the Chesapeake Bay region. I can't really comment beyond that; just some sort of qualitative insights as to what I've heard leading up to the meeting.

But it is somewhat unique to have other states or other jurisdictions add on to conservation equivalency; because usually when you add jurisdictions there is new datasets, and those new data would alter the outcome of the analysis. But my understanding here is that Maryland or someone else had done some analysis; and they didn't see a significant impact. But that was just what I had heard before the meeting.

CHAIRMAN ARMSTRONG: I'm not sure that is the issue you're addressing, Dennis, right? It's not about the data it's about the process. You would propose they should be a standalone. Mike.

MR. LUISI: I'm not sure what to say. In hindsight, we could have reached out to the two jurisdictions and just added their name to our proposal. Staff has informed me that it would not have changed the analysis in any way. The analysis would have been completely the same, and it provides for that consistency in regulations between the Potomac River that feeds the main stem of the Chesapeake Bay.

I hope this Board doesn't find too much more heartburn over this request; and it makes things more simple and more complete for the jurisdictions that are all fishing out of the state of Maryland. I'll just leave it at that. I hope we can move this issue quickly, and then get back to the main motion.

CHAIRMAN ARMSTRONG: Pat.

MR. KELIHER: I certainly understand the issue in regards to, I'm going to let this conversation finish. The issue of process I think frankly is a real one. The issue that I was struggling with is a precedent setting nature that staff brought up. If you remember a couple years ago, just last year or two years ago. The Herring Section utilized a pilot project dealing with spawning during the days out process for the herring fishery. As I've been sitting here looking at this; and the fact that Maryland, the way the original motion is written, is going to be reporting back on the effectiveness of this. If you remove the fact that it says equivalency and talk about this as a pilot project, it is not precedent setting. In

my mind this is a pilot project. They are going to report back to the Board and then this Board is going to have to make a determination on how we're going to move forward. From my standpoint and for the insurance of the Commission not to set precedence on this matter, I would view this as a pilot project.

CHAIRMAN ARMSTRONG: Jay.

MR. McNAMEE: Yes I wanted to get away from the process part of it and drill in on Mike, what you said a minute ago. Just trying to be clear, so did your staff analyze data from these adjacent jurisdictions, and that was what their comment was based on that it would have no impact? Was it an actual analysis?

MR. LUISI: It was included in the original analysis; because the jurisdictions don't have their own MRIP estimations that come from them. Fishermen from Maryland go into those jurisdictions, come back to Maryland and are accounted for in Maryland data. That is why there would have been no difference in the analysis as it stands.

CHAIRMAN ARMSTRONG: Okay, we're a little bit frayed now. I want to go back to the consensus. Do we have consensus of the Board that it's appropriate to use the current data and regulations going back to the actual letter of Amendment 4? Head nods, I don't see grimaces so I'll say we have consensus; going back to Amendment, Marty.

MR. GARY: I really don't want to complicate this; but having achieved that consensus I just want to be clear. Would that consensus also include the existing consistency that has been existed as it extends to seasons? I just want to be completely out front with this Board. Both the District and PRFC, in this regulatory consistency as it applies to minimum size and creel limits.

There is a differential in the season length. That proposal in the original motion, the season ends on December the 15th. Both the District and PRFC season runs through the calendar year. I've discussed this with Maryland. There was a sense that the consistency doesn't change, because the season length doesn't change.

But that would be problematic for my constituents if we had to end on the 15th. We do not have an issue with bait; people are not even bait fishing at that time of the year. But I just want to be absolutely clear about this. If it's a problem I'll withdraw my amendment if I have to.

CHAIRMAN ARMSTRONG: Michelle.

DR. DUVAL: I definitely appreciate Marty's clarity on that. I mean my understanding from reading Maryland's proposal is that they specifically removed those 15 days from December from the analysis. Well, okay but the way they partitioned Wave 6 was a ratio to remove those 15 days, but it was 5 days. The PRFC and DC seasons run all the way to the end of the calendar year, so an additional 15 days. I think that's my point is that whatever numbers of fish are coming in there are not included in Maryland's analysis. That's the way I read it.

CHAIRMAN ARMSTRONG: I think it's fairly clear that as written, DC and Potomac River would have to follow exactly those seasons. We can move forward this Amendment, or you can withdraw it and come back. Go ahead, Marty.

MR. GARY: Thanks Mr. Chairman for that clarification. I have clear guidance from my constituents in my Commission. PRFC will withdraw their amendment.

CHAIRMAN ARMSTRONG: Yes, Dennis.

MR. ABBOTT: That amendment does not belong to the makers; it belongs to the Board. It is up to the Board to dispose of that at this point; Roberts Rules.

CHAIRMAN ARMSTRONG: I think we're clear on this, Dennis. All right, so you're saying we should vote on it? Mike.

MR. LUISI: Maybe I can make a suggestion. We

had this conversation leading into the meeting about the complicated nature of this addition. I've talked with Marty and Bryan about the idea that perhaps we can come back to this as a follow up action at our next meeting; and we could have some resolution as to how an analysis might be different.

What does it really all mean? We worked on this at the last minute leading up to this meeting. That could be a way forward. Then at the May meeting we take another quick look at the implication of including Potomac River and District of Colombia into the plan.

CHAIRMAN ARMSTRONG: Okay, I think I see a path. Bryan, do you agree with withdrawing?

MR. KING: Yes, we will agree with withdrawing.

CHAIRMAN ARMSTRONG: Okay that being said; it's the Board's approval. Does anyone object to withdrawing this motion to amend? Seeing no objections; the motion to amend is removed, back to the main motion, just Maryland, more discussion. Are we ready to vote? Pat.

MR. KELIHER: Mr. Chairman, I think we still have the issue of a precedent setting nature; where we should consider this as a pilot program, and not a conservation equivalency as defined by our policies. I think it clarifies and addresses the issue that has been raised by staff. I would like to see this change possibly as a friendly amendment to consider this as a pilot project.

CHAIRMAN ARMSTRONG: Do the makers accept that friendly amendment?

MR. LUISI: While I understand where Pat's going. I think this Board through the conversation that we just had and the clarification by both Max and you, Mr. Chairman that this will be, it's equivalent. It's equivalent to what our current rules are. It deviates slightly from the direction in Addendum IV, but I don't know what happens if it becomes a pilot.

It's not anything I've thought about or considered to this point. I am not certain that I would accept that as a friendly at this point right now. I also know we're running late and we've talked about this for quite a while. Maybe I can get some direction as to how it would be any different if it was a pilot versus a regulation where we're going to be reviewing it next year anyway.

MR. KELIHER: I think it's now been made clear on the record that this issue has been considered or discussed, or the description of the fact that it is precedent setting in nature; and that the consideration of a pilot or looking at this as a pilot was discussed, and that may be enough just to have it reflected in the record. But the Executive Director may want to weigh in.

CHAIRMAN ARMSTRONG: Bob.

EXECUTIVE DIRECTOR BEAL: In addition to what Pat said. I think one of the important parts of the conservation equivalency process to remember is that once regulations have been in place for a year, the Board had the obligation really to go back, review those regulations and determine if they did or didn't have the achieved or desired effect or expected affect.

I think given the conversation that's already on the record and this sort of review provision of conservation equivalency. We're probably going to achieve that. There are some unknowns here as far as the benefits of circle hooks and what the public's acceptance is going to be of circle hooks, et cetera. But if Maryland is going to collect some data and bring that back at the February meeting, I think that's the sort of pilot nature, this is built into that process.

CHAIRMAN ARMSTRONG: I think it's time to move the question, Doug.

MR. GROUT: Just my question about this being a pilot nature. I always think of a pilot as something you're going to try for one year and then evaluate whether to approve to move things forward to a more long term basis. I

guess my question to the Executive Director under this concept that this is a pilot. If we approve this and in February the information that Maryland brings back to report back to us on the effectiveness of this, if we find that it was not as effective as we had envisioned.

Could the Board take action without any kind of a proposal or sunsetting provision that Maryland would have to go back to 20 inches or come up with some other proposal that would reduce the discard mortality, while not increasing their harvest? If it's a pilot, does it end at the end of 2018 without some kind of further Board action?

EXECUTIVE DIRECTOR BEAL: I think Mike Luisi stated earlier that he wanted this to not be a one-year program, wanted to carry on for multiple years if it had the desired effect. I think that review that will take place a year from now, the Board's going to have to decide where they want to go at that point.

It will be hopefully clear whether this program did or did not have the desired effect; and at that point the Board is going to have to decide where to go. I don't know what that's going to be. Also keep in mind that at that same meeting the Board hopefully will be presented with the next benchmark assessment and the results of that. A new read on the stock; where we are with biomass and F rates and everything else.

The Board may also at that time consider initiating another management action. I don't know what that may look like, but to react to that new stock assessment information. I think there is going to be a lot of moving parts next February; a year from now on striped bass, and the Board is going to have to decide where to go at that point. Assuming this works as it is, based on Mike Luisi's comments earlier, I think Maryland's intention or hope is that this would be able to carry forward.

CHAIRMAN ARMSTRONG: David, I ignored you for a while.

MR. BORDEN: My guidance to you, Mr. Chairman is to ignore Mr. Abbott; except when he agrees with everything you're saying. Having been flapping my arm for an hour, I've exhausted myself completely.

CHAIRMAN ARMSTRONG: Well, I've achieved it then.

MR. BORDEN: I have completely forgotten what I wanted to say. No, a little levity is always good in these moments. My only suggestion here is in just listening to the debate. I actually like the idea of doing this as a pilot; and I would vote to support it as a pilot. I've spoken a number of times about the need to get on with reducing discards in this fishery.

In fact if you look at the minutes on Page 6, there was an exchange between myself and the prior Chairman on this. I think this is a good way to do it. Maryland should be commended for bringing the proposal forward. But the big distinction to me between conservation equivalency and a pilot is that a pilot would be just for Maryland to test this.

As everyone has already stated, then we're going to review a broader amount of issues; the benchmark stock assessment and a number of other considerations. We can consider at that point based on the results, whether or not we want to expand it. If we do it as a conservation equivalency proposal, to whatever extent it sets a precedent for other states they could follow. I think that to me is a distinction. I would be more comfortable with it as a pilot.

CHAIRMAN ARMSTRONG: Final word, Dennis.

MR. ABBOTT: I really thank you, Mr. Chairman. If we didn't label this as a pilot, and Bob says we can look at it next year. By what method, if we didn't like what we were seeing. What would be involved in rescinding this action; a question for Bob?

EXECUTIVE DIRECTOR BEAL: I think it would have to be a charge from this Board back to the state of Maryland; sort of indicating this doesn't

work. It has not achieved what the Board had hoped; and a charge to Maryland to bring back a new proposal that does achieve an equivalent suite of measures relative to what they have in place right now. I think it would be a charge back to the state of Maryland to sort of go back, do some more math, and try again.

MR. ABBOTT: A follow up on that Bob. That being the case, they come in next February for example, and they tell us we don't like it at that Board meeting. Then in May we talk about it and they set their regulations for next year; so the one year essentially is going to be an automatic two years. Not saying that's going to happen. But that's why I would rather see in the motion that it's a one year and then we can vote next year to make it permanent.

CHAIRMAN ARMSTRONG: Yes, really the final word.

MR. DAVID E. BUSH, JR.: I'm happy to see that we're actually stepping outside the box. I know that there are legalities involved any time we pilot project, precedence, things of that nature. I really could care less which one it's called; as long as it's the right one. I'm sure somebody somewhere is going to get us in line. Between negative one (-1) and 6 percent, I think it's time to vote.

CHAIRMAN ARMSTRONG: Thank you, David, so do I, it's time to vote. Let's take a three minute break to caucus. Is everyone prepared to vote?

MR. REID: Could I ask for a roll call, Mr. Chairman?

CHAIRMAN ARMSTRONG: So be it. Ritchie has asked that Bob, you put on the record the fact that we can readdress this in February.

EXECUTIVE DIRECTOR: Yes, I think what Ritchie may be looking for is sort of a comment on the conservation equivalency process. The way it is supposed to work by letter of the law or letter of the process is that states implement regulations; monitor the impacts of those regulations, harvest level, use of circle hooks whatever it may be.

Then bring that information back, and then the Board decides whether that program can continue or they have to revert back to their previous regulations, or submit a new suite of regulations that achieve the original intent of what was proposed in their conservation equivalency proposal.

The Board has that authority in February to monitor what Maryland has done; look at their data, and ask them to revert back to their old regulations if it didn't work or Maryland can bring forth a different suite of regulations that will achieve the desired effect and equivalency to what they have in place right now. I think that's what Ritchie was looking for.

CHAIRMAN ARMSTRONG: That's right. Okay, thank you. Max, call the roll.

MR. APPELMAN: Okay working north to south. Maine.

MR. KELIHER: Yes.

MR. APPELMAN: New Hampshire.

MR. ABBOTT: Yes.

MR. APPELMAN: Massachusetts.

MR. RAYMOND W. KANE: Yes.

MR. APPELMAN: Rhode Island.

MR. McNAMEE: Yes.

MR. APPELMAN: Connecticut.

MR. MARK ALEXANDER: Yes.

MR. APPELMAN: New York.

MR. JAMES J. GILMORE: Yes.

MR. APPELMAN: New Jersey.

MS. COLLEEN GIANINI: Yes.

MR. APPELMAN: Pennsylvania.
MR. SHIELS: Yes.

MR. APPELMAN: Delaware.

MR. CLARK: Yes.

MR. APPELMAN: Maryland.

MR. LUISI: Yes.

MR. APPELMAN: District of Colombia.

MR. KING: Yes.

MR. APPELMAN: Potomac River Fisheries Commission.

MR. GARY: Yes.

MR. APPELMAN: Virginia.

MR. O'REILLY: Abstain.

MR. APPELMAN: North Carolina.

DR. DUVAL: Yes.

MR. APPELMAN: U.S. Fish and Wildlife Service.

SHERRY WHITE: Yes.

MR. APPELMAN: National Marine Fisheries Service.

MR. PETER BURNS: Yes.

CHAIRMAN ARMSTRONG: The motion passes 15 yes, 1 abstention.

2018 BENCHMARK STOCK ASSESSMENT PROGRESS UPDATE

CHAIRMAN ARMSTRONG: Moving on, Katie, can you update us on the benchmark assessment?

DR. DREW: Yes, thank you Mr. Chair. We've been added to the SAWSARK Schedule; which means that a review date has been set, which is going to be November 27 to the 30th of this year. We'll be going through with summer flounder. We are in the process of scheduling our first modeling workshop for some time in late April, early May.

That is going to focus on model development for a new sort of stock structured, and hopefully sex-structured model. We'll be having another modeling workshop or assessment workshop in late summer to focus on incorporating the new MRIP estimates; when they become available. The Board working group on reference point guidance has gotten together.

It is in the process of developing a survey that is going to go to the entire Board, as well as the AP, to help give the TC some guidance on what the Board wants for this fishery in terms of management goals, management objectives so that we can develop reference points that meet those goals and objectives. You guys are all going to see that survey soon; and please take it when you do see it. Otherwise we continue on schedule.

ADJOURNMENT

CHAIRMAN ARMSTRONG: Are there any questions for Katie? Is there any other business before this Board? Then I adjourn for the second time.

(Whereupon the meeting adjourned at 5:00 o'clock p.m. on February 7, 2018)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

April 16, 2018

To: **Atlantic Striped Bass Management Board**

From: **Atlantic Striped Bass Board Guidance Work Group**

RE: **Recommended Guidance to Stock Assessment Subcommittee for Board Consideration**

In October 2017, the Striped Bass Technical Committee (TC) and Stock Assessment Subcommittee (SAS) requested guidance from the Board regarding the types of reference points to pursue in the 2018 Benchmark Stock Assessment. Due to time and budget constraints and in order to solicit the necessary guidance on schedule, the Board agreed to establish a work group of Board, Advisory Panel (AP), and SAS Members to develop recommendations for Board consideration. The Board Guidance Work Group (Guidance WG) was Chaired by Mike Armstrong (Board Chair, MA) and membership[1] was as follows:

Board	Advisory Panel	Stock Assessment Subcommittee
Ritchie White (NH)	Peter Whelan (NH)	Ed Hale (SAS Chair, DE)
John McMurray (NY)	Patrick Paquette (MA)	Nicole Lengyel (TC Chair, RI)
John Clark (DE)	Arnold Leo (NY)	Alexei Sharov (MD)
Mike Luisi (MD)	Lou Bassano (NJ)	Katie Drew (ASMFC)
Michelle Duval (NC)	Dave Sikorski (MD)	

The Guidance WG met twice via conference call to develop a survey to provide an opportunity for participation and input from all Board and AP members. The survey asked questions regarding what members' value most from the striped bass resource and fishery, and regarding overall satisfaction with the status of the stock and management under Amendment 6. The survey consisted of 15 questions, most of which were multiple choice and a few open ended[2]. The survey was sent to the Board and AP via Survey Monkey© on March 9th, and members had until March 16th to complete the survey. The results of the survey were the basis for guidance recommendation development.

The Guidance WG met via conference call on April 2 to review survey results (*Appendix 1*) and develop guidance recommendations for Board consideration. As there are much fewer AP members than Board members, AP responses were difficult to summarize without singling out

[1] The Board Chair worked with ASFMC Staff to ensure that selected Board and AP members were representative of all interests (e.g., regions and fishing sectors)

[2] The survey is enclosed at the end of this memo, followed *Appendix 1*

individual responses. The Guidance WG also noted that survey respondents did not represent various user groups equally. For example, the commercial fishery was particularly underrepresented (see *Appendix 1* for more detail regarding respondent demographics). However, the Guidance WG was informed that the AP will have the opportunity to provide its own guidance recommendations for Board consideration as well.

In general, the survey was unable to identify an overwhelming majority regarding overall satisfaction with management of striped bass under Amendment 6 (including the management triggers), or with the current reference points. Respondents that are not satisfied with the current reference points felt that the spawning stock biomass (SSB) target is too conservative and/or unachievable under current conditions (e.g., environmental conditions or the conditions of predator and prey populations), and that the development of stock- or producer area-specific reference points were very important to a successful and equitable management program. Survey results also indicated that there was interest in revisiting pre-Addendum IV reference points (Addendum IV implemented a new set of fishing mortality (F) reference points that were designed to achieve the respective SSB reference point over the long term). There didn't appear to be a strong preference for the type of reference point (e.g., empirical versus model-based) as long as they met the management objectives. Across all respondents, "managing F to maintain an age structure that provides adequate spawning potential to sustain long term abundance of striped bass populations" stood out as the most important management objective. "Broad age structure with high abundance of larger, older fish" and "high abundance of market size fish" were among the top three factors of a quality and viable fishery across all respondents.

Accordingly, the Guidance WG recommends the SAS develop a range of F and SSB reference points including the current target and threshold definitions as well as revisiting the pre-Addendum IV approach based on historic SSB and/or F levels during a period when the stock was considered in "good condition" by majority of stakeholder groups. This will allow the Board to explore the tradeoffs of different management objectives and perceived characteristics of a quality fishery. As part of this, the SAS should clarify the various implications of different reference point values. Additionally, the SAS should continue to strive for development of stock-specific reference points where possible. The lack of satisfaction with the management triggers can be addressed concurrently with the management response to the findings of the 2018 benchmark assessment.

Appendix 1: Striped Bass Resource Satisfaction Survey Results Summary

Introduction

This survey was developed by the Board Guidance Work Group (WG) comprised of Board, Advisory Panel (AP), and Technical Committee (TC) Members. The goal of the survey was to solicit input from Board and AP members regarding what they value most from the striped bass resource and fishery, and regarding overall satisfaction with the status of the stock and management under Amendment 6, in order to facilitate the development of biological reference points in the 2018 benchmark stock assessment. The survey consisted of 15 questions, mostly multiple choice and a few open ended (open ended responses are enclosed at the end of this summary). The survey was send to the Board and AP via Survey Monkey© on Friday, March 9th, and members had until March 16 to complete the survey.

Board Survey Results:

Demographics:

- 27 of 40 members completed the survey (i.e., 12 states x 3 commissioners, plus PRFC, DC, USFWS and NMFS).
- At least one commissioner from each member state and jurisdictions completed the survey, with the exception of DC, and including 1 federal agency
- Responders [3] identified themselves as follows:
    - 17 represent state/federal agencies
    - 8 represent recreational private anglers
    - 5 represent commercial consumer and/or conservation groups
    - 3 represent the commercial sector
    - 3 represent the recreational for-hire sector

Reference Point and Management Trigger Satisfaction:

- 11 (of 24)[4] **are** satisfied with the state of the stock and management under Amendment 6
- 13 (of 24) **are not** satisfied with the state of the stock and management under Amendment 6
- 9 (of 24) **are** satisfied with the current striped bass reference points[5]
- 14 (of 24) **are not** satisfied with the current striped bass reference points
- Split 8:9 (of 23) regarding empirically- or model-based reference points; the rest (6) were indifferent as long as they meet the management objectives
- Majority (14 of 24) felt that stock- or producer area-specific reference points were very to extremely important; the rest (9 of 24) felt they were somewhat or not that important[6]
- Majority (16 of 24) are satisfied with the current management triggers, 4 of which are not satisfied with the reference points
- Of respondents who **are** satisfied with the current reference points:
    - Included respondents from ME, NH, CT, NJ, PA, and DE (no Chesapeake Bay responders)
    - Majority satisfied with the state of the stock and management under Amendment 6

[3] Responders were asked to check all that apply from the sector categories. Those that selected "State or Federal Agency" did not select additional categories (with one exception; also selected private angler). Those that checked more than one category, typically checked "private angler" and one other category.

[4] Some responders skipped certain questions, therefore total number of responses varies by question

[5] One satisfied with the reference points, but not satisfied with the triggers

[6] One responded that stock- or producer area-specific reference points were not at all important

    - Majority split between empirical- based reference points and no preference
    - Majority felt that stock-specific reference points were somewhat to not that important
    - All were satisfied with the current triggers
- Of respondents who **<u>are not</u>** satisfied with the current reference points:
    - Included respondents from all states/jurisdictions with the exception of NH, CT and PA
    - Most common reason, "too conservative – maintain biomass too high."
    - Majority not satisfied with state of the stock and management under Amendment 6
    - Split 5:6 regarding empirical- or model-based reference points; 3 had no preference
    - Majority felt that stock-specific reference points were very or extremely important
    - Majority also not satisfied with current management triggers

Resource and Management Satisfaction:

- Management Objectives (Table 1)
    - Objective #2, "*manage F to maintain an age structure that provides adequate spawning potential and long term sustainability*," stood out as the most important objective across all responders, followed by "*foster quality and viable fisheries*" and "*manage via control rules based on the target reference points*."
- Factors of a Quality and Viable Fishery (Table 2)
    - Factor #3, "broad age structure with high abundance of larger, older fish," stood out as the most important factor across all responders, followed by "*stability and consistency in quotas and regulations from year to year*," and "*high catch rates/abundance of market size fish*."

Advisory Panel Survey Results:

Demographics:

- 9 of 19 members completed the survey (this is on par with historical member participation).
- Responders were from MA, NY, NJ, PA, MD and VA, and identified themselves as follows:
    - 9 represent recreational private anglers
    - 4 represent the recreational for-hire sector
    - 3 represent commercial consumer and/or conservation groups
    - 1 represents the commercial sector
- Water bodies represented:
    - Nantucket Sound and Cape Cod Bay (2MA)
    - New Jersey Shore and Bays (NJ, PA)
    - Raritan Bay, Hudson and East Rivers (NJ)
    - New York Bight, Peconic Bay (2NY)
    - Delaware River (PA)
    - Chesapeake Bay (VA, MD)

Reference Point and Management Trigger Satisfaction:

- Majority (6 of 9) **<u>are</u>** satisfied with the state of the stock and management under Amendment 6
    - 3 (of 9) **<u>are not</u>** satisfied with the state of the stock and management under Amendment 6

- Split 4:4 regarding satisfaction with the current striped bass reference points[7]
    - Most common responses were: "unable to achieve target under current environ conditions," and "being too conservative" with regards to F and/or SSB
- Majority have no preference for type of reference point as long as they meet the management objectives
- Majority felt that stock-specific reference points were somewhat to very important
- Majority are satisfied or don't have an opinion about the current management triggers
- Those that **are** satisfied with current reference points[8] are also satisfied with the state of the stock and management under Amendment 6; they have no preference for reference points as long as they meet the management objectives, but stock-specific reference points are very/somewhat important; and they are satisfied with the current management triggers.

Resource and Management Satisfaction:

- Management Objectives[9] (Table 3)
    - Objective #2, "*manage F to maintain an age structure that provides adequate spawning potential and long term sustainability*," stood out as the most important objective across all responders, followed by "*manage via control rules based on the target reference points*" and "*maintain coastwide consistency of implemented measures while allowing flexibility for alternative measures."*
- Factors of a Quality and Viable Fishery (Table 3)
    - Factor #4, "*high abundance of market size fish*" stood out as the most important factor across all responders, followed by "*broad age structure with high abundance of larger, older fish*" and "*high abundance of trophy size fish.*"

[7] One satisfied with the reference points, but not satisfied with the triggers

[8] Two from MA, one from NY and one from NJ; all represent the recreational sectors

[9] Most important objective was the same for Board and AP, but 2nd and 3rd place differed slightly

Table 1. Board Survey Results: ranking of management objectives. Rankings based on mean survey values. Categorical rankings were only calculated for categories with at least a sample size of 5 responders.

Sample Size (N); only ≥5	21	10	5	5	11	3	7	
Management Objectives of Amendment 6 (average rank)	**Overall Ranking**	**Satisfied w/Management**	**Satisfied w/Management AND Satisfied w/ BRPs**	**Satisfied w/Management BUT not Satisfied w/ BRPs**	**Not Satisfied w/Management**	**Not Satisfied w/Management BUT satisfied w/ BRPS***	**Not Satisfied w/Management AND not satisfied w/ BRPS**	**Average Ranking**
Manage via a control rule to maintain stock at or above the target biomass level and a level of F at or below the target F.	3	2	1	3	4	NA	5	3.0
Manage F to maintain an age structure that provides adequate spawning potential to sustain long-term abundance.	1	1	1	1	1	NA	1	1.0
Maintain coastwide consistency of implemented measures, while allowing states flexibility to implement alternative strategies	4	4	2	5	3	NA	3	3.5
Foster quality and economically viable recreational, for-hire, and commercial fisheries.	2	3	4	2	2	NA	2	2.5
Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.	6	6	6	7	6	NA	4	5.8
Adopt a long-term program that minimizes the need to make annual changes to management measures.	5	4	3	4	5	NA	6	4.5
Establish a F target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population	7	5	5	6	7	NA	7	6.2

1st Place
2nd Place
3rd Place

Table 2. Board Survey Results: ranking of factors of a quality and viable fishery. Rankings based on mean survey values. Categorical rankings were only calculated for categories with at least a sample size of 5 responders.

Sample Size (N); only ≥5	21	10	5	5	11	3	7	
Factors of Quality and Viable Fishery (average rank)	**Overall Ranking**	**Satisfied w/Management**	**Satisfied w/Management AND Satisfied w/ BRPs**	**Satisfied w/Management BUT not Satisfied w/ BRPs**	**Not Satisfied w/Management**	**Not Satisfied w/Management BUT satisfied w/ BRPS***	**Not Satisfied w/Management AND not satisfied w/ BRPS**	**Average Ranking**
High yield/quotas	5	5	5	5	5	NA	4	4.8
High catch rates, even if not all fish can be retained	3	2	2	3	4	NA	4	3.0
Broad age structure with high abundance of larger, older fish	1	1	1	3	1	NA	1	1.3
High abundance of market size fish (>18" in producer areas, >28" on the coast)	4	3	4	1	3	NA	3	3.0
High abundance of trophy size fish (>28" in producer areas, >36" on the coast)	6	4	7	4	7	NA	5	5.5
Stability/consistency in quotas and regulations from year to year	2	2	3	2	2	NA	2	2.2
Ability to fish year round (i.e., no closed seasons)	7	6	6	6	6	NA	6	6.2

1st Place
2nd Place
3rd Place

Table 3. Advisory Panel Survey Results: ranking of management objectives (left) and factors of a quality and viable fishery (right). Rankings based on mean survey values. Categorical rankings were only calculated for categories with at least a sample size of 5 responders.

Sample Size (N); only ≥5	9	6	
Management Objectives of Amendment 6 (average rank)	**Overall Ranking**	**Satisfied w/Management**	**Average Ranking**
Manage via a control rule to maintain stock at or above the target biomass level and a level of F at or below the target F.	2	2	2.0
Manage F to maintain an age structure that provides adequate spawning potential to sustain long-term abundance.	1	1	1.0
Maintain coastwide consistency of implemented measures, while allowing states flexibility to implement alternative strategies	3	4	3.5
Foster quality and economically viable recreational, for-hire, and commercial fisheries.	4	5	4.5
Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.	7	7	7.0
Adopt a long-term program that minimizes the need to make annual changes to management measures.	6	6	6.0
Establish a F target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population	5	3	4.0

Sample Size (N); only ≥5	9	6	
Factors of Quality and Viable Fishery (average rank)	**Overall Ranking**	**Satisfied w/Management**	**Average Ranking**
High yield/quotas	5	4	4.5
High catch rates, even if not all fish can be retained	6	5	5.5
Broad age structure with high abundance of larger, older fish	1	2	1.5
High abundance of market size fish (>18" in producer areas, >28" on the coast)	1	1	1.0
High abundance of trophy size fish (>28" in producer areas, >36" on the coast)	3	2	2.5
Stability/consistency in quotas and regulations from year to year	4	6	5.0
Ability to fish year round (i.e., no closed seasons)	7	7	7.0

1st Place
2nd Place
3rd Place

Striped Bass Resource Satisfaction Survey

Text/Free Response Results

Q5. Please explain your answer to Question 4 [Have you been satisfied with the state of the stock and management under Amendment 6?] above.

Responded "Yes" to Q4

Board Members

- I answered "yes" above only because there has been great stability in the fishery under [Amendment] 6...However, I am not satisfied with the reaction of the board (Addendum IV) to SSB levels. The SSB reference points are arbitrary and are overly conservative creating an expectation for anglers that may never be able to be achieved (SSB Target)
- I've had several great striped bass fishing trips and others I've talked to have as well. I think are plenty of fish available for a sustainable fishery. Overall, I believe the fishery has become better during the course of Amendment 6.
- Increased availability to numbers of fish with the outlook of increased large striped bass with the 2011 year class
- It established measurable triggers
- For the most part, management under Amendment 6 seems to be working. Vagaries of reproductive success continue to limit biomass to less than what was experienced in the early to mid-2000s.
- Maintaining stock abundance really high, all the time, is unrealistic and likely has impacts to other species we don't fully understand. The FMP requires careful monitoring of trends. Managers have been getting uneasy, at least in part, to poorer recruitment for a number of years. We now have two relatively strong year classes working through the fishery. I expect that ASMFC could continue to manage as is w/o major changes.
- Stock remains robust and F well controlled

AP Members

- Yes, for the most part. Amendment 6 has balanced conservation and broad access well
- satisfy meet the expectations, needs, or desires of
- Well thought out, fairly conservative reference points achieve the goals of Amendment 6 - maintaining a self-sustaining spawning stock and a broad age structure, and maximizing the overall benefits of the fishery.
- The abundance of striped bass during the "season" here on Cape Cod has been increasing over the past few years from my experience (fishing nearly every day or night during the season including fishing in the off season). As a field interviewer for DMF MRIP Survey the past couple of years, I have seen the experienced fisher have no trouble in finding and catching striped bass. Also, as an interviewer from 1986 through 1984, I saw the phenomenal recovery of the stock to the declaration of recovery in 1995. Those who know how fish (not necessarily for striped bass) did very well, with little or no complaints about the stock or abundance. I concur with them. My feeling is that those who know how can do, those who don't know how, can't do and blame their lack of expertise on management. I think the Plan with the necessary adjustments is

working fine. We, the fishermen have to adapt to the fish and should expect the fish to adapt to us. I do have reservations about habitat issues in spawning, migratory and summer (Cape Cod area) feeding areas. Thank You

- It's been working

Responded "No" to Q4.

Board Members

- I generally think the plan has worked OK, but I do wonder why the biomass trajectory continues its decline, so this leads me to believe that we're not quite in the right spot, and so we should re-evaluate the reference points.
- Repeated reports from the recreational community suggests there are problems with striped bass sizes and numbers. I have concerns about MD proposal to harvest smaller fish and the uncertainty that use of circle hooks will meet the proposed level of Conservation Equivalency.
- Neglect of the Del. Bay and River contributions have resulted in inequitable quota and catch distributions. Working from 1970's catch data is obsolete to the Commission as it was with the Eel situation in New York. It is time for an update of reference points that reflect the 21st. century Striped Bass populations.
- We did not need to go to one fish as was proven with 2011 being the fourth highest and 2015 being the eight highest young of the year in the Chesapeake Bay. SSBM was not the reason for poor in some years but other factors
- A more conservative F allows for increased levels of fish in Maine waters and ensures a quality recreational experience for both resident and non-resident anglers
- Would like to see the stock return to the levels from the late 90s to ~2006, but concern that the corresponding recruitment may not be attainable.
- The SSB target is too high (125%). It suggests we are managing the stock for conservation purposes only. This puts economic strain on fishing communities.
- The early years when Ftarget = 0.30 were more reasonable than in recent, later years. The 3-fleet model of late seems a way to gloss over the persistent problems with accurately (or close to accurately) estimating commercial discards, by placing it in a separate fleet. In addition, there was much concern by Chesapeake jurisdictions to develop Chesapeake Bay reference points. In addition, managing to the target F is fine but when the Fcurrent is barely above the target F, and stringent management measures are implemented simply to achieve target F, yield is sacrificed. The SSB threshold/target regime is: 1) unusually conservative; recall that the 1995 SSB was considered adequate for management of this stock; and, 2) is not tied to the assessment directly. Not to be parochial, but there is a definite disadvantage for Chesapeake Bay jurisdictions, as the majority of coastal states have a strong veto power over the Chesapeake Bay jurisdictions. My concern is that Addendum IV had an objective to conserve the 2011 year class, but equal conservation was not applied directly to the majority of coastal states, once that year class was available to coastal fisheries.
- Difficult question to answer, b/c I would like to check both buttons -- while I am satisfied with the state of the stock, I do think management of the stock (which is driven by the reference

points) needs to evolve; population dynamics have likely shifted in response to changes in the environment and management needs to reflect this.

- In our area of the Atlantic Coast, availability of striped bass has been low for the past several years, prompting complaints from the private and for-hire components of the fishery.
- Management under Amendment 6 and Addenda I-III was effective, with consistent recreational regulations and reasonable commercial quotas for all states. The Amendment went into effect near the peak of a population cycle and it conserved the stock while allowing for reasonable harvests. The stock inevitably declined from the historic high level seen at the time Amendment 6 was approved and the Board overreacted. Addendum IV put extremely conservative reference points into effect and sought to impose restrictive fishing measures on the stock throughout the range. The result has been a needless loss of interest among recreational anglers, a needless loss of income to commercial fishermen, and a confusing welter of state regulations as some states accommodate the most restrictive measures demanded by their most vocal anglers while other states try to maximize access to this great resource. These restrictive regulations have turned the great Mid-Atlantic estuaries into feed lots for immature striped bass. Mid-Atlantic fishermen are frustrated by having to release nearly everything they catch when sub-legal striped bass are the only fish available.
- Overall abundance and a broad year class representation is not is not adequate to support a quality fishery in Northern New England
- Anecdotal evidence of greatly reduced numbers of trophy size fish in near shore Atlantic waters (Long Island, NY)

AP Members

- The stock is significantly over the rebuilt goal, but the triggers for curtailing landings are inflexible (i.e., small excesses in F and/or SSB trigger a 25% reduction in landings).
- The SSB are the numbers from the Chesapeake. We have no numbers from the Hudson or the Delaware. Both rivers add a lot of S.B. fishery to the system. We need more data from the rivers above.
- Less fish than in years passed. Smaller fish than in years passed.

Q7. If you are not satisfied with the current striped bass reference points, why not?

Board Members "Other" responses.

- I think there is disconnect between the biomass and fishing mortality ref points which needs to be re-evaluated.
- SSB needs to be assessment based and should be based on MSY or some type of MSY proxy. Also, the Chesapeake Bay should have its own assessment based BRPs so that management of the Bay portion (resident population) of the stock can be part of the management plan.
- Lacks up to date environmental changes which cancels the flexibility to react to the fishery in order to keep it viable. Abundances appear to have shifted in location, yet no recognition has been the reaction.
- They management measures do not include the fact that the Delaware and Hudson River contribution to the costal migratory stock has greatly increase is not used for management.

- I am concerned that targets for SSB have been set at a level which is difficult to attain or even get close to. The current target is more aligned with biomass levels that resulted from super year class recruitment events in 93, 96 & 2001 that we have not seen since (clustered over a short number of years) and may not see again. Fishing under a coastal F stripped the Chesapeake region of its ability to effectively manage the pre-migrant component of the stock, which had been done effectively under the Chesapeake Bay Harvest Control Model
- Granted, recruitment has fallen off after 2007, with one exception. Nonetheless, the 'ceiling' (SSB target) is too high. Poor and average recruitment are typical but once there is rebuilding (we hope) BRPs should be assessment based, and management efforts my need to be different than current. For example, the numbers of striped bass decrease with age (size), and it may not be beneficial to have abandoned the 18-inch minimum size limit in Chesapeake Bay, in that discards are a large problem and older, stable fish are part of the harvest. Maximum size limits may better protect valuable year classes.
- Triggers 1-4 require information that must be derived from an assessment or assessment update. If the interval between assessments is more than two years, it is difficult to monitor where the stock stands in relation to the reference points and to assess the effectiveness of any previous corrective measures. Nevertheless, the current management approach does provide a more stable, more compliant and more enforceable alternative to chasing harvest targets with MRIP estimates.
- BRPs based upon 1995 SSB. ASMFC can do better. Ecosystem considerations are always the goal but I have concerns re: data needs, modeling complexity, and the 1-sided application of uncertainty.
- Suspect that it not be possible to reach the target biomass under normal recruitment

AP Members "Other" responses

- My concern is that there is not enough flexibility in the management regime to allow for common sense decisions.
- The fishery is doing well now, but get several bad YOY in a row, and our fishery will crash. We should be more conservative.

Q12. If you chose "Other" as an objective that was important to you in the question above, please describe that objective.

Board Members

- Separate management of producer areas taking into consideration the sex specific information from those areas.
- #4 "Foster quality and economically viable recreational and for hire fisheries" Delete the "Commercial" part of this. The unique nature of striped bass, where it is found (rivers, bays, estuaries, ocean beaches), how it may be caught, the wide variety of methods and baits make it an ideal species for recreational and for hire anglers. Its value as a recreational species far exceeds it value as a commercial species and it should be managed as such.
- Manage striped bass taking into account ecosystem considerations.

- The control rule option can be good or poor depending on the adequacy of the BRPs to represent changing stock conditions (i.e. the control rule must be flexible to adapt to static and dynamic stock conditions.
- Fairness and equity in management among jurisdictions seems to be a common goal, but it has proven hard to define. Also what standing stock of striped bass best fits ecological considerations (other species)?
- Ability to effectively evaluate tradeoffs between management objectives
- I know the preceding objectives were all in Amendment 6, but it is hard to rank them since they are ambiguous and some are contradictory.
- Determine (and take) management steps needed to return stock to abundance experienced across the entire range during the period of 1990-1999

AP Members

- Triggers that allow for incremental reductions when portions of the stock require to achieve wide range of age structure and high abundance of SSB, rather than waiting to make large reductions.
- Provide management flexibility so that exceeding target s of F and/or SSB do not mandate harmful curtailments of landings when the stock is extremely abundant (i.e., the waste of bycatch mortality currently in the Chesapeake fishery).
- #1 would be to manage conservatively, for abundance, so as to maintain opportunity for quality fisheries over a broad range - from Maine to North Carolina.

Q14. If you chose "Other" as a factor that was important to you in the question above, please describe that factor.

Board Members

- Consistent regulations in shared jurisdictions like Delaware Bay, Chesapeake Bay, Long Island Sound, and Atlantic coastal waters.
- A management plan that insures long term quality stocks (full range of sizes) and minimizes fish mortality (after release by recreational anglers) and from excessive bycatch (from commercial angling operations)

AP Members

- Effective law enforcement to prevent striped bass landings in the EEZ.
- A wide ranging stock with a good distribution of older larger fish, providing opportunity along the coast for the greatest number of people to utilize them.

Q15. Please share any other thoughts you have regarding the status and management of the striped bass stock and fishery.

Board Members

- We need to make sure that the reference points and management triggers are all consistent with each other and based on similar and consistent information. For instance, if a robust age structure is deemed important, there should be a trigger based on some proportion of age X in the population, and the information used to determine this proportion should be strong and used consistently through time.
- Regulations that protect the largest fish which are usually spawning age females should be considered. Maximum length or annual limits of one fish over a maximum length would protect the most important fish in the stock. A species which can reach very large sizes >60 lbs should be managed so that a much greater percentage of fish can reach that potential rather than being removed from the population as 3-4 year olds at 18-22 inches. No other fish species along the east coast is as available to all angling skill and economic levels as striped bass. I would like to see management strategies that recognize striped bass as the preeminent gamefish of the east coast. As other shore-based fisheries are in decline, striped bass are poised to fill the void and keep coastal communities viable.
- #9 - CB reference points are important. Not as concerned about reference points of other producer areas. #10 - Triggers are very conservative.
- Picture this, a small group of children standing at the edge of a river catching Striped Bass too numerous to count. Yet undersized according to the ASMFC. “Can we keep a few" is always the question posed by the youngsters. No, kids you have to throw them back. Next response from the kids, "Can we go now, why do we go fishing if we can't keep anything." Next year’s willingness to participate has been cut in half. The idea of a Coastwide Super Abundance of Striped Bass is not practical, most especially were the fish are reared. Does the example sound like a viable managed fishery? How many generations will we deny?
- Inclusion of consideration of sex specific reference points. Especially for producer areas that have male dominated populations
- It may be time to establish an ACL option to provide incentive to states to reduce discard problems. It may be time to establish studies that can better quantify discard mortality rates. This survey is fine, but should be presented again, once the re-calibration of MRIP is complete.
- Over all, management of SB has been successful since the stock was rebuilt in the early 1990's. Even when recruitment was down in the middle/late 2000's due to a lack of a dominant year class for 8 years, management responded as called for in A6 and put in measures to bring fishing mortality back to the target. The SB resource has clearly responded with some dominate year classes that are now moving through bay and coastal fisheries.
- Some jurisdictions apparently are more concerned with "getting their fair share" of the resource rather than the long-term health and stability of the resource. We must take a long-term view of striped bass management and resist knee-jerk responses to fluctuating reproductive success and abundance of particular year-classes in some portions of the species range. Also, we cannot manage for maximum striped bass production and abundance and ignore other predators, prey, and competitors. Spawning contributions from the Hudson R. and Delaware Bay have been pretty much ignored for a number of years.
- I believe the status is fine; I do not think our existing reference points reflect some pretty significant changes in the environment that we have already seen over the past 10+ years (or are likely to see in the future), and believe we need to re-evaluate those. While the management triggers in general are fine, I do not believe that trigger #1 adequately accounts for

the social and economic impacts that can result from sudden changes in management and would prefer to see this changed to a two-year trigger...I do think the next survey should probably focus specifically on the management triggers themselves ;-)

- Striped bass management seems to have an emotional component not seen in other fisheries. Regulations that would be considered overly restrictive for other species are considered not restrictive enough for striped bass. The Amendment 6 reference points would have been left alone in any other fishery back in 2014. While it is great that striped bass still inspire so much passion, it does complicate management.
- In summary, we need a quality recreational fishery: high abundance, broad year class representation with the real possibility of catching trophy sized fish.
- Protect and enhance stocks in the Chesapeake Bay 2. Develop conservation measures (e.g. mandate circle hooks) so as to reduce mortality on fish caught & released 3. Develop effective coast wide surveys regarding angler satisfaction and measures of success
- Continues to be a well-managed fishery. The most difficult part is providing for both a strong commercial fishery and a robust recreational fishery. Our current management is a trade-off between these two factors, as it probably should be. However, because striped bass are the cornerstone of many northeast recreational fisheries, I believe we should maintain a slight preference for keeping the recreational fishery robust over the commercial fishery should trade-offs need to be necessary.

AP Members

- Largest problem is ASMFC not actively managing toward the Target
- The politics of striped bass management favors states that have only recreational fisheries and therefore vote against any improvement of commercial fisheries.
- It would be very unwise to drastically change reference points to allow for greater yield at the expense of opportunity. I am certain that the public (and this IS a public resource) would prefer managing for abundance and opportunity over greater harvest levels. Should the public have a chance to comment on this, I am certain this is what we'd hear. Really, to alter/change goals and objectives like this, there should have been a full addendum or amendment process.
- Research by ASMFC with help from other agencies and colleges that teach marine biology.
- The Pennsylvania / Delaware River fishery is a direct result of the FMP. The last few years recreational fishing has been poor compared to years past.
- I think the Plan has done a good job in maintaining the stock of striped bass and providing a quality fishing experience for all.

Striped Bass Resource Satisfaction Survey - Management Board Reponses

Demographic Information

Your responses are anonymous! However, this information will help us understand the results of the survey better.

1. Which sector do you represent? (Choose all that apply.)

- [ ] Commercial
- [ ] Recreational - For Hire
- [ ] Recreational - Private Angler
- [ ] Commercial consumer - Non-angler/fisher (e.g., fish buyer/processor/wholesaler, or restaurant goers)
- [ ] State or Federal Agency (e.g., Maryland Department of Natural Resources, or U.S. Fish and Wildlife Service)
- [ ] Conservation Group or Agency

2. Which state or jurisdiction do you represent?

- ◯ Maine
- ◯ New Hampshire
- ◯ Massachusetts
- ◯ Rhode Island
- ◯ Connecticut
- ◯ New York
- ◯ New Jersey
- ◯ Pennsylvania
- ◯ Delaware
- ◯ Maryland
- ◯ District of Columbia
- ◯ Potomac River Fisheries Commission
- ◯ Virginia
- ◯ North Carolina
- ◯ Not Applicable - (I do not represent a particular state or jurisdiction, e.g., Federal Agencies)

3. Which region or water body do you primarily fish? (for example, "Hudson River," "Long Island Sound," "the Chesapeake Bay," or "I am not an avid angler" are all acceptable responses).

Striped Bass Resource Satisfaction Survey - Management Board Reponses

Reference Point and Management Trigger Satisfaction

Please tell us how satisfied you are with current striped bass biological reference points under Addendum IV to Amendment 6.

Biological Reference Points for Striped Bass:
Biological reference points (BRPs) are used in fisheries management as a measure of stock status and as a

reference to evaluate management plan effectiveness. There are two sets of BRPs used in striped bass management. The first is based on spawning stock biomass (SSB), with a threshold value equal to the SSB value in 1995, the year the striped bass stock was declared rebuilt. The stock is declared overfished if SSB drops below the SSB threshold. The second set of reference points is based on fishing mortality rate (F, the rate at which individual striped bass die because of fishing), with a threshold value equal to the fishing mortality rate that will maintain the population at the SSB threshold in the long term. Overfishing occurs when F is greater than the F threshold. Target levels for SSB and F provide additional performance metrics. The current SSB target corresponds to 125% of the SSB threshold and the F target is associated with achieving the SSB target over the long term.

Management Triggers for Striped Bass:
Amendment 6 established five (5) management triggers. Upon reaching any (or all) of these triggers, the Management Board is required to alter the management program to ensure the objectives of the Fishery Management Plan are achieved. Management triggers are typically only associated with BRP thresholds (e.g., if the F threshold is exceeded, the Board is required to take action to reduce F below the threshold). However, for striped bass, management action may be triggered when F and SSB are between the target and the threshold.

Click here for more information regarding the Atlantic Striped Bass Fishery Management Plan, current BRPs and management triggers, and current state of the resource and its fisheries.

4. Have you been satisfied with the state of the stock and management under Amendment 6?

- ◯ Yes
- ◯ No

5. Please explain your answer to Question 4 above.

* 6. Are you satisfied with the current striped bass reference points?

- ◯ Yes
- ◯ No
- ◯ I'm satisfied with the reference points, but I do not like the management triggers
- ◯ I do not have an opinion on the specific reference points

7. If you are not satisfied with the current striped bass reference points, why not?

- [ ] Too conservative -- restrict fishing too much
- [ ] Too conservative -- maintain biomass at too high of a level
- [ ] Not conservative enough -- does not maintain a high enough level of abundance
- [ ] No ecosystem considerations -- reference points due not take environmental information into accoun
- [ ] Concerns about the stock's ability to achieve the target under current environmental conditions
- [ ] Other (please specify)

8. What kind of reference points do you prefer?

- ◯ Historically/empirically based (targets and thresholds based on the abundance of the stock and the performance of the fishery during a historical period -- similar to current reference points but not necessarily the same year or percentage)
- ◯ Model-based - for example, Maximum Sustainable Yield (MSY), Spawner-per-Recruit (SPR)
- ◯ No preference as long as they meet the management objectives

9. How important is it to you to have stock- or producer-area specific reference points?

- ◯ Extremely important
- ◯ Very important
- ◯ Somewhat important
- ◯ Not that important
- ◯ Not at all important

10. Are you satisfied with the current management triggers?

- ◯ Yes
- ◯ No
- ◯ The current management triggers are fine, but I am not satisfied with the current reference points
- ◯ I do not have an opinion on the specific management triggers

Striped Bass Resource Satisfaction Survey - Management Board Reponses

Resource and Management Satisfaction

Please tell us how satisfied you are with current management options and what a quality striped bass resource and fishery would look like to you.

11. Please rank the management objectives from Amendment 6 in order of most important (1) to least important (8).

- [ ] Manage striped bass fisheries under a control rule designed to maintain stock size at or above the target female spawning stock biomass level and a level of fishing mortality at or below the target exploitation rate.
- [ ] Manage fishing mortality to maintain an age structure that provides adequate spawning potential to sustain long-term abundance of striped bass populations.
- [ ] Provide a management plan that strives, to the extent practical, to maintain coastwide consistency of implemented measures, while allowing the States defined flexibility to implement alternative strategies that accomplish the objectives of the FMP
- [ ] Foster quality and economically viable recreational, for-hire, and commercial fisheries.
- [ ] Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.
- [ ] Adopt a long-term management regime that minimizes or eliminates the need to make annual changes or modifications to management measures.
- [ ] Establish a fishing mortality target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population, relative to the 2000 estimate.
- [ ] Other - please see Question 12 below to describe an alternative objective that you feel is important but is not one of the objectives of Amendment 6.

12. If you chose "Other" as an objective that was important to you in the question above, please describe that objective.

* 13. What does a quality and economically viable striped bass fishery look like to you? Please rank the following factors from most important to you (1) to least important (8).

☐	High yield/quotas	☐ Not important
☐	High catch rates, even if not all fish can be retained	☐ Not important
☐	Broad age structure with high abundance of larger, older fish	☐ Not important
☐	High abundance of market size fish (>18" in producer areas, >28" on the coast)	☐ Not important
☐	High abundance of trophy size fish (>28" in producer areas, >36" on the coast)	☐ Not important
☐	Stability/consistency in quotas and regulations from year to year	☐ Not important
☐	Ability to fish year round (i.e., no closed seasons)	☐ Not important
☐	Other	☐ Not important

14. If you chose "Other" as a factor that was important to you in the question above, please describe that factor.

15. Please share any other thoughts you have regarding the status and management of the striped bass stock and fishery.

Atlantic States Marine Fisheries Commission

Atlantic Herring Section

May 1, 2018
3:00 – 3:45 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(P. Keliher)* 3:00 p.m.

2. Section Consent 3:00 p.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2018

3. Public Comment 3:05 p.m.

4. Discuss Potential Impact of Possession Limits in the Atlantic Mackerel Fishery on the Atlantic Herring Area 1A Fishery *(M. Ware)* 3:15 p.m.

5. Technical Committee Report on Spawning Fish Sampling Protocols *(M. Ware)* **Possible Action** 3:30 p.m.

6. Consider Approval of 2018 FMP Review and State Compliance *(M. Ware)* **Action** 3:40 p.m.

7. Other Business/Adjourn 3:45 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Atlantic Herring Section
Tuesday, May 1, 2018
3:00 – 3:45 p.m.
Arlington, Virginia

Chair: Pat Keliher (ME) Assumed Chairmanship: 02/18	Technical Committee Chair: Renee Zobel (NH)	Law Enforcement Committee: Michael Eastman
Vice Chair: Dr. David Pierce (MA)	Advisory Panel Chair: Jeff Kaelin (NJ)	Previous Board Meeting: February 6, 2018
Voting Members: ME, NH, MA, RI, CT, NY, NJ (7 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Discuss Potential Impact of Mackerel Fishery Possession Limits on the Atlantic Herring Area 1A Fishery (3:15-3:30 p.m.)

Background

- On February 27th, river herring and shad catch caps were harvested in the Atlantic mackerel fishery, prompting a 20,000 pound per trip/day possession limit.
- In addition, as of April 11, 89% of the mackerel fishery quota has been landed. The fishery moves to a zero possession limit once the Atlantic mackerel quota is caught.

Presentations

- Overview of 2018 caps and mackerel fishery possession limits by M. Ware **(Supplemental Materials)**

5. Technical Committee Report (3:30-3:40 p.m.) Potential Action

Background

- At the February Meeting, the Section tasked the TC with developing a method to scale-up spawning samples of herring which are less than the required 100 fish sample size.
- The TC met via conference call on March 9th to discuss this task.

Presentations

- Technical Committee report by M. Ware **(Briefing Materials)**

Board actions for consideration at this meeting

- Consider changes to spawning closure sampling requirements

6. Fishery Management Plan Review (3:40 -3:45p.m.) Action

Background

- State Compliance Reports are due on February 1st
- The PRT reviewed each state report and compiled the annual FMP Review.
- New York has requested and meets the requirements for *de minimis.*

Presentations

- Overview of the FMP Review Report by M. Ware **(Briefing Materials)**

Board actions for consideration at this meeting

- Accept 2018 FMP Review and State Compliance Report.
- Approve de minimis requests

7. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC HERRING SECTION

The Westin Crystal City
Arlington, Virginia
February 6, 2018

These minutes are draft and subject to approval by the Atlantic Herring Section
The Section will review the minutes during its next meeting

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INDEX OF MOTIONS

ATTENDANCE

Section Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Sen. Brian Langley, ME (LA)
Doug Grout, NH (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Rep. Sarah Peake, MA (LA)
David Pierce, MA (AA)
Raymond Kane, MA (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Bob Ballou, RI, proxy for J. Coit (AA)
David Borden, RI (GA)
Colleen Giannini, CT proxy for M. Alexander (AA)
Emerson Hasbrouck, NY (GA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Jeff Brust, NJ, proxy for L. Herrighty (AA)

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Rene Zobel, Technical Committee Chair

Staff

Robert Beal
Toni Kerns
Megan Ware
Jessica Kuesel

Guests

The Atlantic Herring Section of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Tuesday, February 6, 2018, and was called to order at 1:30 o'clock p.m. by Chairman Robert E. Beal.

CALL TO ORDER

CHAIRMAN ROBERT E. BEAL: I would like to call the Atlantic Herring Section to order. We've got a relatively small group today; but the rest of the Commissioners will join us in a moment. My name is Bob Beal; I am the Executive Director of ASMFC. Currently the Herring Section does not have a Chair or a Vice-Chair; due to retirements and health issues and a number of other things.

I am standing in as the acting Chair of the Herring Section until we get to Agenda Item Number 4, which is elect a Chair and a Vice-Chair, and then after that point the newly elected Chair will come up and take over the meeting at that point. That is where we are.

APPROVAL OF AGENDA

CHAIRMAN BEAL: An agenda was distributed in the briefing materials. Are there any changes or additions to the agenda as presented? Seeing none; the agenda stands approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN BEAL: Are there any changes or adjustments to the proceedings from the October, 2017 meeting of the Herring Section? Seeing none; those stand approved as well.

PUBLIC COMMENT

CHAIRMAN BEAL: Agenda Item Number 3 is public comment. Is there any public comment on any items that are not on the agenda for the Atlantic Herring Section?

ELECTION OF CHAIR AND VICE-CHAIR

Seeing no hands; we'll go on to Agenda Item Number 4, which is the election of a Chair and Vice-Chair of the Atlantic Herring Section. Are there any nominations for Chair and Vice-Chair? Ritchie White.

MR. G. RITCHIE WHITE: I have the great honor of nominating two distinguished candidates; Pat Keliher for Chair and David Pierce for Vice-Chair.

CHAIRMAN BEAL: Wonderful, is there a second to those nominations? Bob Ballou seconds the nomination of Pat Keliher for Chair and David Pierce for Vice-Chair of the Atlantic Herring Section. Are there any other nominations? Seeing none; any objections to the nominations, none? Congratulations Pat Keliher and David Pierce. This is all yours now, Pat.

CHAIRMAN PATRICK C. KELIHER: At least he didn't say one of the two is distinguished. I'm going to try to get us back on task and on time. A couple things, I know Dennis Abbott will talk a lot about process. But we don't go by Robert's Rules; we go by Pat's Rules associated with running the Herring Section.

We'll dispense Robert's Rules and we'll see if we can't move this right along. Perfect.

REVIEW EFFECTIVENESS OF CURRENT SPAWNING CLOSURE PROCEDURES

CHAIRMAN KELIHER: With that we will go to Item Number 5, **Review Effectiveness of Current Spawning Closure Procedures**. Renee, are you ready for that?

MS. RENEE ZOBEL: I am, thank you Mr. Chair. The TC was tasked with reviewing the spawning closure program that was initiated in 2016; our forecast TSI-30 based program. As a reminder, our task was to review the efficacy of the current spawning closure method; which is the forecasting method based on the goals and objectives of the program, and make suggestions

for any improvements to better meet those objectives.

First up, what were the objectives of this program; or what are the objectives? The first is to reduce the interaction between the fishery and spawning. We know that it is impractical to eliminate interaction completely between spawning and the fishery; but that we should prohibit fishing when greater than 25 percent of fish are spawning.

Now that 25 percent is an important value to look at; we on the flip side, when there is a spawning closure. In order to reclose or not reclose there is a 25 percent threshold that we follow. The TC took a logical leap to assume that that threshold was appropriate on the front side of a spawning closure as well.

When you hear me refer to a spawning season; we're going to be looking at the 25 to 25 percent on the front and on the backside. The second objective is to maximize spawning coverage and access to the 1A quota. In a perfect world spawning closures cover the spawning season and no more. We know it's an imperfect world; but that's the goal.

Third is to account for interannual variation in spawning season. We do know that there is – and you're going to see this later – there is pretty solid interannual variation in our spawning seasons in this species. We do this by monitoring the development of the ovaries, getting GSI values each year before, during, and after the spawning closure.

Fourth objective is flexibility to extend the closure if necessary; because we do not want to be opening up on more than 25 percent spawning fish. A little bit of a review of the data, so 2015 prior to that we did not sample the full suite of spawning, so prior to2015 the focus was on collecting samples pre-spawning.

Doing the pre-spawning GSI, not worried as much about during the spawning season or after; other than to determine if we needed a reclosure or not. In 2015, there was a concerted effort to start taking samples before, during, and after the spawning closure, which allows us to get a good feel of what the spawning season looks like and what the biology of the fish is throughout the entire timeframe.

Now 2015 we still were under the old program. It wasn't until 2016 and then this previous year, 2017 that we used the new method. Now what we're really evaluating are some assumptions of this program; and there are four that we really took a look at as a TC. The first assumption of the program was that larger herring arrive and spawn earlier than smaller herring.

Second was spawning commences near GSI-30 value of 25, which is the value that the Section picked when we implemented this; that four weeks sufficiently covers the spawning season, and finally that GSI increases linearly during the last two months of spawning, which was part of what went into the modeling. The first question; do larger herring arrive earlier? In the figure you'll see up on the screen. You can see that the large fish are the lighter color; small fish are the darker color. Over the years you can see that in fact the larger fish are replaced with smaller fish as we go through the spawning season. This is another way to look at it. The mean length of Stage 3 through 5 female herring and you can see even more clearly here that the length of fish declines over the course of time. They do in fact decrease in size throughout the spawning season; so that assumption we found to be sound.

Second question; does spawning commence near the GSI-30 value of 25; which is the value that was chosen by the Section? To get at the answer to that we have to determine when is the spawning season? This is a very busy figure; but what you really want to be paying attention to is the orange line and the red line. Those two lines are really the fish that are in spawning stages; and the black lines (black vertical bars) are the actual spawning closures.

You can see that we're doing a pretty good job capturing the spawning fish during those closure dates. Another way to look at this is this is the observed fraction of sampled herring that had started spawning; which is the red line. Those are Stage 6 plus fish; and those in purple are those that had completed spawning, with fitted logistic regression lines.

Shaded in blue is what the spawning season was determined to be via sampling. Again, the black vertical bars are the actual spawning closures. We're going to talk a little bit about these three different years individually. One thing to note is that 2016, and I'll bring this up again, very few samples during and after the spawning closure. There was only one.

What you see there is a very short spawning season of 16 days. We don't have a whole lot of faith in that; because we don't have enough samples to really feel confident about that value, so just a side note for everybody. The other thing to observe in this figure, those 25 percent values that I talked about earlier, so where more than 25 percent of fish are spawning and then where less than 25 percent of fish have remained to spawn after the closure.

There are two circles; one at the beginning of the spawning season, and one at the end of the spawning season. That is what those are referencing. Our goal is to try and basically look at the spawning season between those two values; that is our end goal. This is 2015 under the old method and what it looked like.

Again, you can see shaded in blue is the actual spawning season; based on the biology of the fish. The vertical bars are again what we implemented for a spawning closure. This season was two weeks early; as far as we missed the spawning fish by two weeks, which is indicative of us opening up smack in the middle of spawning and having to implement a reclosure.

Had we used the new method in 2015, this is what it would have looked like. Instead of two weeks early we would have been three days late from that 25 percent spawning threshold; so much more precise. In 2016 again, it appears we had a very short spawning season. But this is the year where we have very, very few samples; just one sample during the spawning closure and one sample after. Good samples leading up to it, but not during and after to help us categorize what the spawning season looks like.

This year it would have been five days late. It really would have been four days late, but managers decided to push this out one additional day from what the model predicted. In 2017, our most recent year, this is our most comprehensive year with 29 samples taken during this year. This year actually did a very nice job. It was two days early from that 25 percent spawning threshold; and you can see that we did have to have a reclosure, because this spawning season was about five weeks. You can already see here the variability in the length of the spawning season; based on the biology of the fish in any given year. Third assumption, is a four week closure sufficient?

I already showed you that there was some variability between the different years; based on the length of the spawning season, which we already knew going into this, but it was again confirmed for us. Here what we're looking at is if managers were not comfortable with those 25 percent values, which has been on the books for us for a long time post spawning closure and we have now introduced it as a beginning period for spawning closure.

Then managers could elect to do something different with those percentages. However, the thing to keep in mind is that a percentage change would extend time both on the front end and the back end of a spawning closure. If the choice was to be more conservative than the 25 percent that's currently on the books, we could do that.

But there would be a tradeoff in the amount of time that the spawning closure would cover; and likely a four week closure would result very frequently in a reclosure. What we're looking at here is that if managers also decided they could go with a different GSI-30 value. For the 2016 initiation we went with a GSI value of 25; which as I showed you earlier fit the spawning season very well, with just a matter of being off by two to four days versus a matter of weeks, which it was off before we implemented the new method.

Here you can see what would happen if we chose a different GSI-30 value; and obviously the lower the value the further up in time it would bump that up. If the Section did decide to go with a lower value, it would likely result in reclosures more frequently, unless a longer timeframe for a spawning closure was also adopted.

Based on what I just said, so those different GSI-30 values as you dropped the timeframe would get earlier and earlier for the spawning closure, and would also have to come with different default dates. The default dates that were selected prior were based on a GSI-30 value of 25. If we went with a different value then we would also have to implement a different default closure date.

One thing you'll notice here is that the default closure for a value of 25 is October 1, and not October 4, which is currently on the books for all of us. We have more data now. We were able to go back and take a look with updated data at what the default date would be; including the last three years, and that has changed the value some.

The value for the 25 threshold is now October 1st instead of October 4th. The last assumption does GSI increase linearly during the last two months prior to spawning? These are the three years. The line that you want to pay most attention to is the blue line; that is the fit of the samples. You can see in all years there is an increase in the slope of that line headed up to the spawning closure, which is indicated with the red vertical bar.

The notification date is what is indicated by N, and the black on the figure is the closure date as it changed over the number of samples that we were able to work up and implement. The last year is the only one that differs a little bit; and the slope decreases right after the notification date. But headed up to that notification date, it follows a nice linear path. Conclusions and recommendations, the first conclusion is the current spawning closure model appears to be meeting the Sections objectives. The second conclusion, which I think you were able to see is that the spawning season is variable both in time and length of time.

In 2015 there was approximately a 28 day spawning season, 2016 had a 16 day spawning season, again very low sample sizes so low confidence in that number, 2017 had a 34 day spawning season, so a lot of variability between years. Two week reclosures may occur frequently as a result of this; with just a four week spawning closure initially.

A five or six week closure could reduce the frequency of reclosures. The current GSI-30 threshold of 25 is a good fit to the spawning season. It's within days not weeks, which the old system tended to be off by a number of weeks when we've gone back and taken a look at old data. The Section could consider a threshold of 23 or 24 to reduce the probability of greater than 25 percent spawning fish in each catch; that would result in an earlier default date.

It would also increase the likelihood of reclosure if the four week spawning sample closure is retained; and a longer closure is not implemented. Fishery independent sampling is needed during closures. We have a very hard time getting samples in eastern Maine in particular, but as far as samples during a spawning closure, which help us categorize what the spawning season looks like and what the biology of the fish are doing in any given year.

Those two areas are in particular need of independent sampling. We were able to get quite a bit of sampling in the Mass/New Hampshire closure area during the closure. A lot of those samples came from the small mesh bottom trawl fishery that was operating during that timeframe; in addition to some other sources. That concludes my presentation; I'm happy to take any questions, if anybody has any.

CHAIRMAN KELIHER: Great, thank you Renee. I have Ritchie and then Doug.

MR. WHITE: Great report, Renee, thank you. Two questions, one I assume that any of these changes that we could make would be an addendum process.

CHAIRMAN KELIHER: It's my understanding that an addendum would be appropriate; but we could also if we wanted to make a change and evaluate it, we could also do it as a pilot.

MR. WHITE: Second question, did the Technical Committee talk about the herring accessibility to the fleet this year; in that I know there were market situations that affected it as well, with the Area 3 quota not being caught, and the Area 1A quota constrained early, and then had an extremely hard time trying to catch the remainder of the quota.

Some of the anecdotal information was that the herring were not available to the harvesters when they wanted them; or they were staying hard to the bottom for the seine boats. I just wondered if the Technical Committee had any discussions on that.

MS. ZOBEL: Due to workload and the timeline of taking a look at the tasks which we were presented, which was taking a look at the spawning closure efficacy; that is not something we discussed as of right now. However, the Council Herring Workgroup is going on today and the rest of this week. I'm sure that is something that the TC members who are all involved there will be discussing as a result of that as well.

CHAIRMAN KELIHER: I've got Doug Grout, anybody else on this side, Colleen and David Pierce? Doug.

MR. DOUGLAS E. GROUT: Thank you Renee for this report. I have three questions; one is just a clarification. In your previous slide you said in 2015 the closure was 28 days. Does that include what it would have been under the new method? Do you have an idea of how many days it would have been in 2015 under the new method?

MS. ZOBEL: That is not the spawning closure that was implemented that is a spawning season. Based on the biology of the fish, between that 25 percent on the front end and 25 percent on the back end, it was 28 days long.

MR. GROUT: Thank you for clarifying that for me. Do you have in 2016 when we had low sample size, compared to the year before and the year after. Was there any reason why we had such low sample size, or why their sample sizes were higher in the '15 and '17?

MS. ZOBEL: Often during the spawning closure the samples are coming from either the small mesh bottom trawl fleet or independent means; fishery independent. That year I recall us really having trouble finding fish to sample during the closure.

MR. GROUT: We are getting samples from the fisheries independent surveys too now.

MS. ZOBEL: We are that is correct.

CHAIRMAN KELIHER: Colleen.

MS. COLLEEN GIANINI: Thanks, Renee. Since the sample sizes are so influential in informing the closures dates, was there any thoughts or discussion in the TC as to identifying maybe a minimum or optimal sample size?

MS. ZOBEL: There was no discussion about that specifically. Based on when we developed the

model we set three samples as a minimum; as far as fitting that linear regression to allow us to predict a closure. Obviously more samples are better than fewer samples. We've really been trying to categorize the fishery, so like I said this last year was 29 samples. We really tried to capture as much as we possibly could. But no, we did not talk about an optimal sample size.

CHAIRMAN KELIHER: Colleen brings up a good point in regards to sample size; and one that I've had very quick discussions with both David Pierce and Doug Grout about; in regard to the hundred fish that are collected. Occasionally we fall short; so I would like to discuss that after we deal with all the questions regarding the report, of some way to possibly scale that sample size and maybe tasking the TC. But we'll save that portion for the end of this discussion. David.

DR. DAVID PIERCE: Yes Renee, much appreciation is expressed to you and your colleagues, Micah Dean and Matt Cieri for all the hard work you did; impressive display of the data in graphical figure form. A great deal of thought went into this to evaluate the merits of the changes that we made in the spawning closure approach. I'm glad to see that the changes have proven to be good ones, and that we've had some success. I believe you said that the approach resulted in pretty good capturing of the spawning season. My question is, just so I understand.

In looking at the data that you have provided, Figures 8 and Figure 9 and the different sizes or length of the spawning seasons. You may have already alluded to this. But by spawning season you mean the actual time that we implement it to protect spawning fish; or do you mean the actual time when the fish were seen to have been spawning?

MS. ZOBEL: The latter. You can see in all those figures the spawning closure is indicated by vertical black bars. The spawning season is based on the biology of the fish and the length of time between 25 percent on the front end and 25 percent on the back end of fish spawns.

DR. PIERCE: Thanks for that clarification. Do you or other members of the Technical Committee have any insight, any thoughts as to why the spawning season was so long in 2017; in contrast to previous years, water temperature effects? What can you offer if anything?

MS. ZOBEL: We know based on literature that the spawning season can be very variable. We're seeing that played out. There are a number of factors that contribute to it. Why 2017 was longer than 2015, the last year of confidence, we didn't entirely discuss, and it would only be conjecture. But there are a number of factors that go into it; and we know that based on literature the spawning season often can go up to 40 days or more.

CHAIRMAN KELIHER: Are there any other questions or comments for Renee regarding this? Is there any interest from the Section in seeing a modification to the procedures that we have in place? Ritchie White.

MR. WHITE: I'm not quite sure I'm ready to make a motion to that regard; but the concerns that I raised earlier that we heard from fishermen that there just were not the herring this last year that should be there. Does that mean that they're geographically elsewhere? We don't know. It's not a stock assessment. But we had a lot of very experienced fishermen raising substantial concern about the availability of herring last year.

I think that if menhaden had not been available in Maine, I think there would have been a serious bait crisis in the lobster industry. Should we be taking a more conservative approach; to make sure we're capturing just as much spawning as we possibly can? That is the direction I would lean; but I guess I would like to hear more input, if there are others that feel the concern that I've expressed.

CHAIRMAN KELIHER: Are there any thoughts on Ritchie's comments? David.

DR. PIERCE: Yes Ritchie, I've heard some of those similar remarks from the fishing industry regarding a difficulty in getting herring catch. At the same time I've also heard the fishermen just decided to fish on mackerel as opposed to herring; because the price was far better, so as a consequence there wasn't as much hunting for the herring and therefore it appeared that there were less herring. What the answer is I don't know. But nevertheless we have heard those concerns expressed.
I guess I'm influenced more so by the objectives that we've established for ourselves. I think Megan went over those, Renee or Megan, I forget who gave us those objectives. But one of the objectives was to maximize spawning coverage and access to the Area 1A quota. While I might be tempted to extend the spawning season, at the same time I've got to reflect on that objective.

So far it seems as if we're achieving that objective. Now with that said, we have a sea herring assessment scheduled for this spring. I think it's for this spring. I'm anxious to see what the assessment scientists have got for us relative to an update. Is it a benchmark or an update? If I may, it's benchmark? All right so this is a big deal.

This is a benchmark assessment. Therefore, we should know in the not too distant future the status of the stock; and if we get some real negative news, it might prompt us to do something different for this year. I think we would still have time to do something for this year. I'm not quite clear on the timing, but nevertheless we should have some insights.

At this point in time I don't support making a change. But I do support being very attentive to all the early work that goes into the benchmark assessment; because we're all privy to it one way or another, our staff is involved in it. Once we get that insight that may be early in the game, we can then decide what the best next step is for us; specific to reducing fishing mortality and increasing the protection for spawning herring.

CHAIRMAN KELIHER: Are there any additional comments in regards to Ritchie's original? Ray.

MR. RAYMOND W. KANE: Renee, you said that the spawning season can last up to 40 days?

MS. ZOBEL: Based on literature, yes. That is what we presented when we initially presented this model as well.

MR. KANE: That would be a six week spawning closure if we wanted to truly protect the spawning stock biomass.

MS. ZOBEL: On the far end, yes. As you can see, this year it was a 34 day spawning season, and after four weeks we now can reclose before opening, so that is what happened this year. Samples indicated spawning was ongoing so reclosure occurred. Yes effectively this year and many years it ends up being a six week closure.

MR. KANE: Just a comment. Ritchie, at the next meeting if you want to put a motion up I'll definitely support you.

CHAIRMAN KELIHER: Doug.

MR. GROUT: When we first adopted the addendum that put this process in place, one of the options was a six week spawning closure. The Section at that time agreed with a four week, as long as we had essentially an enhanced process for reclosing. I think the benefit of the four week versus six week is really for the industry; and being able to plan, although there is a drawback where you could potentially like in 2016, when you had a short spawning season, you could potentially close it longer than you had to. I think the real advantage, if we're going to move forward with this, might be coming forward with a more conservative GSI percentage that we're going to work with. Move it down to 25 or 24 or maybe even lower;

because then you might catch the early spawners more readily, if I am reading that correctly. That is sort of a question for Renee. Is that the way I'm reading it?

MS. ZOBEL: Yes you would catch earlier spawning fish. But if you maintained a four week closure, you would also likely be opening up on spawning fish, and have to reclose more frequently. That is the risk.

CHAIRMAN KELIHER: Are there any additional questions or comments? Seeing none; a potential Band-Aid that may be beneficial for this from a process standpoint is when we actually have samples that do not equal 100 or more fish in the individual sample. We had some instances where the industry was screaming, particularly at me, because of the fishery happening in eastern Maine when the samples were less than 100 fish.

At the time we had issues of collecting the samples, but also some damaged samples that for dissection purposes were not valid. I've talked to staff a little bit about this. One way to rectify this is to find a way for us to basically scale up; so if we had a sample of 90 or 91 fish that the TC could find a way to statistically scale up that sample so we could accept it, avoiding two or three or four days to collect another sample to be able to go through the process of closing.

One thought I had would be to task the TC to come up and develop that type of a system of scaling up, and bring it back to the Section at the May meeting, for us to utilize that for this upcoming fishing season. I would like some thoughts or comments on that. Doug.

MR. GROUT: I would support that concept, but I think we have with the TCs advice. You would almost have to have the 100 fish now as a target. But we would still have to have some kind of a minimum threshold for a sample. You would have to give confidence to the industry and to us.

CHAIRMAN KELIHER: Yes. I think from internal conversations with state staff, we still wouldn't want to go less than 90. The goal is always 100 fish or 100 fish sampled. But there have been times. The last closure we did for Mass/New Hampshire, I believe ended up being 95 or 96 fish that we all determined that we would accept for the closure.

I think just formalizing that making sure that we're getting that good advice from the Technical Committee, and then accepting it as a Section, as we deal with days out and dealing with the spawning closures would be appropriate. I see some heads nodding; so with that I think we can task the TC to look at that issue of scaling up.

We don't need a motion from that and they can kind of add it to their growing workload with the assessment coming up. With that thank you. That concludes conversations around spawning closures.

ADJOURNMENT

Is there any other business that needs to be brought before the Section? Seeing none; I would accept a motion to adjourn, motion to adjourn by Dennis Abbott, seconded by Ray. I think we have consensus, thank you very much that concludes the business of the Section.

(Whereupon the meeting adjourned at 2:00 o'clock p.m. on February 6, 2018)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Herring Section

FROM: Atlantic Herring Technical Committee

DATE: March 12, 2018

SUBJECT: Response to Section Task Regarding 100 Fish Samples

At their February 2018 meeting, the Atlantic Herring Section (Section) asked the Atlantic Herring Technical Committee (TC) to investigate a method of scaling-up samples of herring that are less than the required 100 fish minimum, as outlined in the spawning re-closure procedure. This task was prompted by concern that samples of herring greater than 90 fish but less than 100 fish are not considered when determining the need for a spawning re-closure.

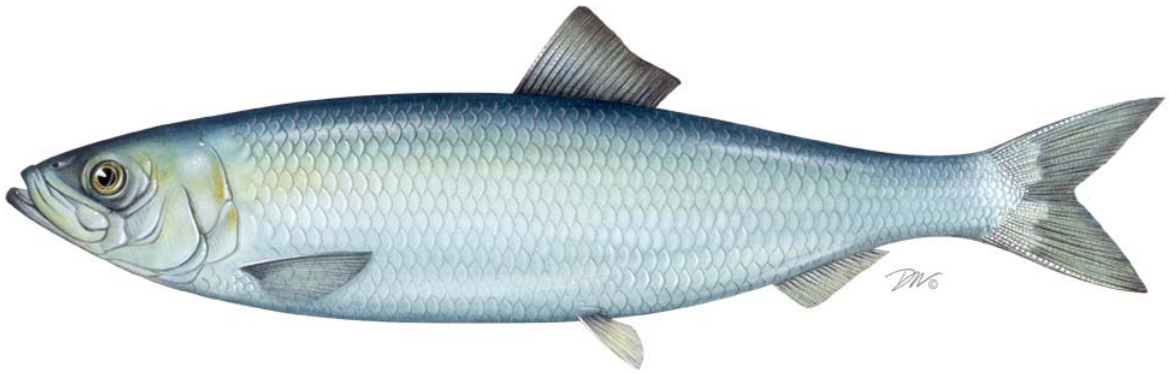
The TC met via conference call on March 9th to discuss this task. Overall, the TC noted that there are two requirements for a sample in the re-closure protocol: 1) the sample be a minimum of 100 randomly selected adult sized fish; and 2) the sample be comprised of a significant number of spawning herring, defined as 25% or more mature herring in a sample. Of these two requirements, the TC concluded that the second requirement to have 25% mature herring in a sample is the priority and should be met in every sample used to evaluate the need for a re-closure. For the first requirement, while the TC recommends the Section maintain a target of 100 fish per sample to ensure a robust protocol, the TC expressed comfort with a minimum baseline of 80 fish per sample, as long as 25% of those fish are mature herring. Since the TC recommends priority be given to the percent composition of the sample, no analysis is needed to scale-up a sample of herring less than 100 fish; the 25% can also be applied to a sample of less than 100 fish.

The TC does highlight that whether there is an 80 fish or 100 fish minimum requirement, a line must be drawn somewhere to define a sample. As a result, there will always be some samples which fall slightly short of the requirement. The TC also notes that the stipulations for a sample in the forecast system (as opposed to the re-closure protocol) are slightly different in that each sample must contain at least 25 female herring in gonadal stages III-V. At present, samples which contain less than 100 fish are included in the forecast system as long as they meet the 25 female fish requirement.

2018 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN FOR

ATLANTIC HERRING
(Clupea harengus)

2017 FISHING YEAR



Atlantic Herring Plan Review Team

Renee Zobel, New Hampshire Fish and Game
Melissa Smith, Maine Department of Marine Resources
Megan Ware, Atlantic States Marine Fisheries Commission

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I. Status of Fishery Management Plan

Date of FMP Approval	November 1993
Amendments	Amendment 1 (February 1999) Amendment 2 (March 2006) Amendment 3 (February 2016)
Addenda	Addendum I to Amendment 1 (July 2000) Technical Addendum #1A to Amendment I (October 2001) Addendum II to Amendment I (February 2002) Technical Addendum 1 to Amendment 2 (August 2006) Addendum I to Amendment 2 (March 2009) Addendum II to Amendment 2 (December 2010) Addendum V to Amendment 2 (October 2012) Addendum VI to Amendment 2 (August 2013) Addendum I to Amendment 3 (May 2017)
Management Unit	US waters of the northwest Atlantic Ocean from the shoreline to the seaward boundary of the Exclusive Economic Zone (East Coast of Maine), and from the US/Canadian border to the southern end of the species range (Cape Hatteras, North Carolina).
States With Declared Interest	Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, and New Jersey
Active Boards/Committees	Atlantic Herring Section, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, and Plan Review Team

Atlantic herring (*Clupea harengus*), also known as sea herring, are an oceanic fish that occur in large schools and undergo seasonal inshore-offshore migrations. Herring are important to the Northwest Atlantic ecosystem as a forage species and to the fishing industry as bait for lobster, blue crab, and tuna. To a lesser degree this resource also serves as a food, typically canned, pickled, or smoked. The U.S. Atlantic herring fishery is currently managed as a single stock through complementary plans by the Atlantic States Marine Fisheries Commission (ASMFC) and the New England Fishery Management Council (NEFMC).

The stockwide annual catch limit (ACL) is divided amongst four distinct management areas: inshore Gulf of Maine (Area 1A), offshore Gulf of Maine (Area 1B), Southern New England/Mid-Atlantic (Area 2), and Georges Bank (Area 3). The Area 1A fishery is managed by ASMFC's Atlantic Herring Section (Section), which includes representatives from Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York and New Jersey.

The 1993 ASMFC Atlantic Herring Fishery Management Plan (FMP) was implemented to address the growth of the herring resource and interest in Internal Waters Processing (IWP) operations. Amendment 1 to the FMP was developed to complement the goals and objectives of the NEFMC federal management plan. It established total allowable catch limits (TACs) for specific management areas. The Days Out program was established for state waters.

Addendum I (2000) redefined spawning areas in state waters. It also reduced the exploitation of herring spawning aggregations by imposing a limited landing restriction on herring caught in spawning areas (20% tolerance for spawn herring in Maine and Massachusetts). Technical Addendum #1A (October 2001) was approved to change the delineation of the Eastern Maine spawning area.

Addendum II (2002) was developed in conjunction with NEFMC's Framework Adjustment 1 to allocate the Management Area 1A TAC on a seasonal basis. This addendum also specified procedures to allocate the annual Internal Waters Processing (IWP) quota.

Amendment 2 (2006) to the FMP was developed to complement management measures in Amendment 1 to the federal FMP. Identical management area boundaries were adopted, in addition to a joint TAC specification setting process between NEFMC and ASMFC, and management area closure when 95% of the TAC is harvested. Technical Addendum I to Amendment 2 (2006) was developed to address inconsistent interpretation of the zero tolerance spawning provision.

Addendum I (2009) identified tools to address effort in Area 1A in order to maintain a steady supply of herring throughout the fishing season. States adjacent to Area 1A could set bi-monthly, trimester or seasonal quotas and roll the quota into later periods if there was under-harvest. It also required states to implement weekly reporting for timely quota management.

Addendum II (2010) was developed to complement Amendment 4 to the federal FMP. It revised the specifications process (sets measures for three-years) and terminology (e.g., TAC is now called ACL) to be consistent with federal management.

Addendum V (2012) compiled the previously approved spawning regulations into one document and revised the spawning sample provisions.

Addendum VI (2013) was developed to complement the NEFMC's Framework Adjustment 2 to the federal FMP. It established new provisions and consistent measures for the four management areas. States were allowed to seasonally split sub-ACLs for each management area, and up to 10% of unused sub-ACL could be carried over to the following fishing year (after data is available). Addendum VI also established new closure triggers: a directed fishery closes when 92% of an area's sub-ACL is projected to be reached, and the stock-wide fishery closes when 95% of the total ACL is projected to be reached.

Amendment 3 (2016) to the FMP consolidates prior amendments, addenda, and recent management decisions into a single document; it is now the comprehensive document for Atlantic herring management in state waters. The amendment refines the spawning closure system using a modified GSI-based spawning monitoring system. Additionally, the fixed gear set-aside is now available to fixed gear fishermen through December 31.

Addendum I to Amendment 3 was developed to stabilize the rate of catch in Area 1A and distribute the seasonal quota throughout Trimester 2 (June through September). The Addendum includes a variety of management tools which can be used by the Section, including weekly landings limits, restrictions on carrier vessels, vessel declaration requirements, and modifications to the 'days out' procedure for a variety of gear type and permit categories.

II. Status of the Stock

A benchmark stock assessment was published in 2012. An update was released in 2015 to incorporate data through 2014. Both assessments indicate the stock is not overfished and not experiencing overfishing. The next benchmark stock assessment is scheduled for review in 2018.

In the 2015 update, the maximum sustainable yield (MSY) based reference points were updated; the overfishing threshold is F_{MSY} = 0.24 and the overfished threshold is ½SSB_{MSY} = 342 million lbs. (155,573 mt). The 2015 update estimated fishing mortality to be 0.16 in 2014 and spawning stock biomass to be 1.3 billion lbs (623,000 mt). The 2012 age-1 recruitment was estimated to be the second largest in the time series and equaled 42.4 billion fish.

III. Status of the Fishery

There is an Atlantic herring fishery in the United States and Canada. The U.S. Atlantic herring fishery is controlled by annual catch limits (ACL) set by NOAA Fisheries. The stockwide ACL is distributed among the four management areas. Specifications are set every three years and adjusted annually to account for overages or underages from the previous fishing season. Once 92% of the sub-ACL for an area is reached, the respective fishery is closed. The stockwide fishery closes when 95% of the total ACL is projected to be reached. Following a closure, there is a 2,000 lb trip limit to allow for incidental bycatch of Atlantic herring for the remainder of the fishing year. In addition to quota-based closures, the "days out" and spawning closure programs provide additional measures to control fishing effort.

For the 2016-2018 fishing season, the Council and Commission set the ACL at 231 million pounds (104,800 mt), a 2.6% decrease from the 2013-2015 fishing limits. For all three years, the ACL is further subdivided by Atlantic herring management areas as follows: Area 1A = 66.79 million pounds, Area 1B = 9.9 million pounds, Area 2 = 64.1 million pounds, and Area 3 = 90.16 million pounds. The Area 1A sub-ACL is distributed seasonally with 72.8% available from June 1-September 30 and 27.2% available from October 1-December 31. Underages from June through September may be rolled into the October through December period.

The domestic Atlantic herring fishery is predominantly commercial; recreational catch accounts for less than 1% of landings. Over the time series of 1965 to 2017, annual landings by the United States Atlantic herring fleet generally increased and averaged roughly 131.4 million pounds (59,612 mt). Landings reached the lowest level in 1983, at 51.263 million pounds (23,253 mt), and peaked in 2006 at 268.533 million pounds (121,804 mt).

Catch, in metric tons, from Area 1A is shown in Table 1. Preliminary information from 2017 indicates that 29,164 mt were caught in Area 1A, representing 90.9% of the sub-ACL. Since a directed fishery closes when 92% of an area's sub-ACL is projected to be reached, there was no closure in the Area 1A fishery in 2017.

Table 1: Area 1A catch, sub-ACL, and associated directed fishery closures from 2013-2017. Source of catch information: NOAA Fisheries Atlantic Herring Fishery Monitoring

Year	Sub-ACL (mt)	Catch (mt)	% Utilized	Sub-ACL Closure
2013	29,775	29,820	100%	Oct-15
2014	33,031	33,428	101%	Oct-26
2015	30,580	29,406	96%	Nov-2
2016	30,524	27,826	91.2%	Oct-18
2017	32,083	29,164**	90.9%**	NA

**Preliminary landings data

2017 Fishing Season

Based on preliminary data provided in state compliance reports, Maine and Massachusetts accounted for 89.4% of the commercial Atlantic herring landings in 2017 (Table 2). Landings generally decreased across the states with the largest decreases occurring in Rhode Island (52% reduction from 2016) and Massachusetts (33% reduction from 2016). The states of New Hampshire and New York did see noticeable increases in landings in 2017, with New Hampshire reporting a 32-fold increase in landings from 2016.

Table 2. 2017 commercial landings by state and percent of total harvest. 2017 landings data is considered preliminary at this time. Source: State compliance reports.

	Commercial Landings (lbs)	**Percent of Total**
ME	61,204,733	59.1%
NH	2,789,406	2.7%
MA	31,357,614	30.3%
RI	4,535,139	4.4%
CT	40,370	0.0%
NY	81,148	0.1%
NJ	3,491,640	3.4%

Table 3 outlines the 'days out' program and effort control measures which were implemented in Area 1A. Based on the accelerated landings of Area 1A quota during Trimester 2 in both 2015

and 2016, and the adoption of Addendum I, the original landing schedule for Area 1A was established at 3 days a week for vessels with a Category A permit. This was subsequently increased to 4, then 5, and then 7 days as it became clear that landings were occurring at a slower pace than the two previous years. Several industry observations indicated that fish were exhibiting atypical behavior and thus were harder to catch. Weekly landings limits for Category A permits likewise increased throughout Trimester 2. On October 1, a 3 days consecutive landings limit was implemented for Trimester 3. This was increased to 7 days once it became clear that landings were below the sub-ACL for Area 1A. Trimester 3 landings continued well into December, creating a longer season than the previous two years (see Table 1).

Table 3: 2017 'days out' program for trimester 2 and 3 in Area 1A.

Trimester	Date Effective	Consecutive Landing Days for Category A Permit	Weekly Landings Limit for Category A Permit	Poundage that can be Transferred to a Carrier Vessel
2	June 1, 2017	3	400,000	80,000
	July 2, 2017	4	600,000	80,000
	July 30, 2017	5	680,000	120,000
	September 17, 2017	7	1,000,000	120,000
3	October 1, 2017	3	NA	NA
	December 18, 2017	7	NA	NA

Spawning Area Closures

The Atlantic Herring Area 1A (inshore Gulf of Maine) fishery regulations include seasonal spawning closures for portions of state and federal waters in Eastern Maine, Western Maine and Massachusetts/New Hampshire. In 2017, the Commission's Atlantic Herring Section permanently implemented the GSI_{30} Based Forecast System for spawning closures in Area 1A. This forecasting method relies upon at least three samples, each containing at least 25 female herring in gonadal stages III-V, to trigger a spawning closure. If sufficient samples are not available, the spawning closure occurs on the default dates outlined in Amendment 3. Prior to 2017, the GSI_{30} spawning protocol had been implemented as a 1-year pilot program in 2016.

The Eastern Maine spawning area closed on the default date of August 28th through September 24th, given there was a single sample from the area at the time. The Eastern Maine spawning closure was extended for two additional weeks, closing October 16th through October 30th, after samples indicated a significant number of spawning herring.

In Western Maine, four samples were collected throughout the summer, allowing the GSI_{30} forecasting model to project a spawning closure starting on September 26th. The closure lasted through October 24th and there was no re-closure in the Western Maine area.

Finally, the Massachusetts/New Hampshire spawning closure began October 1st and continued through October 28th, based on forecasting produced from 15 samples. The closure was extended two additional weeks (October 29th through November 11th) after samples indicated a significant number of spawning herring in the area.

IV. Status of Research and Monitoring

Under Amendment 3, states are not required to conduct fishery independent surveys for Atlantic herring. However, state survey programs designed to catch other species may encounter herring regularly, so some states do collect biological information on Atlantic herring. A summary of these surveys results follow.

Maine and New Hampshire: The states jointly operate an inshore bottom trawl survey in the spring and fall that is designed to catch groundfish, but regularly encounters Atlantic herring. Data from the 2017 survey was not available in time for inclusion in the compliance reports; however, data from 2000-2016 show variance in both the number and weight of Atlantic herring per tow across years.

Maine Department of Marine Resources also conducts commercial portside catch sampling. In 2017, 96 sampling events occurred, covering purse seine, mid-water trawl, and small-mesh bottom trips.

New Hampshire Fish and Game Department also conducts a juvenile finfish seine survey in the Great Bay, its tributaries, and other coastal harbors. In 2017, 690 Atlantic herring were observed during the months of June and July.

In 2015, **Massachusetts** Division of Marine Fisheries and UMass-Dartmouth School for Marine Science and Technology (SMAST) applied for the 2016-2018 Atlantic herring Research Set-Aside (RSA), and were awarded the majority of RSA quota. Portside sampling and the River Herring Bycatch Avoidance program were conducted with both the midwater trawl (MWT) fishery (primarily operating out of Massachusetts ports) and the small mesh bottom trawl (SMBT) fishery (primarily operating out of Rhode Island ports). Due to a lack of funds and staffing, portside sampling and bycatch avoidance program with the small-mesh bottom trawl fishery operating out of Rhode Island was discontinued.

The primary goal of the River Herring Bycatch Avoidance program is to characterize the landings of vessels and advise the fleets of river herring bycatch, in an effort to minimize bycatch independent of management actions. The 2017 harvest of Area 1A quota was delayed due to spawning closure extensions, days-out restrictions, and a shift in target species to mackerel, resulting in less than 100% of the quota harvested. As a result, no RSA compensation trips were conducted in Area 1A, and zero of the 909 metric tons of Area 1A RSA herring quota was caught.

MarineFisheries sampled the Massachusetts MWT fishery, including herring and mackerel landings, at 36% (41 of 114) by trip and 41.5% (7,331 of 17,657 mt) by weight, in 2017. Data from an additional 21 Northeast Fisheries Observer Program (NEFOP) trips and one Maine DMR portside sampled trip landed in MA were incorporated into the bycatch avoidance program. Thus, combined landings coverage of 61.3% was achieved in 2017.

Rhode Island Division of Fish & Wildlife conducts a Seasonal Trawl Survey to develop abundance indices for Atlantic herring. Atlantic herring are mostly observed in the late fall and spring in the RIDFW seasonal trawl survey. Monitoring for 2017 suggested a decrease in the relative biomass and abundance of Atlantic herring in Rhode Island waters. An average of 1.28 kg/tow of Atlantic herring was observed in 2017, lower than the 2.72 kg/tow observed during 2016. Similarly, the Atlantic herring abundance index derived from the trawl data decreased from 135.12 fish/tow in 2016 to 84.65 fish/tow in 2017.

Connecticut Department of Energy and Environmental Protection monitors Atlantic herring through the Long Island Sound Trawl Survey (LISTS), which is conducted each spring and fall since 1984. The Long Island Sound Trawl Survey spring index for 2017 was 0.11 fish/tow or about 92% less than the average of the previous ten years (1.46 fish/tow), and was second lowest in the time series (1984-2017). LISTS 2017 spring abundance was low due in part to the survey missing April sampling. Most of LISTS catches occur in the month of April, prior to herring leaving the Sound. Warming water temperatures in Long Island Sound particularly have affected the timing of Atlantic herring leaving the Sound and Survey catches.

New York has *de minimis* status and does not conduct directed monitoring of Atlantic herring.

New Jersey Division of Fish and Wildlife monitors Atlantic herring through the New Jersey Ocean Trawl Survey, which collects samples during five surveys conducted throughout the year between Sandy Hook, NJ and Cape Henlopen, Delaware. In 2017, 683.6 pounds (5,609 individuals) of Atlantic Herring were caught in the ocean trawl surveys.

V. Status of Assessment Advice

The following research recommendations were included in the 2012 benchmark stock assessment. The 2015 stock assessment update did not provide additional research recommendations.

Research Recommendations from the 54th Northeast Region Stock Assessment for Atlantic Herring (2012)

a. More extensive stock composition sampling including all stocks (i.e. Scotian Shelf).
b. Develop (simple) methods to partition stocks in mixed stock fisheries.
c. More extensive monitoring of spawning components.
d. Analyze diet composition of archived mammal stomachs and sea bird stomachs. Improve knowledge on prey size selectivity of mammals and sea birds.
e. Consider alternative sampling methods such as HabCam.

f. Research depth preferences of herring.
g. Simulation study to evaluate ways in which various time series can be evaluated and folded into model.
h. Evaluate use of Length-based models (Stock Synthesis and Chen model)
i. Develop indices at age from shrimp survey samples
j. Evaluate prey field to determine what other prey species are available to the predators that could explain some of the annual trends in herring consumption.
k. Develop statistical comparison of consumption estimates and biomass from model M.
l. Consider information on consumption from other sources (i.e. striped bass in other areas) and predators inshore of the survey.
m. Investigate why small herring are not found in the stomachs of predators in the NEFSC food habits database.
n. Develop an industry-based LPUE or some other abundance index (Industry Based Survey).
o. Develop objective criteria for inclusion of novel data streams (consumption, acoustic, larval, etc) and how can this be applied.

VI. Management Measures and Issues

Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring lists the following state regulatory requirements:

1. Each jurisdiction shall prohibit the landing of herring when the management area sub-ACL has been attained.
2. Vessels are prohibited from landing more than 2,000 lbs. of Atlantic herring from Area 1A when the fishery is closed, during a 'day out' or during spawning closures.
3. Jurisdictions will close the directed fishery when 92% of a management area's sub-ACL is projected to be harvested.
4. Each jurisdiction must enact spawning area restrictions that are at least as restrictive as those in Section 4.2.6.
5. States adjacent to Area 1A will implement days out restrictions as identified in Section 4.2.4.1.
6. States are required to implement weekly reporting by all non-federally permitted fishermen on Atlantic herring (including mobile and fixed gear).
7. Any herring vessel transiting a management area that is under a herring spawning closure or a 'day out' must have all of its fishing gear stowed.
8. The harvest of herring for the primary purpose of reduction to meal or meal-like product is prohibited.
9. Internal Water Processing operations will be prohibited from processing herring caught in all state waters.

VII. PRT Recommendations

State Compliance

All states with a declared interest in the management of Atlantic herring have submitted compliance reports and have regulations in place that meet or exceed the requirements of the Interstate Fisheries Management Plan for Atlantic herring as described in Amendment 3.

Request for *De Minimis* Status

A state may be eligible for *de minimis* status if its combined average of the last three years of commercial landings (by weight) constitute less than one percent of the coastwide commercial landings for the same three-year period.

New York has requested and met the requirements for *de minimis* status in 2018. The state's 2015-2017 combined average commercial landings (96,876 pounds) is less than 1% of coastwide commercial landings during the same three year period.

Research and Monitoring Recommendations

In addition to the research recommendations outlined in the 2012 stock assessment, the PDT also recommends the following research priorities.

<u>Fishery-Dependent Priorities</u>

High

- Investigate bycatch and discards in the directed herring fishery through both at sea and portside sampling.
- Continue commercial catch sampling of Atlantic herring fisheries according to ACCSP protocols

<u>Fishery-Independent Priorities</u>

High

- Expand monitoring of spawning components.

Low

- Continue to utilize the inshore and offshore hydroacoustic and trawl surveys to provide a fishery-independent estimation of stock sizes. Collaborative work between NMFS, DFO, state agencies, and the herring industry on acoustic surveys for herring should continue to be encouraged.

<u>Modeling / Quantitative Priorities</u>

Moderate

- Conduct simulation studies to evaluate ways in which various time series can be evaluated and folded into the assessment model.
- Develop new approaches to estimating recruitment (i.e., juvenile abundance) from fishery-independent data.
- Examine the possible effects of density dependence (e.g., reduced growth rates at high population size) on parameter estimates used in assessments.

Low

- Conduct a retrospective analysis of herring larval and assessment data to determine the role larval data plays in anticipating stock collapse and as a tuning index in the age structured assessment.
- Investigate the M rate assumed for all ages, the use of CPUE tuning indices, and the use of NEFSC fall bottom trawl survey tuning indices in the analytical assessment of herring.

Life History, Biological, and Habitat Priorities

Moderate

- Continue tagging and morphometric studies to explore uncertainties in stock structure and the impacts of harvest mortality on different components of the stock. Although tagging studies may be problematic for assessing survivorship for a species like herring, they may be helpful in identifying the stock components and the proportion of these components taken in the fishery on a seasonal basis.

Low

- Research depth preferences of herring.

Management, Law Enforcement, and Socioeconomic Priorities

High

- Continue to organize annual US-Canadian workshops to coordinate stock assessment activities and optimize cooperation in management approaches between the two countries.

Moderate

- Develop a strategy for assessing individual spawning components to better manage heavily exploited portion(s) of the stock complex, particularly the Gulf of Maine inshore spawning component.
- Develop socioeconomic analyses appropriate to the determination of optimum yield.

Low

- Develop economic analyses necessary to evaluate the costs and benefits associated with different segments of the industry.

XI. Figures

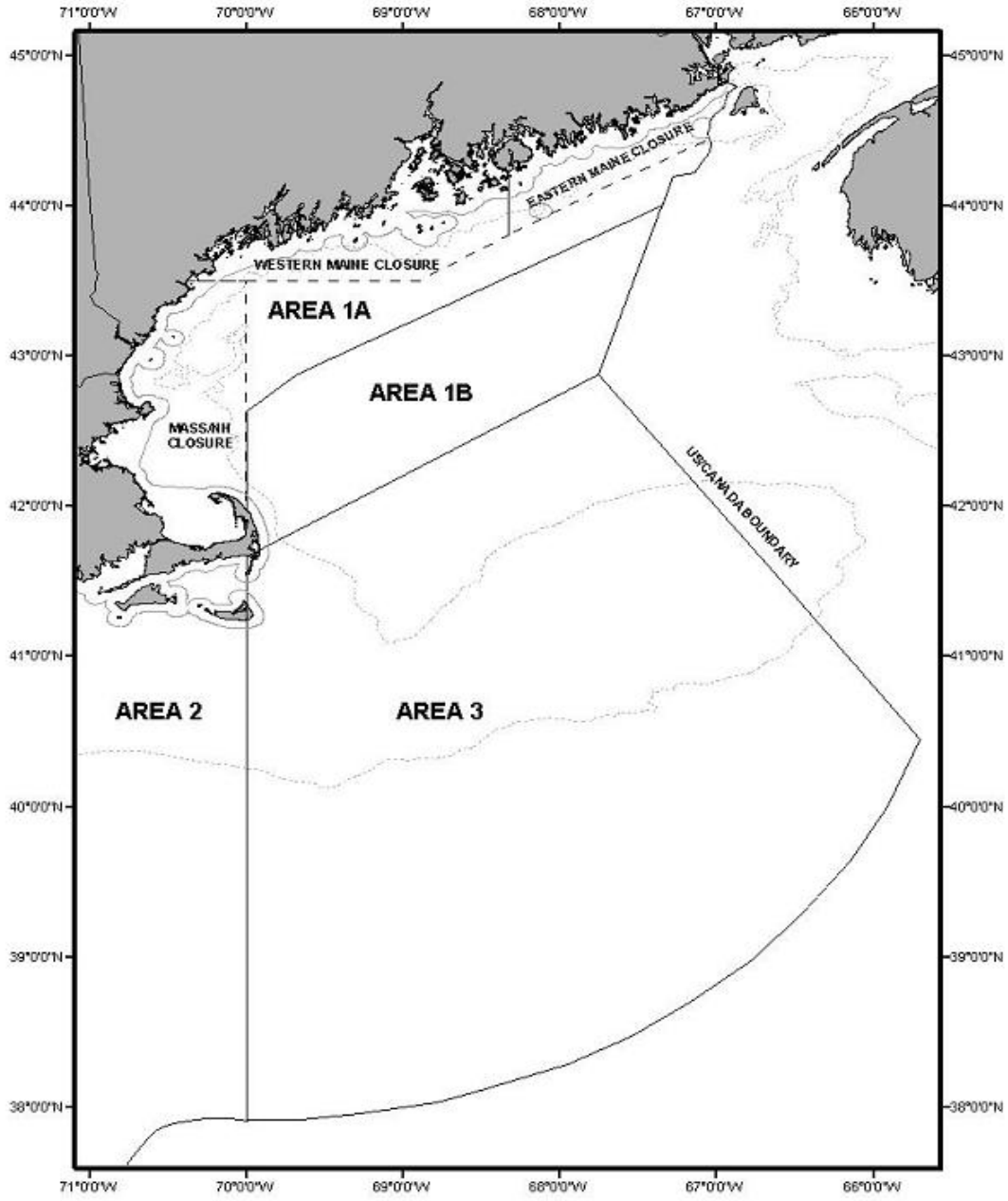

Figure 1. Map of Atlantic herring management areas with boundaries and the three spawning areas are within Area 1A, the inshore region of Gulf of Maine.

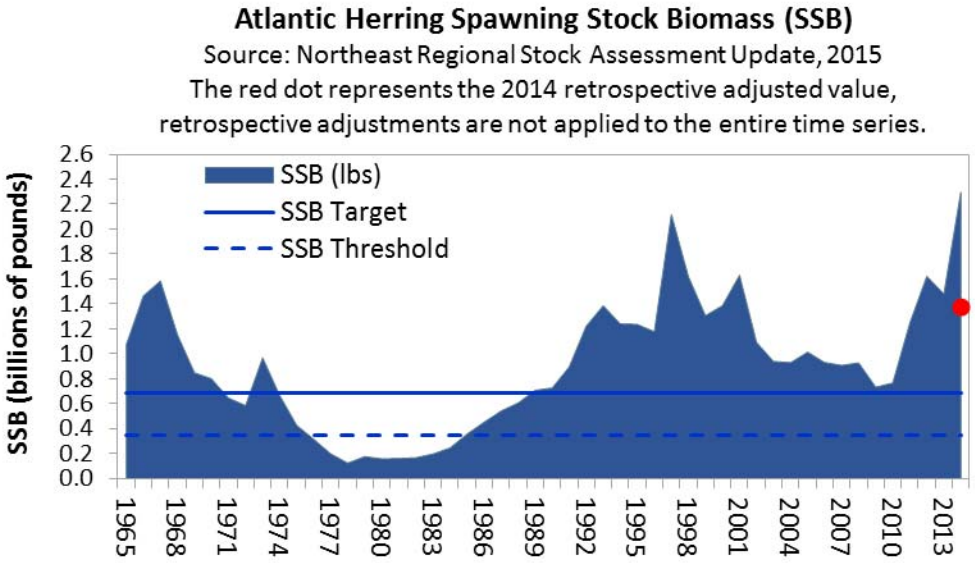

Figure 2. Spawning stock biomass from 1965 to 2014.

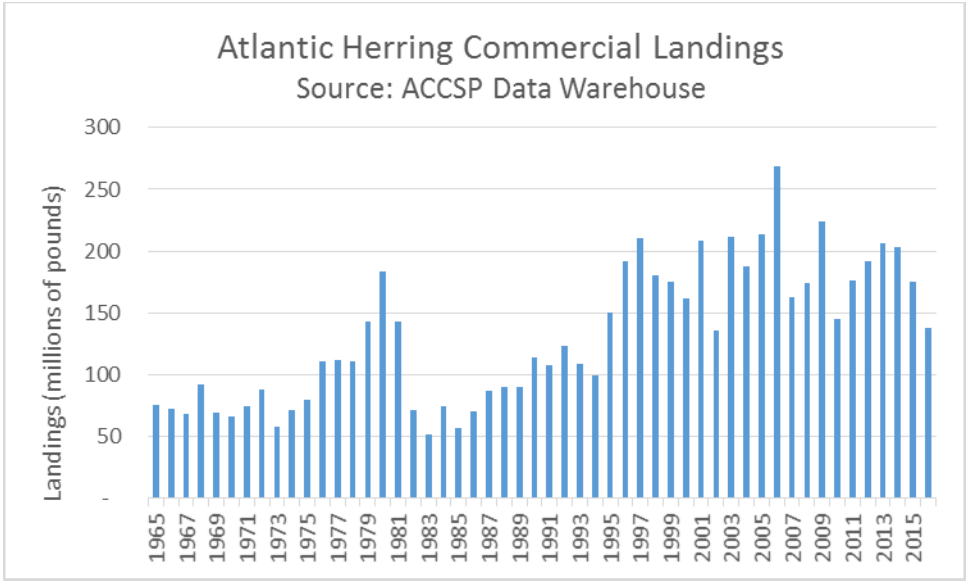

Figure 3. Commercial Atlantic herring landings by the U.S. fleet from 1965-2016

Atlantic States Marine Fisheries Commission

Northern Shrimp Section

May 1, 2018
4:00 – 5:00 p.m.
Arlington, Virginia

This meeting will be available to the public via conference call. Information to connect to the telephone line are below:
Telephone: 1-888-394-8197, passcode: 499811

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(S. Train)*	4:00 p.m.
2. Section Consent • Approval of Agenda	4:00 p.m.
3. Public Comment	4:05 p.m.
4. Discuss Potential Inclusion of a Second Management Issue in Draft Addendum I to Extend Current Fishing Season Range in FMP	4:15 p.m.
5. Other Business/Adjourn	5:00 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

t nt c St te r ne F er e omm on

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

TO: Northern Shrimp Section

FROM: Megan Ware, FMP Coordinator

DATE: April 13, 2018

SUBJECT: Briefing Document for Discussion on Northern Shrimp Fishing Season

At their May 1st meeting, the Northern Shrimp Section is scheduled to discuss the potential of adding a second issue to Draft Addendum I. This second issue would consider extending the current fishing season in order to provide a greater opportunity for fishermen to harvest age 4-5 shrimp which have already dropped their eggs. The following memo provides information on the timing of egg hatch, recent fishing seasons, and migration patterns. It is intended to synthesize applicable information ahead of the Section's discussion.

Current Fishing Season

Per Amendment 3, the Section may establish a fishing season to occur anytime between December 1 and May 31.

Egg Hatch Timing and Duration

The timing of northern shrimp egg hatch varies annually, but typically occurs in the months of February and March. Figure 1 shows the timing and duration of egg hatch in the Gulf of Maine, based on the day of year. In 2015 and 2016, most of the female shrimp were still carrying eggs in late January and early February, but had hatched off their eggs by the middle of March. In 2017, the egg hatch midpoint was February 21, earlier than 2015-2016 but still within the historical time series range. With the exception of a few years, the figure does show that, on average, egg hatch in the Gulf of Maine is typically 90% complete around the 80th day of the year (~March 20th). For reference, May 31st is the 151st day of the year.

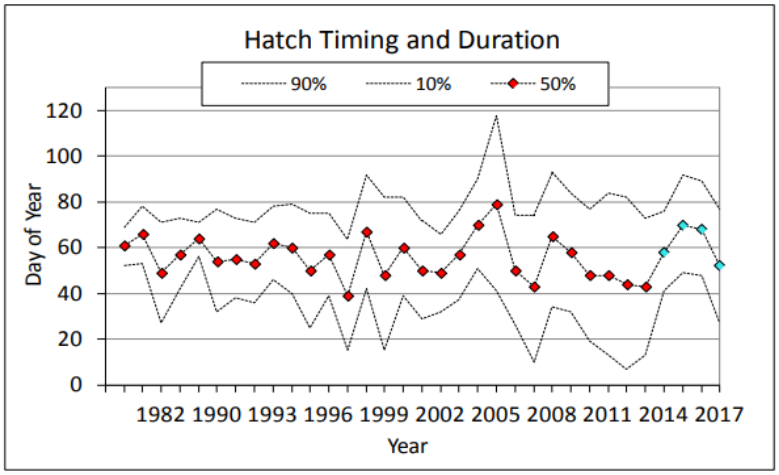

Figure 1: Timing and duration of egg hatch for Gulf of Maine northern shrimp. Turquoise points indicate winter sampling done by the states while the fishery was closed. (Source: 2017 Stock Status Report)

The timing of egg hatch can exhibit regional trends, with hatch typically beginning earlier in the western Gulf of Maine and later in the eastern Gulf of Maine. Using 2017 as a case study, samples taken on trawl vessels show that the approximate day of the year corresponding with 50% egg hatch was day 36 in Massachusetts, day 47 in western Maine, and day 58 in eastern Maine.

Distribution of Landings by Month and Season

The harvest of Gulf of Maine northern shrimp has typically occurred in late winter, with some catch reported in early spring. Table 1 shows the catch, in metric tons, of northern shrimp by fishing year, state, and month. Given management action can impact the timing and magnitude of harvest, the fishing season and landing day restrictions are also listed. The table includes information from 2006 through 2013, and does not include more recent years given the moratorium in the fishery.

Table 1: Distribution of landings (metric tons) in the Gulf of Maine northern shrimp fishery by fishing year, state, and month (2006-2013). (Source: 2017 Stock Status Report[1])

	Dec	Jan	Feb	Mar	Apr	May	Other	Season Total
2006 Season, 140 days, Dec 12 - Apr 30								
Maine	144.2	691.6	896.9	350.8	118.0			2,201.6
Mass.	conf	conf	30.0	conf	conf			30.0
N.H.	3.4	27.9	9.6	50.3	conf			91.1
Total	147.6	719.5	936.5	401.1	118.0	0.0	0.0	2,322.7
2007 Season, 151 days, Dec 1 - Apr 30								
Maine	761.9	1,480.5	1,590.4	481.9	154.2	0.4	0.03	4,469.3
Mass.	conf	27.5	conf	conf				27.5
N.H.	52.5	222.6	81.6	26.1	conf			382.9
Total	814.4	1,730.6	1,672.0	508.1	154.2	0.4	0.0	4,879.7
2008 Season, 152 days, Dec 1 - Apr 30								
Maine	408.6	1,053.6	2,020.4	983.8	49.3		0.1	4,515.8
Mass.	conf	conf	15.4	14.5				29.9
N.H.	94.2	123.7	161.6	37.4	conf			416.8
Total	502.7	1,177.3	2,197.3	1,035.7	49.3	0.0	0.1	4,962.4
2009 Season, 180 days, Dec 1 - May 29								
Maine	134.6	595.9	988.2	560.1	34.9	1.8	0.2	2,315.7
Mass.& NH	conf	112.9	72.6	conf	conf			185.6
Total	134.6	708.8	1,060.8	560.1	34.9	1.8	0.2	2,501.2
2010 Season, 156 days, Dec 1 - May 5								
Maine	264.1	1,689.2	2,956.0	524.3	254.4	33.0	0.4	5,721.44
Mass.	conf	16.9	18.2	conf	conf			35.1
N.H.	112.8	152.4	200.0	14.2	27.4	conf		506.8
Total	376.9	1,858.6	3,174.2	538.5	281.8	33.0	0.4	6,263.3
2011 Season, 90 days, Dec 1 - Feb 28								
Maine	722.7	2,572.2	2,274.3	0.5				5,569.7
Mass.	20.8	100.9	74.7					196.4
N.H.	93.1	304.0	234.4					631.46
Total	836.6	2,977.0	2,583.4	0.5	0.0	0.0	0.0	6,397.5
2012 Season, Trawling Mon,Wed,Fri, Jan 2- Feb 17 (21 days); Trapping Feb 1-17 (17 days)								
Maine	0.5	1,130.6	1,088.2	0.5				2,219.9
Mass.		58.4	19.4					77.8
N.H.		119.2	68.6					187.8
Total	0.5	1,308.2	1,176.2	0.5	0.0	0.0	0.0	2,485.4
2013 Season, Trawling 3 to 7 days/wk, Jan 23 - Apr 12 (54 days); Trapping 6 or 7 days/wk, Feb 5 - Apr 12 (62 days								
Maine		64.9	179.7	42.5	2.6			289.7
Mass.		5.3	8.9	4.7				18.9
N.H.		13.8	16.3	6.9	conf			36.9
Total	0.0	84.0	204.9	54.1	2.6	0.0	0.0	345.5

[1] Atlantic States Marine Fisheries Commissioner. 2017 Stock Status Report for Gulf of Maine Northern Shrimp *(Pandalus borealis).* http://www.asmfc.org/uploads/file/5a1deb972017NorthernShrimpAssessment_Final.pdf

Spawning and Migration Patterns of Northern Shrimp

Female northern shrimp exhibit seasonal migration patterns, in which they move inshore during the fall and winter months, and return offshore in the spring and summer months. Females typically extrude eggs in the early fall before they migrate inshore in the late autumn to hatch their eggs. Once the eggs are hatched (see above: *Egg Hatch Timing and Duration*), females can migrate back offshore to rejoin the younger males and repeat the spawning process. Juveniles often remain in coastal waters for a year or more before migrating to offshore waters, where they mature as males. Spawning between males and females typically takes place in offshore waters, beginning in July. (Source: 2017 Stock Status Report)

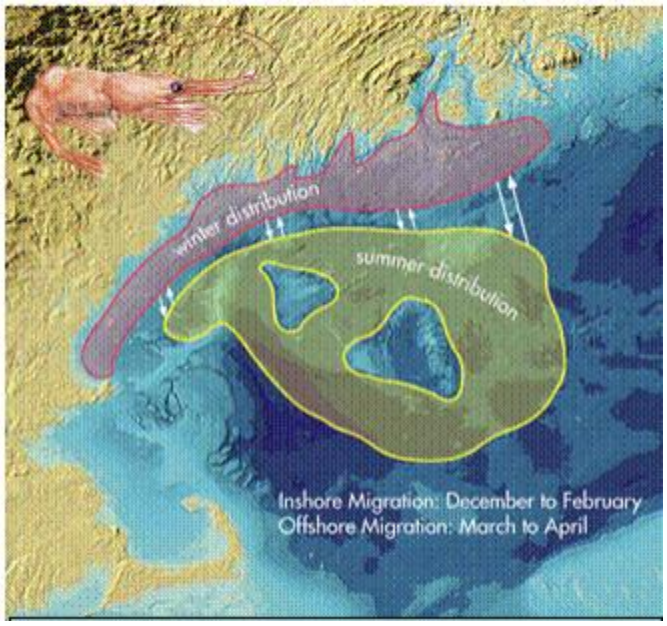

Figure 2: Distribution of adult female northern shrimp. (Source: North Atlantic Marine Alliance, 2006)[2]

[2] North Atlantic Marine Alliance (NAMA). 2006. Ecosystem relationships in the Gulf of Maine — combined expert knowledge of fishermen and scientists. NAMA Collaborative Report 1:1–16, 2006.

Atlantic Coastal Cooperative Statistics Program
1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201
703.842.0780 | 703.842.0779 (fax) | www.accsp.org

Atlantic Coastal Cooperative Statistics Program Coordinating Council
In-person Meeting
May 1, 2018 | 4:00 pm
The Westin Crystal City, 1800 S. Eads St, Arlington, VA
Calendar Link:
https://safis.accsp.org:8443/accsp_prod/f?p=552:15:::NO:15:P15_CAL_ID_1:2128

DRAFT AGENDA

1. Welcome/Introductions – Coordinating Council Chair Lynn Fegley

2. Public Comment – L. Fegley

3. Committee Consent – L. Fegley
    a. Approval of Agenda (Attachment I) – **ACTION**
    b. Approval of Minutes from October 2017 (Attachment II) – **ACTION**

4. ACCSP Status Report
    a. Program Status – M. Cahall
    b. Committee Updates – A. Dukes

5. Review and Consider Approval of FY19 Request for Proposals – M. Cahall (Attachment III) – **ACTION**

6. Accountability Standards – L. Fegley

7. Other Business

8. Adjourn – L. Fegley

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Atlantic Coastal Cooperative Statistics Program Coordinating Council Meeting
In-person Meeting
October 17, 2017 | 4:45 pm
Waterside Marriott Hotel, 235 East Main Street, Norfolk, VA
https://safis.accsp.org:8443/accsp_prod/f?p=552:15:::NO:15:P15_CAL_ID_1:1902

DRAFT MEETING MINUTES

COMMITTEE MEMBERS IN ATTENDANCE

Name	Partner	Phone	Email
Mark Alexander	CT DEEP	(860) 434-6043	mark.alexander@ct.gov
Tom Baum	NJ DFW	(609) 748-2020	tom.baum@dep.nj.gov
Bob Beal	ASMFC	(703) 842-0740	rbeal@asmfc.org
Robert Boyles (Chair)	SC DNR	(843) 953-9304	boylesr@dnr.sc.gov
John Carmichael	SAFMC	(843) 571-4366	john.carmichael@safmc.net
Joe Cimino	VMRC	(757) 247-2237	joe.cimino@mrc.virginia.gov
John Clark (Proxy)	DE DFW	(302) 739-9108	john.clark@state.de.us
Michelle Duval (Proxy)	NC DMF	(252) 808-8011	michelle.duval@ncdenr.gov
Jim Estes (Proxy)	FL FWCC	(850) 617-9622	jim.estes@myfwc.com
Lynn Fegley (Vice Chair)	MD DNR	(410) 260-8285	lynn.fegley@maryland.gov
Martin Gary	PRFC	(804) 224-7148	martingary.prfc@gmail.com
Patrick Geer	GA DNR	(912) 264-7218	pat.geer@dnr.state.ga.us
Jim Gilmore	NYS DEC	(631) 444-0430	james.gilmore@dec.ny.gov
Alan Lowther	NOAA S&T	(301) 427-8154	alan.lowther@noaa.gov
Jason McNamee (Proxy)	RI DEM	(401) 423-1943	jason.mcnamee@dem.ri.gov
Brandon Muffley	MAFMC	(302) 526-5260	bmuffley@mafmc.org
Derek Orner (Proxy)	NOAA	(301) 427-8567	derek.orner@noaa.gov
Cheri Patterson (Proxy)	NH FGD	(603) 868-1095	cheri.patterson@wildlife.nh.gov
Sherry White	US FWS	(413)-253-8500	Sherry_White@fws.gov

Committee Members Not in Attendance: P. Keliher (ME DMR), B. King (DC FWD), D. Pierce (MA DMF), A. Shiels (PFBC)

Others in Attendance

Name	Title	Partner	Phone	Email
Thad Altman	Legislative Appointee	FL FWCC	(321) 409-2022	Thad.Altman@myfloridahouse.gov

Welcome and Introductions (Chair R. Boyles)

The Atlantic Coastal Cooperative Statistics Program Coordinating Council of the Atlantic States Marine Fisheries Commission convened in the Hampton Roads Ballroom V of the Marriott Waterside Hotel, Norfolk, Virginia, October 17, 2017, and was called to order at 4:30 o'clock p.m. by Chairman Robert H. Boyles, Jr.

Review and Approve Agenda (R. Boyles) – Attachment I

CHAIRMAN ROBERT H. BOYLES, JR.: Good afternoon everybody. I would like to call to order the meeting of the ACCSP Coordinating Council. My name is Robert Boyles; I've had the privilege of serving as Chairman of the Coordinating Council. Our first order of business is to seek your consent on the agenda; which was mailed out with the briefing materials.

I would point out that there was a social and economic data standards update that Ray Rhodes, my Sandlapper counterpart was to give. I think Mike is going to cover that under Committee Updates. Are there any other changes to the agenda, additions to the agenda? I see none; the agenda will be adopted by consent.

Public Comment (R. Boyles)

Next on the agenda, I dare somebody to come to the microphone and make a public comment. I'm sorry; I've always wanted to say that. I don't really mean that. It is the time on the agenda for the public who would like to address the Coordinating Council to make those comments; particularly if there are items that are not on the agenda. I'm a little saucy and spicy today you all, what can I say? Seeing no public comment; we'll move on next to status reports and turn it over to Mike.

Review and Approve August Meeting Minutes (R. Boyles) – Attachment II

The next item is approval of proceedings from our last meeting in August, 2017, again which were included in the briefing materials. Are there any additions or edits to those minutes? Seeing none; any objection to adopting those minutes as submitted? Then the minutes are adopted by consent.

ACCSP Status Report (M. Cahall) – Attachment III

- **Program Updates**

MR. MIKE CAHALL: We're going to go ahead and start with the bad news; which is that SAFIS suffered its longest outage in its history about three weeks ago. We were down for the better part of 36 hours, along with the rest of the Commission. We had a failure of the local loopback circuit of our internet provider, which has incidentally been the sole source of systems failure since we moved.

Needless to say, any of you who have tried to do battle with Verizon can understand how that is. What we're going to do is we're moving forward to implement a redundant internet connection using cable; believe it or not. It looks like what we're going to be doing is our hardware will already do the load balancing and automatic fail over. We're going to go ahead and install the second line going in through a relatively inexpensive Comcast cable line. We would enjoy significantly reduced performance; but at least we wouldn't be down for the period of time that we have problems. Our single source of failure for our internet connectivity has been consistently the Verizon local loopback; which is the last bit of this fiber network that we're connected to. It's allegedly state of the art, but it's also been by far and away the most problematic thing that we've had with the database system.

Moving on, we've got a couple of pilots that are wrapping up. The South Atlantic Fisheries Management Council pilot is wrapping up. It's been fairly successful, we think. The Council has asked us to go ahead and hold that pilot over and expand it; so that on January 1, hopefully we will be able to open that up to any of the permitted South Atlantic for-hire folks who want to use it, in order for them to continue it in an expanded pilot.

Also the South Carolina for-hire electronic trip reporting validation pilot is wrapping up. I believe the report is being written almost as we speak. The purpose of that pilot again, was to look at making sure that the data that we were actually collecting from these reports corresponded to reality; and also working on the math that would be required to potentially expand that sample.

Both of those pilots I think went relatively well. We've learned a great deal about both of them; in both of the areas. I think that we're going to be well informed as we move forward; especially with the potential expansions of the system. We did have the initial SAFIS design meeting about two weeks ago. It was very well attended.

We discussed in a good bit of depth the direction the system should be going in; reviewed the vision that we have for the system, as well as a ten-year vision, and also some general design principals. Eventually you all will be seeing the products from that group as they push through out process.

We are going to be reviewing the documents; putting them then to the IS Committee, and eventually they'll reach you. The intention here is for these documents to serve as guidance for the development effort. Just for your reference, this is a funded project through FIS, so we do have funds available to go ahead and do it.

I think, just to step back for a minute, the main point of the redesign is not to completely change the system as it is to streamline it, to homogenize it, to straighten out for lack of a better way to describe it, some of the curves that we've had to put into the system over the years, so that the design is a little bit more straightforward, and is more flexible.

We know that the demands on the system are going to continue to increase; and it's our goal to make it as flexible as possible. An example might be, I've got Lynn sitting right here, an example might be building the data feed to their system, which is collecting the majority of for-hire data in Maryland.

We would very much like to have facts feeding the SAFIS system in real time; so those data are made available to everyone that might need it. It's the kind of thing we're looking forward to doing in the future. As I talked a little bit before, we are also working with the Mid-Atlantic Council for their

mandatory electronic for-hire reporting. This is for all Mid-Atlantic species, and the regulations will be going into effect in March of 2018. We have sewed up the help desk, thanks to the funding that we received last year, and are working through the issues with GARFO and the Mid-Atlantic to make sure that we have support in place well in advance of the rollout date. As a reminder, ACCSP in and of itself will not be responsible for analyzing the data or doing any of the compliance or quota monitoring. We're going to be serving as a collection agency; and also as a central support point in the sense that we'll be funding the help desk and working with the help desk contractor to refine the help desk script, so that everybody knows.

For example, I'll pick on Lynn for just a minute. If someone from Maryland calls in and says, well how do I get on this thing? I say no, no, you call Maryland DNR; they use facts and that sort of thing, so that we can correctly direct folks that might call us to the appropriate personnel in the appropriate agency. It's going to vary widely; depending on the participation of each individual agency.

Also again, as I alluded a little earlier with the South Atlantic Council, mandatory electronic for-hire reporting is on the way. We are directly participating in a process they call the SEFHIER, whose initials have escaped me. Do you remember again what they are?

MR. JOHN CARMICHAEL: Southeast For-hire Electronic Reporting; I think that's it.

MR. CAHALL: That sounds right. This is a process that they've put together; in order to analyze their needs, and look at ways that they might approach solving the various and sundry issues that are presented in electronic trip reporting. We are participating in virtually all of their planning committees.

We don't really have a due date for that; but I think that they very much would like to have reporting in place no later than January 1, 2018. I believe the South Atlantic Council would like that to happen sooner; I'm not quite sure how that is all going to fall out. But at this point it looks fairly likely that we'll be assisting in that effort; in at least the same sense that we would be working with the Mid-Atlantic Council.

In terms of the social and economic module, we are making some progress. We did find previous work. I was reminded by Ray Rhodes that the report, which I had listed earlier as being in 1998, was actually 1996. We updated the data elements in that. That report has been reviewed by the Committee.

We do have a second call planned with the subgroup, which is scheduled for October 25; where they're going to be planning for the updated module. Essentially we're going to look at what kind of data elements could we essentially provide now; which will result in recommendations going back to the Operations Committee for potentially integrating into SAFIS, or potentially creating data products from data we already have.

Then additional data collection will have to be reviewed by the various and sundry other technical committees that might potentially be involved. We are making some forward progress on that. I want to thank Shanna especially from the Commission group; for helping us organize this and make it happen. We have a nice group of volunteers, and I think that's moving forward. This is very brief. You will get a great deal more information tomorrow at the workshop. I encourage all of you to attend. Do you have any questions for me?

- **Committee Updates**

CHAIRMAN BOYLES: Okay Mike, no questions so we'll roll on into Committee Updates.
MR. PATRICK A. CAMPFIELD: I'm going to provide a quick summary of the Operations and Advisory Committee activities since we last gave you an update. Both committees met jointly during the third week of September. One of the major topics on our agenda was to again revisit the priorities of the RFP modules, catch and effort, biological, bycatch, and socioeconomic.

We had brought this up earlier in 2017. The committees needed more time to chew on the different options that had been developed by a workgroup; and at the fall meeting both groups agreed to make a significant change from FY '18 to FY '19, to essentially elevate the biological data to an equal and top tier with the catch and effort data, but retain bycatch and socioeconomic modules as secondary tiers.

Proposals can still come in, and will be scored. But catch and effort and effort and biological will have the highest potential for being supported. This was to reflect that now that the program is 15 years or so into funding projects, the catch and effort data coming in is a lot better than it was 15 years ago. Now we may be able to turn our emphasis to biological.

I just wanted to clarify, for the information you'll get next on the FY '18 proposal scoring, we are sticking with the current status with catch and effort elevated. Then in next year's cycle FY '19, we're recommending making this change. There were 12 proposals submitted in both the maintenance and new categories; in addition to the administrative grant proposal.

In total the eight maintenance proposals were about 1.1 million dollars in requests; and the four new proposals totaled about $317,000.00, and the administrative grant came in at around 1.8 million. Among those proposals, both Ops and Advisors agreed and wanted to recommend to the Coordinating Council that one of the new proposals is not recommended for funding.

This is a proposal from the Mid-Atlantic Fishery Management Council, evaluating angler perception, handling practices, and maltreatment of smooth dogfish in the recreational fishery. In your supplemental materials there is a brief memo or letter describing why the committees did not support that proposal.

The next slide is the big picture on the FY '18 proposals and how they were scored and ranked by both the Advisory and Operations Committees. We could get into that in more detail. I did want to pass it to Jerry to provide a summary of the Advisory Committee comments.

Consider Approval of Recommendations of FY2018 Submitted Proposals (Operations Committee Chair P. Campfield and Advisory Committee Chair J. Morgan) - Attachment IV

MR. JERRY MORGAN: On behalf of ACCSP Advisors, I would like to thank our partner the great state of Virginia, for hosting the 76th ASMFC Annual Meeting; home of the world's largest naval installation, Naval Station Norfolk, and abutting the great Chesapeake Bay; known for its diverse marine habitat. This Mid-Atlantic haven is an ideal meeting place, since scoring and ranking proposals often involves this region. One of the new proposals submitted by Rhode Island DFW involves the Mid-Atlantic Region.

New Proposal 9, advancing fishery dependent data collection for black sea bass, in the southern New England and Mid-Atlantic Region, utilizing modern technology and a fishing vessel research fleet approach was scored highest. Since better data is needed to learn more about and effectively manage this highly mobile and increasingly popular fishery, we ranked it Number 1 as advisors. This was followed by new proposal N-11, vessel SAFIS integration development; submitted by South Carolina DNR, and ranked Number 2. N-11 would allow for data transfer of three ACCSP program priorities; catch and effort, bycatch, species interaction and social economic. From bluefins, vessel API, for-hire electronic data into SAFIS. Coming in with Number 3 ranking and a groundbreaking innovative proposal is Number 10; Rhode Island's Department of Environmental Management's voice recognition and headboat serving mobile application. The key item discussed was to identify and resolve any physical issues that could hamper an accurate transmission and recording of data collected.

Finally, it was agreed by consensus that proposal N-12, dealing with the handling and maltreatment of the recreational fishery of smooth dogfish, considered a coastal shark, had merit, would best be left to another funding source, and be reworked in order to better accomplish this goal. The concern was not that the study team would be intentionally engaging in questionable behavior.

The concern was that they would be present while a potentially illegal activity regarding maltreatment, mutilation of smooth dogfish was occurring under a project we approved and funded. That we felt would make for a bad perception and some very bad PR. Additionally, the usefulness of the limited scope and depth of data acquired would be less relevant in the whole scheme of things.

Notwithstanding the fact that ACCSPs core principals were not heeded. As mentioned previously, we believe the concept is a good one, should be proposed in a different way, and funded by another source. All maintenance proposals were similarly agreed upon; and based on in part, annual progress reports, funding was uniformly suggested for each. Recruitment and maintaining an acceptable number of advisors from our Atlantic Coast partners, continues to need work.

It is from this Committee that ideas and comments from the recreational and commercial fishing industry flow through ACCSP. Consequently, the advisors are in a never ending building mode. Any referrals from the recreational and commercial industry sent our way will be appreciated. Lastly, our outreach decal project incorporating ACCSP and ASMFC into one was well received. It looks as though we'll be undergoing another printing. Thank you for your time.

MR. CAMPFIELD: Thanks, Jerry. If we could just go back one slide please, again this is in your materials. It summarizes the scoring and ranking, both for the Operations and Advisory Committees, and then the average rank. That's how it broke down. The New Proposals group is at the bottom, with the South Carolina data transfer project being the highest ranked, and the Rhode Island voice recognition proposal and finally the research fleet fishery dependent proposal also out of Rhode Island.

The bottom line you can see is that if we stick with our funding split of 75 percent maintenance, 25 percent new, this would leave the last maintenance proposal, the Georgia trip ticket proposal below the line. However, at the bottom right you can see if we fund all three new proposals, we need to have about $79,000.00 unspent.

That led to the Advisory and Operations Committee's recommendation to deviate from our 75/25 percent split, in order to fund all the maintenance proposals, to not fund the Mid-Atlantic smooth dogfish

proposal as we've mentioned. This would allow for all the maintenance proposals and three recommended new proposals to be funded. That is the preferred option from the two committees and recommendation to you on the Coordinating Council. There was a lot of discussion at the meeting a few weeks ago; so we did devise Option 2, if we wanted to stick with a 75/25 percent split. That would require a 2 percent roughly, or a small percentage cut to all the proposals, in order to still fund the Georgia trip ticket proposal. But again, both committees are recommending Option 1. That's all we have, Mr. Chairman.

CHAIRMAN BOYLES: Jerry, Pat, thank you; questions for Pat or for Jerry? Pat.

MR. PAT GEER: Pat, I just wanted to make sure that this priority is the FY '18 is the old method, correct, not the new method?

MR. CAMPFIELD: That's correct.

MR. GEER: Okay, and do you see any, well we don't exactly how much money we're going to get. But do you see any further cuts? A lot of times we do this and then we get another 2 percent cut or another 4 percent cut; you know because we don't get all the money. How confident are you that you're going to get the whole 3.5, I guess is what I'm asking.

MR. CAHALL: We're pretty confident that we're going to get fully funded. In addition, in general ST has been very kind to us when we've been even a few thousand short, and made up the difference. Right now we believe that the FIN line, which is where the majority of our funding comes from, is pretty much safe. I think we're going to be okay this year.

CHAIRMAN BOYLES: Dr. Duval.

DR. MICHELLE DUVAL: Yes Pat, could you please go back to the previous slide with the chart on it? I just want to make sure I understand this. Under a 3.35 million funding that is where the shortfall would come in?

MR. CAMPFIELD: That's correct. We've had a precedent where we fund, take of that 3.35 we fund the administrative grant and then the remaining amount we split 75/25. Under that setup, the Georgia proposal would be unfunded.

DR. DUVAL: We're just making a leap of faith that the program is going to be funded at 3.5, and maintain the 75/25 percent split?

MR. CAHALL: No, Dr. Duval. Even at 3.35, if we lift the 75/25, we'll have roughly a thousand dollars more than we need to fund these projects. I have to emphasize also that there is always a little bit of uncertainty; because until the decisions are made and the funding vehicles are established, we don't know exactly A, how much money we're going to have, or B, how much money is going to have to be tacked on to these various projects as they move through their different channels to get funded.

Some of these may incur an overhead fee from one of the grants office. Some, if they come through the Commission, there is also an overhead fee for the Commission, some may not. Some may be funded directly through NMFS. Basically anything less than a few percentage points, is very difficult to pin down,

until we have a final decision from this group exactly what should be funded. Then finally, once we've established exactly how all the funding vehicles are going to be utilized.

CHAIRMAN BOYLES: Further questions. Cheri.

MS. CHERI PATTERSON: I don't have any questions. I have a motion.

CHAIRMAN BOYLES: Jay.

MR. JASON McNAMEE: I apologize. I am going right back to Dr. Duval's question, because the math is not right in my head. You are saying that under the 3.35, if we went with the recommendation of the two committees, you would still be able to offset what is in pink up on the board there?

MR. CAMPFIELD: Yes that is correct. If we go with Option 1, we would fund all three of the new proposals listed on the board and all the maintenance proposals.

CHAIRMAN BOYLES: Michelle.

DR. DUVAL: This is going with Option 1, which is you're lifting the 75/25 percent split, correct? I mean I have some philosophical issues with that; because I think that is a little bit of the camel's nose under the tent. You know the spirit of ACCSP was that we would move things off of maintenance funding, and look towards funding new projects.

I appreciate that there were a variety of factors contributing to this particular shortfall like this, this year. But I'm concerned that if we do this once we're going to keep on doing it. I recognize that it all comes out in the wash. But I just see creep here, in terms of maintaining that 75/25 percent split, so I just had to register that concern.

CHAIRMAN BOYLES: Tom.

MR. TOM BAUM: If Pat or someone could give me a little clarification, as far as maintenance versus new. I see the Georgia project is under maintenance, and there was some maybe discussion that maybe it was a new project. If you want to clarify that I would appreciate it.

MR. CAMPFIELD: The Georgia representative and the state debated that; whether it should come in as a maintenance or a new project. Ultimately they decided to submit it as a maintenance proposal; because they've requested and received funding for their trip ticket program in several years in the past. That seemed fairly far afield from our current definition of a new proposal of one or two years of essentially brand new activity.

CHAIRMAN BOYLES: Okay, I've got Cheri then Brandon.

MS. PATTERSON: Just a little clarification from Mike, maybe. Georgia did submit this, but they submitted it for one year; is that correct? This would actually be considered the second year, even though there was a gap between the first year and this second year. It could technically be considered a new project.

MR. CAHALL: You're technically correct, and there was a good bit of discussion about that by the Operations Committee. But it was the decision of the Georgia Rep to submit it as a maintenance project.

CHAIRMAN BOYLES: Brandon.

MR. BRANDON MUFFLEY: Just to clarify, because this seems different than what I remember at the Operations Committee; and hence why the Operations Committee provided two alternatives. But you're saying under Alternative 1, we deviate from the 75/25, but all the new projects get fully funded under that scenario?

I didn't think that was how we were operating; that that Rhode Island proposal, the second Rhode Island proposal on sea bass would have had to have been cut, because we didn't have enough funds to cover all maintenance, if we allocated all of the funds to cover the maintenance projects. Did I miss something from when we met last month to now? Did something change? Because that's why I thought we provided two different alternatives for the Coordinating Council to consider.

MR. CAHALL: The issue was the fees. When I started to look at that it was just no way to make a rational estimate for how much the fees were going to be. They could be $10,000.00, they could be $50,000.00. It depends entirely on how they end up being funded and routed. Within this, because this is a very narrow financial window, and that's the reason you see slightly different numbers here, because these numbers.

I can tell you with reasonable certainty how much the fees are going to be for the Administrative Grant; because they are the same thing over and over and over again. But for all of these other things it is hard to tell. When we decided we wanted to display it as a level field, as opposed to trying to make a guess on how much these were all going to be. I'm reasonably confident that we will be able to fund all of these projects. It is within the realm of what has been going on for the last three or four years, with our back and forth with SMT.

CHAIRMAN BOYLES: Follow up Brandon and then Jay.

MR. MUFFLEY: You just assigned a flat administrative fee to all of those other projects, or you got rid of? Okay, thank you.

MR. McNAMEE: I wanted to jump back. I appreciated Dr. Duval's comments. I guess the way that I was looking at it. I sort of appreciate that we set that 75/25 split up ahead of time to do that in sort of an objective way; based on the philosophy of the program. In this case though, with the exception of a smooth dogfish, were we to accept the advice to not fund that one. There weren't additional proposals submitted, so in the end, in my view, it becomes just an accounting issue. There is a gap. No other competing proposals, and so for me it makes sense to accept that recommendation Option 1 for that reason.

CHAIRMAN BOYLES: Michelle.

DR. DUVAL: It's late in the day and my thought just ran away from my head. Oh, I know what I was going to say. I just want to make sure that my comments earlier, about the spirit of the 75 percent, 25 percent split are not in any way, shape, or form taken to mean that I do not support funding the Georgia project. I absolutely support funding Georgia's project. I guess maybe my question is, you know this recommendation for Option 1 was that a unanimous recommendation from the Operations Committee?

MR. CAMPFIELD: Sure. There was quite a lot of discussion about the 75/25 percent split. A number of voices among both committees that our long term intent is to maintain that; you know, promoting new proposals, and currently at the 25 percent level. As Jay mentioned, it really came down to the accounting this year.

But if we had received half a dozen new proposals, and most of them had merit, and we thought they were worthwhile. Then there would have been more debate, and perhaps different recommendations, and possibly to keep a maintenance proposal or two below the line. But that simply wasn't the case this year, with three new proposals that we thought were worth supporting.

CHAIRMAN BOYLES: I have a question. I think it appears that we're trying to find a way to split the baby. You know maybe a question maybe from Bob. I mean we've got a new governance structure, and I noted the Administrative Grants got a body in it. It's been a while. I confess it's been a while since I've been in the office. Are we okay space wise? I mean do we have capacity, I guess is the question I've got?

EXECUTIVE DIRECTOR ROBERT E. BEAL: We're pretty full in the office right now. We would have to be creative to shoehorn another body into the office right now. But you're right; there is a full-time employee in the Administrative Grant to help out with some of the data projects.

CHAIRMAN BOYLES: Any further questions, discussion? Bob.

EXECUTIVE DIRECTOR BEAL: The other variable that's just come up in the last few days is we've heard from our insurance company that our health insurance premiums are going to go up 10 to 12 percent. I'm not really sure what that's going to mean to all of ASMFCs budget.

You know all the states are experiencing, all the businesses; everybody is experiencing the insurance premiums going up. There is going to be an added expense there. I haven't figured out exactly the magnitude of it; because we just got the word not that long ago. We are going to have to figure out where to find a few dollars to cover that as well.

CHAIRMAN BOYLES: That's good information. This is where I think we are, and you all check me on this, please. We've got a consensus recommendation from our Advisors. This is how the projects split out. In contrast to some difficult discussions in years past, we don't have competing proposals. There is nothing, at this point I don't get a sense from anybody around the table. We want to fund what we've got here, in terms of projects.

I think Mike or somebody characterized it. This is as much an accounting exercise. We're not making programmatic priority decisions here. How does the Coordinating Council want to move? We've got an issue potentially with health insurance. We've got the question of administrative fees that we don't know about; and we've got state partners, ACCSP partners waiting for a decision from this group. Yes, Mike.

MR. CAHALL: In past years when we've been uncertain, the guidance that's been provided is essentially to fund these in priority order. When and if we run out of money is where we run out of money. In past years you have directed me to take that into consideration, when we do finally have our final numbers, when we send the allocations forward to National Marine Fisheries Service to move the money around.

We certainly could do that this year. I don't expect that in terms of the base funding for these, to have a shortfall. The health insurance will push the overhead up some. It's hard to say with assurance exactly how much that would be. But I think for the purposes of this discussion, certainly you could give me direction to fund these in their priority order; and cut it off when we run out of money, and report back to you, or work through the, what do we call the Executive Committee now, The Leadership Committee, to make those changes if necessary.

CHAIRMAN BOYLES: All right Pat and then Michelle.

MR. GEER: Mike, if we go with Option 1, how far of a deviation are we talking about? Do you have any idea?

MR. CAHALL: A few thousand dollars, not much.

MR. GEER: Okay.

CHAIRMAN BOYLES: Michelle.

DR. DUVAL: I guess if there is a concern about what is going to be available; and the somewhat uncertain nature of the fees. It seems like rather than funding things in priority order, which you know given the challenges of this year's process. It might be fairer to everyone, because this way someone wouldn't get left out, to think about more Option 2, where you're docking everybody a little bit of money off the top.

CHAIRAMN BOYLES: John.

MR. CARMICHAEL: Then in the Option 2, the 2 percent. That is for the maintenance proposals? Oh that would be for everything altogether.

MR. CAHALL: There is one element. If I send it across with an across the board cut, ST won't give us any extra money. If I send it across showing pain, they probably will. It's the truth of how things move. That is something that has to factor into the decisions, I think.

CHAIRMAN BOYLES: Wisdom, wisdom, wisdom, wisdom. Lynn Fegley.

MS. LYNN FEGLEY: I was just going to say that maybe the answer is to go with Option 1, and see what we get, and then propose the blanket cuts before we go to the priority order.

CHAIRMAN BOYLES: Cheri.

MS. PATTERSON: We've been in this place before; and we have also deviated from the 75/25 percent in the past. Precedence has already been set on that perspective. I am definitely leaning towards Option 1, and we have also presented a caveat that if there is a funding issue that that moves forward to the former Executive Committee of ACCSP, to have a discussion and make decisions based on that. That would be my recommendation moving forward with a motion.

CHAIRMAN BOYLES: Just for the record. I'm kibitzing with Mike here. The Leadership Team presently is Lynn Fegley, Bob Beal, me and John Carmichael. That's it. Those of you, whose names were just called, wake up. Bob.

EXECUTIVE DIRECTOR BEAL: There is also a NOAA Rep and a Fish and Wildlife Service Rep on there. The Chair, the Vice-Chair, the immediate past Chair, me, and the two federal Reps, I believe is who is on the group.

CHAIRMAN BOYLES: What is the pleasure of the Coordinating Council? Cheri. Yes Ma'am.

MS. PATTERSON: Then we can move forward with discussion. I would like to make a motion to move forward. I forgot my speed reading. I think it's the Management Policy Committee for ACCSP.

CHAIRMAN BOYLES: While we're crafting this motion. Again I would like to thank the Advisors and the Ops Committee for bringing us to this place. This is a good spot to be. Trying to find ways to fund important projects, important efforts, and it's a nice position to be in, not having to choose and pick and choose necessarily winners and losers.

But I think clearly it is the desire of the Coordinating Council to well, we'll let Cheri read her motion. I'm sorry. I think it's clearly the desire of the Coordinating Council to adopt the recommendations of the committees; to the degree that resources are available. Of course with the big unknowns, in terms of administrative fees, health insurance, in terms of what that may cost the Administrative Grant as well.

Decision making uncertainty, but am I getting a sense, I would like to see heads nod in affirmative or a negative is that the consensus of where the group would like to go. Well let's see if we can put this in the form of a motion. Bear with us for just a moment.

MS. PATTERSON: I would like to place the **motion to fund all maintenance proposals, deviating from the 75/25 percent split. Do not fund the new proposal from the Mid-Atlantic Fisheries Management Council, and use the remaining funds on new proposals as recommended by the Operations and Advisory Committees. If there is a funding shortage the deciding body will be the ACCSP Management and Policy Committee.**

CHAIRMAN BOYLES: That's a motion by Ms. Patterson, do we have a second; **second by Ms. Fegley**, further discussion on the motion, Joe?

MR. JOE CIMINO: I appreciate all the work that goes into evaluating these proposals; and I wonder if, as Cheri mentioned, we've been in this place before. I wonder if there is a sense for those proposals that can't live with partial funding; and therefore would die versus those that could, so that in that process if two or three fall out but there is remaining funding and we know that one of those can live with partial funding if it would go there.

MR. CAMPFIELD: The committees discussed that as well; because that is an option that we've exercised in the past, to make relatively small cuts across the board, in order to get everybody funded at some level. There was agreement around the Operations and Advisory Committees table that those proposals could still get the bulk of their work done, and they could complete most of the activities. None of the proposals would be a full stop.

CHAIRMAN BOYLES: Further discussion on the motion? John.

MR. CARMICHAEL: I've always been a big fan of the 75/25, and I agree with Michelle about keeping the camel's nose from bringing his whole body inside the tent. I'm thinking though that there is a sunset coming up, right. Is that next year or the year after that they're going to start being ratcheted down; so the year after? I think that's going to affect some of the ones as Joe mentioned that kind of find taking a small cut to be a problem. Well they're going to be forced to take cuts on a lot of these, and that's certainly going to be a challenge when the time comes.

But I think we may be in the same situation next year; because we add some new proposals the last few years finally, thanks to that 75/25. Now we're starting to eat up more of the maintenance again. I think it's going to be a real interesting development when we start really forcing some of these longstanding projects to cut back.

CHAIRMAN BOYLES: Jay.

MR. McNAMEE: Mr. Chair, I'm going to ask you a process question here. I am a PI on the Black Sea Bass Project. Since this could potentially end up at another management body for a decision. I was wondering if I could offer some insight on that project. It's my understanding it was an item of discussion at the Ops Committee; and I wanted to clarify something. Okay, thank you. One of the reasons, and I don't know if this in fact affected their ranking.

But one of the discussion items with the Black Sea Bass Project was a lack of understanding of how that data might transfer into the stock assessment. We apparently didn't do a good job in the proposal of describing this. But we had a Steering Committee. That Steering Committee had both myself and Gary Shepherd, who is the Assessment Lead on it.

The data elements that we're collecting were in fact driven by the Assessment Lead; and I have also participated on that stock assessment in the past as well. I think given the closeness that we had to that is why we neglected to – it was obvious to us, but we should have recorded that in a more explicit way in the proposal – but I wanted to offer that insight, just for those deliberations, if it in fact ends up in that second step.

CHAIRMAN BOYLES: Further discussion on the motion. Dr. Duval.

DR. DUVAL: I'm going to go ahead and support this motion; but I just want it noted for the record that I'm supporting it reluctantly, because of the 75/25 percent deviation. I appreciate Cheri's comments that we've been in this place before. But if we don't move forward, if we continue to get ourselves on the spot, we're never going to move forward. As John stated, there are going to be some harsh realities coming up, once these, I guess the weaning off kicks in. I know some of the maintenance proposals had some increases over the years. Just let that be noted.

CHAIRMAN BOYLES: Further discussion. All right I'm going to read the motion one more time. The motion is to fund all maintenance proposals, deviating from the 75 percent-25 percent split. Do not fund the new proposal from the Mid-Atlantic Fishery Management Council, and use the remaining funds on new proposals as recommended by the Operations and Advisory Committees.

If there is a funding shortage, the deciding body would be the ACCSP Management and Policy Committee. That motion was by Ms. Patterson; seconded by Ms. Fegley. All those in favor of the motion

please raise your hand, please. Thank you, put your hands down, any opposition? That motion carries unanimously.

Thank you all, good discussion, good conversations, important policy implications for how this group moves forward; particularly as the funding formulas and the forced weaning comes, as John referenced.

Chair/Vice Chair Elections

Next item on the agenda is Chair and Vice-Chair elections. We will take nominations for Chair first. Then I'll do this; nominations for Chair. Bob Beal.

EXECUTIVE DIRECTOR BEAL: I would like to nominate Lynn Fegley; from Maryland, Mr. Chairman.

CHAIRMAN BOYLES: Nomination for Ms. Fegley, is there a second? Second by Tom Baum, I'm looking for a motion to close the nominations. John Carmichael makes a motion to close the nominations and by acclamation Ms. Fegley of Maryland is your new Coordinating Council Chair. (Applause) I'm sorry, I didn't call that question. All those in favor of that motion signify by raising your hand. Is there any opposition to the motion? That motion carries let it be known unanimously; Lynn, congratulations. Next nomination is open for Vice-Chair. Cheri.

MS. PATTERSON: Yes, I would like to nominate John Carmichael for Vice-Chair of ACCSP.

CHAIRMAN BOYLES: Nomination for John, a second by Dr. Duval, and is that a motion to close the nominations Mr. Gilmore, and appoint by acclamation.

MR. JAMES J. GILMORE, JR.: Mr. Chairman, I was going to close the nominations and cast one vote for the old version of Pat Augustine in electing a Vice-Chairman, so congratulations.

CHAIRMAN BOYLES: All those in favor of that motion for John Carmichael as Vice-Chair, please raise your hand. All right thank you. John, again let the record reflect a unanimous vote. Congratulations to Ms. Fegley and to Mr. Carmichael.

Other Business

Is there any other business to come before the Coordinating Council? Seeing none; we will stand adjourned. Thank you all.

Adjourn

(Whereupon the meeting adjourned at 5:20 o'clock p.m. on October 17, 2017)

INDEX OF MOTIONS

Atlantic Coastal Cooperative Statistics Program
1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201
703.842.0780 | 703.842.0779 (fax) | www.accsp.org

TO: ACCSP Coordinating Council and All ACCSP Committees

FROM: Michael S. Cahall, ACCSP Director

SUBJECT: ACCSP Request for 2019 Proposals

The Atlantic Coastal Cooperative Statistics Program (Program or ACCSP) is issuing a Request for Proposals (RFP) to program partner agencies or Committees for FY19 funding.

The Funding Decision Document provides general guidance and includes information on proposal preparation, the project approval process, and the RFP schedule. Projects in areas not specifically addressed may still be considered for funding if they help achieve Program goals. These goals, listed by priority, are improvements in:

1a. Catch, effort, and landings data (including licensing, permit and vessel registration data);
1b. Biological data (equal to 1a.);
2. Releases, discards and protected species data; and
3. Economic and sociological data.

Project activities that will be considered according to priority may include:

- Partner implementation of data collection programs;
- Continuation of current program funded partner programs;
- Funding for personnel required to implement Program related projects/proposals; and
- Data management system upgrades or establishment of partner data feeds to the Data Warehouse and/or Standard Atlantic Fisheries Information System.

Proposals for biological sampling should target priority species in the top quartile (Attachment II) of the Biological Priority Matrix. Proposals for observer coverage should align with fisheries affecting the top quartile priority species (Attachment III) of the Bycatch Priority Matrix. Brief descriptions of current levels of biological or bycatch sampling by any of the Partners would be helpful to the review process. Projects for recreational catch and effort data should target the priorities set by the Recreational Technical Committee (Attachment IV).

New components to this year's Funding Decision Document can be found highlighted in light blue in the ranking criteria (Attachment VI).

Submissions must comply with Program Standards found here. Timelines for the 2019 RFP are shown in Attachment V. Please consider using this successful project proposal as a template.

Proposals to continue Program-funded partner projects ("maintenance proposals") may not contain significant changes in scope (for example the addition of bycatch data collection to a dealer reporting project), and must include in the cover letter whether there are any changes in the current proposal from prior years, and if so, provide a brief summary of those changes.

Project submissions will be reviewed in accordance with the Funding Decision Document (Attachment I), ranking criteria (Attachment VI), and funding allocation. Current funding allocation guidelines are 75% for maintenance projects and 25% for new projects within the Program priorities. Additionally, a long-term funding strategy policy was approved requiring maintenance projects to be subject to a prior two-year average as base funding. A funding decrease will begin after year 4 of maintenance funding, with funds decreasing 33% each year starting in year 5 with no funding year 7. Overhead rates may not exceed 25% of total costs unless mandated by law or policy. Items included within overhead should not also be listed as in-kind match. The final decisions on proposals to be funded for FY19 will be made in October 2018. We strongly urge you to **carefully** review the Funding Decision Document, especially in reference to the budget template.

Project awards will be subject to funding availability. If there is a funding shortfall, adjustments may be made to awards in accordance with the Funding Decision Document.

Successful applicants will be notified when funding becomes available. Project Investigators will be required to report progress directly to the Program's Operations and Advisory Committees in addition to meeting the standard Federal reporting requirements.

Please submit initial proposals as Microsoft Word and Excel files no later than **June 11, 2018** by email to **both** Mike Cahall (mike.cahall@accsp.org) and Ali Schwaab (alexandra.schwaab@accsp.org). If you have any questions about the funding decision process, please contact your agency's Operations Committee member (http://www.accsp.org/committees), Mike Cahall (703-842-0781), or Ali Schwaab (703-842-0780).

RELEVANT ATTACHMENTS

ATTACHMENT I Funding Decision Document
ATTACHMENT II FY 2018 Biological Priority Matrix
ATTACHMENT III FY 2018 Bycatch Priority Matrix
ATTACHMENT IV 2017 Recreational Technical Priorities
ATTACHMENT V Timeline for Proposal Review
ATTACHMENT VI FY 2019 Ranking Criteria Document

Funding Decision Process
Atlantic Coastal Cooperative Statistics Program
May 2018

The Atlantic Coastal Cooperative Statistics Program (the Program) is a state-federal cooperative initiative to improve recreational and commercial fisheries data collection and data management activities on the Atlantic coast. This formal funding decision process has been developed to assist the Program committees in deliberations on funding of proposals intended to enhance timely implementation of the Program. The following process and proposal formats are provided as guidance to Program Partners.

The Coordinating Council has charged the Operations and Advisory Committees to review proposals and make funding recommendations to the Program Director and the Coordinating Council.

General Process for Setting Annual Program Priorities

The "Atlantic Coast Fisheries Data Collection Standards" provides the basic framework for implementation of the program by all Program Partners. The current Strategic and annual Operations Plans will be used to guide the determination of annual priorities.

Steps in the Funding Decision Process

1. Develop annual funding priorities, criteria and allocation targets (maintenance vs. new projects)
2. Issue Request for Proposals (RFP)
3. Review initial proposals
4. Provide initial results to submitting Partner
5. Review and rank final proposals
6. Proposal approval by the Coordinating Council
7. Notification to submitting Partner of funded projects and notification of approved projects to appropriate grant funding agency (e.g. NOAA Fisheries Regional Grants Program Office, "NOAA Grants") by Partner
8. Operation and/or Executive Committees and Coordinating Council review and make final decision with contingencies (e.g. scope of work, rescissions, no-cost extensions, returned unused funds, etc.)

1. Develop Annual Funding Priorities, Criteria and Allocation Targets (maintenance vs. new projects).

Prior to issuing the Request for Proposals, the Coordinating Council will approve the annual funding criteria and allocation targets. These will later be used to rank projects and allocate funding between maintenance and new projects respectively. Starting in FY2016 a long-term funding strategy policy was approved requiring maintenance projects to be subject to a prior two-year average as base funding. A funding decrease will begin after year 4 with funds decreasing 33% each year starting in year 5 with no funding year 7.

2. Issue Request for Proposals

a. An RFP will be sent to all Program Partners and Committees no later than the week after the spring Coordinating Council meeting. The RFP will include the ranking criteria, allocation targets approved by the Coordinating Council and general Program priorities taken from the current Strategic Plan. The RFP and related documents will also be posted on the Program's website. The public has the ability to work with a Program Partner to develop and submit a proposal. All proposals MUST BE submitted either by a Program Partner, jointly by several Program Partners, or through a Program Committee. Principle investigators are strongly encouraged to work with their Operations Committee member in the development of any proposal.

b. All proposals must be submitted electronically to the Program Director, and/or designee, in the following standard format:

Applicant Name: Identify the name of the applicant organization(s).

Project Title: A brief statement to identify the project.

Project Type: Identify whether new or maintenance project.

- *New Project – Partner project never funded by the Program. New projects may not exceed a duration of two years. Second year funding is not guaranteed, partners must reapply.*
- *Maintenance Project – Project funded by the Program that conducts the same scope of work as a previously funded new or maintenance project. These proposals may not contain significant changes in scope (e.g., the addition of bycatch data collection to a catch/effort dealer reporting project). They must include in the cover letter whether there are any changes in the current proposal from prior years, and if so, provide a brief summary of those changes.*

Requested Award Amount: Provide the total requested amount of proposal. Do not include an estimate of the NOAA grant administration fee.

Requested Award Period: Provide the total time period of the proposed project. The award period typically will be limited to one-year projects.

Objective: Specify succinctly the "why", "what", and "when" of the project.

Need: Specify the need for the project and the association to the Program.

Results and Benefits: Identify and document the results or benefits to be expected from the proposed project. Clearly indicate how the proposed work meets various elements outlined in the ACCSP Proposal Ranking Criteria Document (Appendix A). Some potential benefits may include: fundamental in nature to all fisheries; region-wide in scope; answering or addressing region-wide questions or policy issues; required by MSFCMA, ACFCMA, MMPA, ESA, or other acts; transferability; and/or demonstrate a practical application to the Program.

Data Delivery Plan: Include coordinated method of the data delivery plan to the Program in addition to module data elements gathered. The data delivery plan should include the frequency of data delivery (i.e. monthly, semi-annual, annual) and any coordinate delivery to other relevant partners.

Approach: List all procedures necessary to attain each project objective. If a project includes work in more than one module, identify approximately what proportion of effort is comprised within each module (e.g., catch and effort 45%, biological 30% and bycatch 25%).

Geographic Location: The location where the project will be administered and where the scope of the project will be conducted.

Milestone Schedule: An activity schedule in table format for the duration of the project, starting with Month 1 and ending with a three-month report writing period.

Project Accomplishments Measurement: A table showing the project goals and how progress towards those goals will be measured. In some situations the metrics will be numerical such as numbers of anglers contacted, fish measured, and/or otoliths collected, etc; while in other cases the metrics will be binary such as software tested and software completed. Additional details such as intermediate metrics to achieve overall proposed goals should be included especially if the project seeks additional years of funding.

Cost Summary (Budget): Detail all costs to be incurred in this project in the format outlined in the budget guidance and template at the end of this document. A budget narrative should be included which explains and justifies the expenditures in each category. Provide cost projections for federal and total costs. Provide details on Partner/in-kind contribution (e.g., staff time, facilities, IT support, overhead, etc.). Details should be provided on start-up versus long-term operational costs.

In-kind - [1]Defined as activities that could exist (or could happen) without the grant. [2]In-kind contributions are from the grantee organization. In-kind is typically in the form of the value of personnel, equipment and services, including direct and indirect costs.

[1] The following are generally accepted as in-kind contributions:

i. Personnel time given to the project including state and federal employees
ii. Use of existing state and federal equipment (e.g. data collection and server platforms, Aging equipment, microscopes, boats, vehicles)

Overhead rates may not exceed 25% of total costs unless mandated by law or policy. Program Partners may not be able to control overhead/indirect amounts charged. However, where there is flexibility, the lowest amount of overhead should be charged. When this is accomplished indicate on the 'cost summary' sheet the difference between the overhead that could have been charged and the actual amount charged, if different. If overhead is charged to the Program, it cannot also be listed as in-kind.

Maintenance Projects: Maintenance proposals must provide project history table, description of completed data delivery to the ACCSP and other relevant partners, table of total project cost by year, a summary table of metrics and achieved goals, and the budget narrative from the most recent year's funded proposal.

Principal Investigator: List the principal investigator(s) and attach curriculum vitae (CV) for each. Limit each CV to two pages. Additional information may be requested.

3. Review initial proposals

Proposals will be reviewed by staff and the Operations and Advisory Committees. Committee members are encouraged to coordinate with their offices and/or constituents to provide input to the review process. Operations Committee members are also encouraged to work with staff in their offices that have submitted a proposal in order to represent the proposal. The review and evaluation of all written proposals will

take into consideration the ranking criteria, funding allocation targets and the overall Program Priorities as specified in the RFP. Proposals may be forwarded to relevant Program technical committees for further review of the technical feasibility and statistical validity. Proposals that fail to meet the ACCSP standards may be recommended for changes or rejected.

4. Provide initial review results to submitting Partner

Program staff will notify the submitting Partner of suggested changes, request responses, or questions arising from the review process (especially if a proposal initially fails to meet ACCSP standards). The submitting Partner will be given an opportunity to submit a final proposal incorporating suggested changes in the same format previously described in Step 2(b) by the final RFP deadline.

5. Review and rank final proposals

The review and ranking of all proposals will take into consideration the ranking criteria, funding allocation targets and overall Program Priorities as specified in the RFP**.** The Program Director and the Advisory and Operations Committees will develop a list of prioritized recommended proposals and forward for discussion, review, and approval by the Coordinating Council.

6. Proposal approval by the Coordinating Council

The Coordinating Council will review a summary of all submitted proposals and prioritized recommended proposals from the Operations and Advisory Committees. Each representative on the Coordinating Council will have one vote during final prioritization of proposed proposals. Projects to be funded by the Program will be approved by the Coordinating Council by the end of November each year. The Program Director will submit a pre-notification to the appropriate NOAA Grants office of the prioritized proposals to expedite processing when those offices receive partner grant submissions.

7. Notification to submitting Partner of funded projects and submittal of project documents to appropriate grants agency (e.g. NOAA Grants) by Partner.

Notification detailing the Coordinating Council's actions relevant to a Partner's proposal will be sent to each Partner by Program staff.

- Approved projects from non-federal partners must be submitted as full applications (federal forms, project and budget narratives, and other attachments) to NOAA Grants via www.grants.gov. These documents must reflect changes or conditions approved by the Coordinating Council.

- Non-federal partners must provide the Program Director with an electronic copy of the narrative and either an electronic or hard copy of the budget of the grant application as submitted to the grants agency (e.g. NOAA Grants).
- Federal Partners do not submit applications to NOAA Grants.

8. Operation and/or Executive Committees and Coordinating Council review and final decision with contingencies or emergencies.

Committee(s) review and decide project changes (e.g. scope of work, rescissions, no-cost extensions, returned unused funds, etc.) during the award period.

Scope of Work Change:

a) Partners shall submit requests for amendments to approved projects in writing to the Program Director. The Coordinating Council member for that Partner must sign the request.
b) When Partners request an amendment to an approved project, the Program Director will contact the Chair and Vice Chair of the Operations Committee. The Program Director and Operations Committee Chairs will determine if the requested change is minor or substantial. The Chairs and Program Director may approve minor changes.
c) For substantial proposed changes, a decision document including the opinions of the Chairs and the Program Director will be sent to the Operations Committee and the ACCSP Leadership Team of the Coordinating Council for review.
d) The ACCSP Leadership Team will decide to approve or reject the request for change and notify the Program Director, who will send a written notification to the Partner's principal investigator with a copy to the Operations Committee.
e) When a requested major amendment is submitted shortly before a Coordinating Council meeting, the approval of the amendment will be placed on the Council Agenda.
f) The Program Director will notify NOAA Grants of any change in scope of work for final approval for non-federal proposals, and the Partner will need to request a Change in Scope through Grants Online. Necessary communications will be maintained between the concerned Partner, the Program and NOAA Grants. Any changes must be approved through the normal NOAA Grants process.

Determination of contingencies for funding adjustments (e.g. rescissions):

The Program Director will be notified by NOAA Fisheries of any federal grant reduction. Such reductions may include, but are not limited to:

- Lower than anticipated amounts from any source of funding
- Rescission of funding after initial allocations have been made
- Partial or complete withdrawal of funds from any source

If these or other situations arise, the Operations Committee will notify partners with approved proposals to reduce their requested budgets or to withdraw a proposal entirely. If this does not reduce the overall requested amount sufficiently, the Director,

the Operations Committee Chair and Vice-Chair, and the Advisory Committee Chair will develop a final recommendation and forward to the ACCSP Leadership Team of the Coordinating Council. These options to address funding contingencies may include:

- Eliminating the lowest-ranked proposal(s)
- A fixed percentage cut to all proposals' budgets
- A directed reduction in a specific proposal(s)

No-Cost Extensions and Unused/Returned Funds:

If additional time is needed to complete the project, Program Partners can request a no-cost extension to their award period. Partners should let the Program know of the need for an additional time and then request the extension as an Award Action Request through NOAA Grants Online at least 30 days before the end date of the award.

In an effort to limit the instances in which funds are not completely used during the award period, draw down reports from the NOAA Grants offices indicating remaining grant balances will be periodically reviewed during each fiscal year.

While effort should be made to complete the project as proposed, if Program Partners find that they will not be able to make use of their entire award, they should notify the Program and their NOAA Federal Program Officer as soon as possible. Depending on the timing of the action, the funds may be able to be reused within the Program, or they may have to be returned to the U.S. Treasury.

Program Partners must submit a written document to the Program Director outlining unused project funds potentially being returned. The Partner must also notify their Coordinating Council member (if applicable) for approval to return the unused funds. If the funding is available for re-use within the Program, the Director will confer with the Operations Committee Chair and Vice-Chair and the Advisory Committee Chair, and then submit a written recommendation to the ACCSP Leadership Team of the Coordinating Council for final approval on the plan to distribute the returned money.

Necessary communications will be maintained between the concerned Partner, the Program, and NOAA Grants office. Any changes must be approved through the normal NOAA Grants process.

Relevant Deadlines

- April
    - Develop annual priorities and funding allocation targets.
- May
    - Distribute request for proposals

- June
    - Proposal submission – Proposals received after specified RFP deadline will not be considered for funding.
- July – August
    - Initial proposal evaluation - recommendations developed by Program staff, and Advisory and Operations Committees.
- August/September
    - Submission of final proposals – final proposals must be submitted electronically to the Program Director, and/or designee by close of business on the day of the specified deadline. Final proposals received after RFP deadline will not be considered for funding.
- September – October
    - Final proposal evaluation - recommendations developed by the Program Director, Advisory and Operations Committees.
- Late October/November
    - Coordinating Council approval of project proposals.

Guidelines

The following guidelines are intended to assist Partners in preparing proposals:

- The Program is predicated upon the most efficient use of available funds. Many jurisdictions have data collection and data management programs which are administered by other fishery management agencies. Detail coordination efforts your agency/Committee has undertaken to demonstrate cost-efficiency and non-duplication of effort.

- All program Partners conducting projects for implementation of the Program standards in their jurisdictions are required to submit data to the Program in prescribed standards, where the module is developed and formats are available. Detail coordination efforts with Program data management staff with projects of a research and/or pilot study nature to submit project information and data for distribution to all Program Partners and archives.

- If appropriate to your project, please detail your agency's data management capability. Include the level of staff support (if any) required to accomplish the proposed work. If contractor services are required, detail the level and costs.

- Before funding will be considered beyond year two of a project, the Partner agency shall detail in writing how the Partner agency plans to assume partial or complete funding, or if not feasible, explain why.

- If appropriate to your project, detail any planned or ongoing outreach initiatives. Provide scope and level of outreach coordinated with either the Outreach Coordinator and/or Outreach Committee.

- Proposals including a collection of aging or other biological samples must clarify partner processing capabilities (i.e., how processed and by whom).

- Provide details on how the proposal will benefit the Program as a whole, outside of benefits to the Partner or Committee.

- Proposals that request funds for Law Enforcement should confirm that all funds will be allocated towards reporting compliance.

- Proposals must detail any in-kind effort/resources, and if no in-kind resources are included, state why.

- Proposals must meet the same quality as would be appropriate for a grant proposal for ACFCMA or other federal grant.

- Assistance is available from Program staff, or an Operations Committee member for proposal preparation and to insure that Program standards are addressed in the body of a given proposal.

- Even though a large portion of available resources may be allocated to one or more jurisdictions, new systems (including prototypes) will be selected to serve all Partners' needs.

- Partners submitting pilot, or other short-term programs, are encouraged to lease large capital budget items (vehicles, etc.) and where possible, hire consultants or contractors rather than hire new permanent personnel.

- The Program will not fund proposals that do not meet Program standards. However, in the absence of approved standards, pilot studies may be funded.

- Proposals will be considered for modules that may be fully developed but have not been through the formal approval process. Pilot proposals will be considered in those cases.

- The Operations Committee may contact Partners concerning discrepancies or inconsistencies in any proposal and may recommend modifications to proposals subject to acceptance by the submitting Partner and approval by the Coordinating Council. The Operations Committee may recommend changes or conditions to proposals. The Coordinating Council may conditionally approve

proposals. These contingencies will be documented and forwarded to the submitting Partner in writing by Program staff.

- Any proposal submitted after the initial RFP deadline will not be considered, in addition to any proposal submitted by a Partner which is not current with all reporting obligations.

Reporting requirements

a) Program staff will assess project performance.
b) The Partner project recipients must abide by the NOAA Regional Grant Programs reporting requirements and as listed below. All semi-annual and final reports are to include a table showing progress toward each of the progress goals as defined in Step 2b and additional metrics as appropriate. Also, all Partner project recipients will submit the following reports based on the project start date to the Program Director:
    a. Semi-annual reports (due 30 days after the semi-annual period) throughout the project period including time periods during no-cost extensions,
    b. One final report (due 90 days after project completion).
    c. Federal Partners must submit reports to the Program Director, and State Partners must submit reports to both the Program Director and the appropriate NOAA Grants office.
c) Program staff will conduct an initial assessment of the final report to ensure the report is complete in terms of reporting requirements. Program staff will serve as technical monitors to review submitted reports. NOAA staff also reviews the reports submitted via Grants Online.
d) Reports shall be submitted using the following format:
    a. Semi-Annual(s) – Progress Reports: (3-4 pages)
        i. Title page - Project name, project dates (semi-annual period covered and complete project period), submitting Partner, and date.
        ii. Objective
        iii. Activities Completed – bulleted list by objective.
        iv. Progress or lack of progress of incomplete activities during the period of semi-annual progress – bulleted list by objective.
        v. Activities planned during the next reporting period.
        vi. Metrics table
        vii. Milestone Chart – original and revised if changes occurred during the project period.
    b. Final Report:
        i. Title page – Project name, project dates, submitting Partner, and date.

ii. Abstract/Executive Summary (including key results)
iii. Introduction
iv. Procedures
v. Results:
    1. Description of data collected.
    2. The quality of the data pertaining to the objective of the project (e.g. representative to the scope of the project, quantity collected, etc.).
    3. Compiled data results.
    4. Summary of statistics.
vi. Discussion:
    1. Discuss the interpretation of results of the project by addressing questions such as, but not limited to:
        a. What occurred?
        b. What did not occur that was expected to occur?
        c. Why did expected results not occur?
    2. Applicability of study results to Program goals.
    3. Recommendations/Summary/Metrics
vii. Summarized budget expenditures and deviations (if any).

e) A project approved on behalf of a Program Committee will be required to follow the reporting requirements specified above. The principle investigator (if not the Chair of the Committee) will submit the report(s) to the Chair and Vice Chair of the Committee for review and approval. The Committee Chair is responsible for submitting the required report(s) to the Program.

f) Joint projects will assign one principle investigator responsible for submitting the required reports. The principle investigator will be identified within the project proposal. The submitted reports should be a collaborative effort between all partners involved in the joint project.

g) Project recipients will provide all reports to the Program in electronic format.

h) Partners who receive no-cost extensions must notify the Program Director within 30 days of receiving approval of the extension. Semi-annual and final reports will continue to be required through the extended grant period as previously stated.

i) Partners that have not met reporting requirements for past/current projects may not submit a new proposal.

j) A verbal presentation of project results may be requested. Partners will be required to submit copies of project specifications and procedures, software development, etc. to assist other Program Partners with the implementation of similar programs.

Programmatic review

Project reports will inform Partners of project outcomes. This will allow the Program as a whole to take advantage of lessons learned and difficulties encountered. Staff will provide final reports to the appropriate Committee(s). The Committees then can discuss the report(s) and make recommendations to modify the Data Collection Standards as appropriate. The recommendations will be submitted through the Program committee(s) review process.

BUDGET GUIDELINES & TEMPLATE FOR PROPOSALS

All applications must have a detailed budget narrative explaining and justifying the expenditures by object class. Include in the discussion the requested dollar amounts and how they were derived. A spreadsheet or table detailing expenditures is useful to clarify the costs (see template below). The following are highlights from the NOAA Budget Guidelines document to help Partners formulate their budget narrative. The full Budget Guidelines document is available at:
http://www.greateratlantic.fisheries.noaa.gov/ob/grants/budget_narrative_guidance-04.09.2015.pdf

Object Classes:
a. Personnel: include salary, wage, and hours committed to project for each person by job title. Identify each individual by name and position, if possible.
b. Fringe Benefits: should be identified for each individual. Describe in detail if the rate is greater than 35 % of the associated salary.
c. Travel: all travel costs must be listed here. Provide a detailed breakdown of travel costs for trips over $5,000 or 5 % of the award. Include destination, duration, type of transportation, estimated cost, number of travelers, lodging, mileage rate and estimated number of miles, and per diem.
d. Equipment: equipment is any single piece of non-expendable, tangible personal property that costs $5,000 or more per unit and has a useful life of more than one year. List each piece of equipment, the unit cost, number of units, and its purpose. Include a lease vs. purchase cost analysis. If there are no lease options available, then state that.

e. Supplies: purchases less than $5,000 per item are considered by the federal government as supplies. Include a detailed, itemized explanation for total supplies costs over $5,000 or 5% of the award.
f.Contractual: list each contract or subgrant as a separate item. Provide a detailed cost breakdown and describe products/services to be provided by the contractor. Include a sole source justification, if applicable.
h. Other: list items, cost, and justification for each expense.
i. Total direct charges
j. Indirect charges: If claiming indirect costs, please submit a copy of the current approved negotiated indirect cost agreement. If expired and/or under review, a copy of the transmittal letter that accompanied the indirect cost agreement application is requested.
k. Totals of direct and indirect charges

Example budget table template. Budget narrative should provide further detail on these costs.

Description	Calculation	Cost
Personnel (a)		
Supervisor	Ex: 500 hrs x $20/hr	$10,000
Biologist		
Technician		
Fringe (b)		
Supervisor	Ex: 15% of salary	$1500
Biologist		
Technician		
Travel (c)		
Mileage for sampling trips	Ex: Estimate 2000 miles x $0.33/mile	$660
Travel for meeting		
Equipment (d)		
Boat	Ex: $7000, based on current market research	$7000
Supplies (e)		
Safety supplies		$1200
Sampling supplies		$1000
Laptop computers	2 laptops @$1500 each	$3000
Software		$500

Contractual (f)		
Data Entry Contract	Ex: 1000 hrs x $20/hr	$20,000
Other (h)		
Printing and binding		
Postage		
Telecommunications charges		
Internet Access charges		
Totals		
Total Direct Charges (i)		
Indirect Charges (j)		
Total (sum of Direct and Indirect) (k)		

Appendix A: Ranking Criteria Spreadsheet for Maintenance and New Project

Ranking Guide – Maintenance Projects:

Primary Program Priority	**Point Range**	**Description of Ranking Consideration**
Catch and Effort Biological Sampling	0 – 10 0 – 10	Rank based on range within module and level of sampling defined under Program design. When considering biological, bycatch or recreational funding, rank according priority matrices.
Bycatch/Species Interactions Social and Economic	0 – 6 0 – 4	
Data Delivery Plan	+ 2	Additional points if a data delivery plan to Program is supplied and defined within the proposal.

Project Quality Factors	**Point Range**	**Description of Ranking Consideration**
Multi-Partner/Regional impact including broad applications	0 – 5	Rank based on the number of Partners involved in project OR regional scope of proposal (e.g. geographic range of the stock).

> yr 2 contains funding transition plan and/or justification for continuance	0 – 4	Rank based on defined funding transition plan away from Program funding or viable justification for continued Program funding.
In-kind contribution	0 – 4	1 = 1% - 25% 2 = 26% - 50% 3 = 51% - 75% 4 = 76% - 99%
Improvement in data quality/quantity/timeliness	0 – 4	1 = Maintain minimum level of needed data collections 4 = Improvements in data collection reflecting 100% of related module as defined within the Program design. Metadata is provided and defined within proposal if applicable.
Potential secondary module as a by-product (In program priority order)	0 – 3 0 – 3 0 – 3 0 – 1	Ranked based on additional module data collection and level of collection as defined within the Program design of individual module.
Impact on stock assessment	0 – 3	Rank based on the level of data collection that leads to new or greatly improved stock assessments.

Other Factors	**Point Range**	**Description of Ranking Consideration**
Properly Prepared	-1 – 1	Meets requirements as specified in funding decision document Step 2b and Guidelines
Merit	0 – 3	Ranked based on subjective worthiness

<u>Ranking Guide – Maintenance Projects:</u> (*to be used only if funding available exceeds total Maintenance funding requested*)

Ranking Factors	**Point Range**	**Description of Ranking Consideration**
Achieved Goals	0 – 3	Proposal indicates project has consistently met previous set goals. Current proposal provides project goals and if applicable, intermediate metrics to achieve overall achieved goals.

Data Delivery Plan	0 – 2	Ranked based if a data delivery plan to Program is supplied and defined within the proposal.
Level of Funding	-1 – 1	-1 = Increased funding from previous year 0 = Maintained funding from previous year 1 = Decreased funding from previous year
Properly Prepared	-1 – 1	-1 = Not properly prepared 1 = Properly prepared
Merit	0 – 3	Ranked based on subjective worthiness

Ranking Guide – New Projects:

Primary Program Priority	**Point Range**	**Description of Ranking Consideration**
Catch and Effort Biological Sampling	0 – 10 0 – 10	Rank based on range within module and level of sampling defined under Program design. When considering biological, bycatch or recreational funding, rank according priority matrices.
Bycatch/Species Interactions Social and Economic	0 – 6 0 – 4	
Data Delivery Plan	+ 2	Additional points if a data delivery plan to Program is supplied and defined within the proposal.

Project Quality Factors	**Point Range**	**Description of Ranking Consideration**
Multi-Partner/Regional impact including broad applications	0 – 5	Rank based on the number of Partners involved in project OR regional scope of proposal (e.g. fisheries sampled).
Contains funding transition plan / Defined end-point	0 – 4	Rank based on quality of funding transition plan or defined end point.
In-kind contribution	0 – 4	1 = 1% - 25% 2 = 26% - 50% 3 = 51% - 75% 4 = 76% - 99%
Improvement in data quality/quantity/timeliness	0 – 4	1 = Maintain minimum level of needed data collections ↓ 4 = Improvements in data collection reflecting 100% of related module as defined within the Program design.

		Metadata is provided and defined within proposal if applicable.
Potential secondary module as a by-product (In program priority order)	0 – 3 0 – 3 0 – 3 0 – 1	Ranked based on additional module data collection and level of collection as defined within the Program design of individual module.
Impact on stock assessment	0 – 3	Rank based on the level of data collection that leads to new or greatly improved stock assessments.

Other Factors	**Point Range**	**Description of Ranking Consideration**
Innovative	0 – 3	Rank based on new technology, methodology, financial savings, etc.
Properly Prepared	-1 – 1	Meets requirements as specified in funding decision document Step 2b and Guidelines
Merit	0 – 3	Ranked based on subjective worthiness

Biological Sampling Priority Matrix

Created in February 2017

For FY2018

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Biological Review Panel recommends:

- Species in the upper 25% of the priority matrix should be considered for funding.

- Sampling projects which cover multiple species within the upper 25% are highly recommended.

Biological Review Panel recommendations based on matrix*:

* UPPER 25% OF MATRIX

New Species															
Species	Overfished	Overfishing	Most Recent Stock Assessment	Current/Next Stock Assessment	Council Priority	ASMFC Priority	State Priority	NMFS Priority	Fishery Managed	Sig. change in landings w/in 24 mo	Sig. change in mgmt w/in 24 mo	Adequacy of level of sampling	Stock Resilience	Seasonality of Fishery	TOTAL
Atlantic halibut *Hippoglossus hippoglossus*	U	U	2015	2017	4.0	0	1.1	4.0	1	5	1	4	5	3	28.07
Atlantic Smooth Dogfish *Mustelus canis*	N	N	2015		3.0	3	1.3	3.0	1	3	3	3	2	3	25.29
American Eel *Anguilla rostrata*	Y	Y	2012	Update 2017	0.0	5	3.5	0.0	1	1	5	4	5	1	25.50
American Lobster *Homarus americanus*	N	N	2015		0.0	5	2.6	3.0	1	1	3	3	4	1	23.57
Atlantic Menhaden *Brevoortia tyrannus*	N	N	2015	Update 2017	0.0	5	2.1	3.0	1	1	5	2	3	1	23.14
Black Sea Bass *Centropristis striata*	N: MA N:SA	N: MA N:SA	2016	2017	5.0	5	3.4	5.0	1	1	4	3	3	1	31.36
Bluefin Tuna *Thunnus thynnus*	Y	N	2014	2017	0.0	0	1.6	5.0	1	5	5	3	3	1	24.64
Blueline Tilefish *Caulolatilus microps*	N	Y	2013	Benchmark 2017	5.0	0	1.1	5.0	1	3	5	4	3	3	30.14
Cobia *Rachycentron canadum*	N	N	2012	2020	5.0	4	1.4	3.0	1	1	3	4	3	3	28.36
Dolphin *Coryphaena hippurus*	U	U			5.0	0	1.3	3.0	1	3	3	3	1	3	23.29
Gag Grouper *Mycteroperca microlepis*	N	N	2014	2020	5.0	0	0.9	4.0	1	1	2	3	4	3	23.93
Gray Triggerfish *Balistes capriscus*	U	U	2016		5.0	0	1.0	4.0	1	5	4	4	2	3	29.00
Red Drum *Sciaenops ocellatus*	U	N	2017		1.0	5	1.2	1.0	1	5	0	3	3	3	23.21
Red Grouper *Epinephelus morio*	Y	Y	2010	2017	5.0	0	1.0	4.0	1	1	0	4	4	3	23.00
Red Snapper *Lutjanus campechanus*	Y	Y	2016		5.0	0	0.7	5.0	1	1	1	2	5	5	25.71
Scamp *Mycteroperca phenax*	U	U		2020	5.0	0	0.9	3.0	1	1	3	4	4	3	24.86
Snowy Grouper *Epinephelus niveatus*	Y	N	2013	2019	5.0	0	1.1	5.0	1	3	4	4	5	3	31.14
Spanish Mackerel *Scomberomorus maculatus*	N	N	2012	2019	5.0	2	1.4	4.0	1	1	3	3	2	1	23.36
Tilefish *Lopholatilus chamaeleonticeps*	N: MA N:SA	N: MA Y:SA	2016		5.0	0	1.7	4.0	1	1	2	4	4	3	25.71
Winter Flounder *Pleuronectes americanus*	Y: GB U: GOM Y: SNE/MA	Y: GB U: GOM Y: SNE/MA	2016	Update 2017	5.0	2	2.4	5.0	1	3	0	2	4	1	25.43
Winter Skate *Raja ocellata*	N	Y	2016		4.0	0	0.9	3.0	1	5	1	3	5	1	23.86

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Bio-sampling Priority Matrix

Averaged Priority Columns		Biological Sampling Adequacy	
		Adequate (0 - 2)	Inadequate (3 - 5)
	High (≥ 3.0)	Winter Flounder	Black Sea Bass - Cobia - Spanish Mackerel
	Low (< 3.0)	Red Snapper - Atlantic Menhaden	Atlantic Halibut - Atlantic Smooth Dogfish - American Eel - American Lobster - Bluefin Tuna - Blueline Tilefish - Dolphin - Gag Grouper - Gray Triggerfish - Red Drum - Red Grouper - Scamp - Snowy Grouper - Tilefish - Winter Skate

Grouping of species in upper 25% of total matrix score, based on sampling adequacy and average priority (average of ASMFC, Council, NMFS and State priorities).

- Red Snapper and Atlantic Menhaden are being sampled adequately and have low priority so additional sampling is not needed.
- Projects that target multiple upper quartile species should be given a higher priority.

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Bycatch Sampling Priority Matrix

Created in February 2017

For FY 2018

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Top Quartile of Bycatch Matrix Suggestions

	Sig. Change in mgmt w/in past 36 mo	Amt of reg discards	Amt of non reg discards	Prot Spp Interactions	Score
Combined Fleets					
Mid-Atlantic Gillnet	3	4	2	5	14
Southeastern, Atlantic and Gulf of Mexico HMS Pelagic Longline	3	4	1	5	13
New England Extra-Large-Mesh Gillnet	0	4	2	5	11
South Atlantic shrimp Trawl	0	4	2	5	11
South Atlantic, black sea bass Pot	3	2	1	5	11
New England Otter Trawl	1	4	2	3	10
Mid-Atlantic Pound Net	1	4	2	3	10
American Lobster Pots - SNE	1	2	1	5	9
New England Gillnet	1	2	1	5	9
Mid-Atlantic Small-Mesh Otter Trawl, Bottom	1	4	1	3	9
South Atlantic Otter Trawl	0	4	2	3	9
Mid-Atlantic Eel Trap/Pot	1	2	1	5	9
New England Fish Pots and Traps	3	2	1	3	9
New England Floating Trap	1	2	1	5	9
South Atlantic Large Mesh Gillnet	0	4	2	3	9
Mid-Atlantic Bottom Longline	3	2	1	3	9
Southeast Calico Scallop Trawl	0	2	2	5	9
South Atlantic small mesh gillnet	1	2	1	5	9

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Additional Fleets of Importance

- Mid-Atlantic Purse Seine: Menhaden
- HMS species, South Atlantic dealer data not included in Trips dataset
- Pelagic Longline Fleet reports via logbooks which are not in the Trips data
- Snapper Grouper H&L Fleet: volatile and have bycatch issues

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ACCSP Funding Prioritization of the Recreational Technical Committee

July 2017

The Recreational Technical Committee sets the recreational data collection priorities for inclusion in ACCSP's annual request for proposals (RFP). In 2017, the committee opted to use its Atlantic Coast Recreational Implementation Plan priorities as the recreational data priorities for ACCSP's annual funding process. The prioritized list of data needs, which were reviewed and approved by the ACCSP Coordinating Council, is provided below:

1. **Improve precision (PSE) of MRIP catch estimates**
2. **Comprehensive for-hire data collection and monitoring**
   Improved recreational fishery discard and release data
4. **Biological sampling for recreational fisheries separate from MRIP APAIS**
5. **Improved spatial resolution and technical guidance for post-stratification of MRIP estimates**
6. **Improved timeliness of recreational catch and harvest estimates**

Atlantic Coastal Cooperative Statistics Program
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703.842.0780 | 703.842.0779 (fax) | www.accsp.org

This list includes dates for fiscal year 2018 in preparation for FY2019 funding. If you have any questions or comments on this calendar, please do not hesitate to contact Ali Schwaab, ACCSP Program Manager, at alexandra.schwaab@accsp.org.

March 1:	Start of ACCSP FY18
Week of April 30:	ASMFC Meeting/ACCSP Executive Committee Meeting and Coordinating Council Meeting; ACCSP issues request for proposals - Alexandria, VA
June 11:	Initial proposals are due
June 18:	Initial proposals are distributed to ACCSP Operations and Advisory Committees
Week of July 9:	Review of initial proposals for ACCSP Operations and Advisory Committees (webinar)
Week of July 23:	Feedback submitted to principal investigators
August 13:	Revised proposals due
August 20:	Revised proposals distributed to ACCSP Operations and Advisory Committees
Week of August 27:	Preliminary ranking exercise for Advisors (webinar)
September 24-25:	Annual Advisors and Operations Committee Joint Meeting (in-person; location TBD)

Ranking Guide – Maintenance Projects:

Primary Program Priority	**Point Range**	**Description of Ranking Consideration**
Catch and Effort Biological Sampling	0 – 10 0 – 10	Rank based on range within module and level of sampling defined under Program design. When
Bycatch/Species Interactions Social and Economic	0 – 6 0 – 4	considering biological, bycatch or recreational funding, rank according priority matrices.
Data Delivery Plan	+ 2	Additional points if a data delivery plan to Program is supplied and defined within the proposal.

Project Quality Factors	**Point Range**	**Description of Ranking Consideration**
Multi-Partner/Regional impact including broad applications	0 – 5	Rank based on the number of Partners involved in project OR regional scope of proposal (e.g. geographic range of the stock).
> yr 2 contains funding transition plan and/or justification for continuance	0 – 4	Rank based on defined funding transition plan away from Program funding or viable justification for continued Program funding.
In-kind contribution	0 – 4	1 = 1% - 25% 2 = 26% - 50% 3 = 51% - 75% 4 = 76% - 99%
Improvement in data quality/quantity/timeliness	0 – 4	1 = Maintain minimum level of needed data collections ↓ 4 = Improvements in data collection reflecting 100% of related module as defined within the Program design. Metadata is provided and defined within proposal if applicable.
Potential secondary module as a by-product (In program priority order)	0 – 3 0 – 3 0 – 3	Ranked based on additional module data collection and level of collection as defined within the Program design of individual module.
	0 – 1	
Impact on stock assessment	0 – 3	Rank based on the level of data collection that leads to new or greatly improved stock assessments.

Other Factors	**Point Range**	**Description of Ranking Consideration**
Properly Prepared	-1–1	Meets requirements as specified in funding decision document Step 2b and Guidelines
Merit	0 – 3	Ranked based on subjective worthiness

<u>Ranking Guide – Maintenance Projects:</u> (*to be used only if funding available exceeds total Maintenance funding requested*)

Ranking Factors	Point Range	Description of Ranking Consideration
Achieved Goals	0 – 3	Proposal indicates project has consistently met previous set goals. Current proposal provides project goals and if applicable, intermediate metrics to achieve overall achieved goals.
Data Delivery Plan	0 – 2	Ranked based if a data delivery plan to Program is supplied and defined within the proposal.
Level of Funding	-1 – 1	-1 = Increased funding from previous year 0 = Maintained funding from previous year 1 = Decreased funding from previous year
Properly Prepared	-1 – 1	-1 = Not properly prepared 1 = Properly prepared
Merit	0 – 3	Ranked based on subjective worthiness

Ranking Guide – New Projects:

Primary Program Priority	Point Range	Description of Ranking Consideration
Catch and Effort Biological Sampling	0 – 10 0 –10	Rank based on range within module and level of sampling defined under Program design. When
Bycatch/Species Interactions Social and Economic	0 – 6 0 – 4	considering biological, bycatch or recreational funding, rank according priority matrices.
Data Delivery Plan	+ 2	Additional points if a data delivery plan to Program is supplied and defined within the proposal.

Project Quality Factors	Point Range	Description of Ranking Consideration
Multi-Partner/Regional impact including broad applications	0 – 5	Rank based on the number of Partners involved in project OR regional scope of proposal (e.g. fisheries sampled).
Contains funding transition plan / Defined end-point	0 – 4	Rank based on quality of funding transition plan or defined end point.
In-kind contribution	0 – 4	1 = 1% - 25% 2 = 26% - 50% 3 = 51% - 75% 4 = 76% - 99%
Improvement in data quality/quantity/timeliness	0 – 4	1 = Maintain minimum level of needed data collections ↓ 4 = Improvements in data collection reflecting 100% of related module as defined within the Program design. Metadata is provided and defined within proposal if applicable.
Potential secondary module as a by-product (In program priority order)	0 – 3 0 – 3 0 – 3 0 – 1	Ranked based on additional module data collection and level of collection as defined within the Program design of individual module.
Impact on stock assessment	0 – 3	Rank based on the level of data collection that leads to new or greatly improved stock assessments.

Other Factors	Point Range	Description of Ranking Consideration
Innovative	0 – 3	Rank based on new technology, methodology, financial savings, etc.
Properly Prepared	-1–1	Meets requirements as specified in funding decision document Step 2b and Guidelines
Merit	0 – 3	Ranked based on subjective worthiness

Atlantic States Marine Fisheries Commission

Executive Committee

May 2, 2018
8:30 – 10:30 a.m.
Arlington, Virginia

Draft Agenda

The order in which these items will be taken is subject to change;
other items may be added as necessary.

A portion of this meeting may be a closed session for Commissioners and Committee members only

1. Welcome/Call to Order *(J. Gilmore)*

2. Committee Consent
   - Approval of Agenda
   - Approval of Meeting Summary from February 2018

3. Public Comment

4. Report of the Administrative Oversight Committee *(P. Keliher)*
   - Presentation of the FY19 Budget **Action**

5. Report on Legal Opinion Regarding Proxies Serving as Officers *(R. Beal)*

6. Discuss Commissioner Conflict of Interest *(R. Beal)*

7. Discuss Appeals Process *(R. Beal)*

8. Discuss Future Scope of MRIP/APAIS Activities *(R. Beal/M. Cahall)*

9. Future Annual Meetings Update *(L. Leach)*
   - October 21-25, 2018 – New York, New York
   - October 27-31, 2019 – Portsmouth, New Hampshire
   - 2020 – New Jersey
   - 2021 – North Carolina

10. Executive Director Performance Review **Closed Session**

11. Other Business/Adjourn

Please Note: Breakfast will be served when you arrive; you may arrive as early as 8:00 a.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street Arlington, Virginia; 703.486.1111

Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

May 2, 2018
10:45 a.m. – 12:30 p.m.
Arlington, Virginia

Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*N. Meserve*) 10:45 a.m.

2. Board Consent 10:45 a.m.
   - Approval of Agenda
   - Approval of Proceedings from November 2017

3. Public Comment 10:50 a.m.

4. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Single Species Benchmark Stock Assessment and Peer Review (*K. Anstead*) **Action** 11:00 a.m.

5. Review and Populate the Atlantic Menhaden Stock Assessment Subcommittee Membership (*K. Anstead*) **Action** 11:15 a.m.

6. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Ecosystem-Based Benchmark Stock Assessment and Peer Review (*K. Drew*) **Action** 11:20 a.m.

7. Review and Consider 2018 Fishery Management Plan Review and State Compliance Reports (*M. Appelman*) **Action** 11:45 a.m.
   - Review State Implementation Plans for Amendment 3

8. Other Business/Adjourn 12:30 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia 22202; 703.486.1111

MEETING OVERVIEW

Atlantic Menhaden Management Board Meeting
May 2, 2018
10:45 a.m. – 12:30 p.m.
Arlington, Virginia

Chair: Nichola Meserve (MA) Assumed Chairwomanship: 05/18	Technical Committee Chair: Joey Ballenger (RI)	Law Enforcement Committee Representative: Capt. Kersey (MD)
Vice Chair: Vacant	Advisory Panel Chair: Jeff Kaelin (NJ)	Previous Board Meeting: November 13 and 14, 2017
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (18 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from November 2017

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Single-Species Benchmark Stock Assessment and Peer-Review (11:00-11:15 a.m.) Action

Background

- The Technical Committee drafted terms of reference for the upcoming benchmark stock assessment for Board review and approval (**Briefing Materials**).

Presentations

- Review single-species benchmark stock assessment terms of reference by K. Anstead

Board actions for consideration at this meeting

- Approve single-species benchmark stock assessment terms of reference

5. Review and Consider Approval of Atlantic Menhaden Stock Assessment Subcommittee Membership (11:15-11:20 a.m.) Action

Background

- The next benchmark assessment for Atlantic menhaden is scheduled for review in 2019
- The Stock Assessment Subcommittee is repopulated prior to a benchmark assessment.

Presentations

- Stock Assessment Subcommittee membership by K. Anstead

Board actions for consideration at this meeting

- Approve Stock Assessment Subcommittee membership

6. Review and Consider Approval of Terms of Reference for the 2019 Atlantic Menhaden Ecosystem-Based Benchmark Stock Assessment and Peer-Review (11:20-11:45 a.m.) Action
Background • The Ecological Reference Point Work Group drafted terms of reference for the upcoming Atlantic menhaden ecosystem-based benchmark stock assessment for Board review and approval (**Briefing Materials**).
Presentations • Stock Assessment Subcommittee membership by K. Drew
Board actions for consideration at this meeting • Approve Stock Assessment Subcommittee membership

7. Review and Consider 2018 Fishery Management Plan Review and State Compliance (11:45 a.m.-12:30 p.m.) Action
Background • Annual state compliance reports for Atlantic menhaden are due April 1st • The Plan Review Team (PRT) reviewed the reports and drafted the 208 Fishery Management Plan (FMP) Review (**supplemental materials**). • The FMP Review includes updated 2018 state quotas and the PRT's review of state implementation plans for Amendment 3
Presentations • 2018 FMP Review and State Compliance by M. Appelman
Board Actions for Consideration • Consider the 2018 Fishery Management Plan Review and State Compliance

8. Other Business/Adjourn

Atlantic Menhaden

Activity level: High

Committee Overlap Score: High (SAS, ERP WG overlaps with American eel, striped bass, northern shrimp, Atlantic herring, horseshoe crab, weakfish)

Committee Task List

- TC, SAS, BERP – January-March – 2019 Benchmark stock assessment planning and data collection
- TC – April 1st: Annual compliance reports due
- TC, SAS, ERP WG – April 23rd-27th – Data workshop
- ERP WG– September – Data/Modelling workshop

TC Members: Joey Ballenger (SC, TC Chair), Jason McNamee (RI), Lindsey Aubart (GA), Jeff Brust (NJ), Matt Cieri (ME), Ellen Cosby (PRFC), Micah Dean (MA), Corrin Flora (NC), Kurt Gottschall (CT), Jesse Hornstein (NY), Rob Latour (VIMS), Behzad Mahmoudi (FL), Ray Mroch (NMFS), Josh Newhard (USFWS), Derek Orner (NMFS), Amy Schueller (NMFS), Alexei Sharov (MD), Jeff Tinsman (DE), Kristen Anstead (ASMFC), Max Appelman (ASMFC)

SAS Members: Amy Schueller (NMFS, SAS Chair), Matt Cieri (ME), Micah Dean (MA), Robert Latour (VIMS), Behzad Mahmoudi (FL), Ray Mroch (NMFS), Jason McNamee (RI), Alexei Sharov (MD), Kristen Anstead (ASMFC), Max Appelman (ASMFC), Josh Newhard (USFWS), Joey Ballenger (SC, TC chair)

ERP WG Members: Matt Cieri (ME, BERP Chair), Jeff Brust (NJ), Michael Celestino (NJ), David Chagaris (FL), Micah Dean (MA), Rob Latour (VIMS), Jason McNamee (RI), Amy Schueller (NFMS), Alexei Sharov (MD), Howard Townsend (NFMS), Jim Uphoff (MD), Kristen Anstead (ASMFC), Katie Drew (ASMFC), Max Appelman (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC MENHADEN MANAGEMENT BOARD

BWI Airport Marriot
Linthicum Heights, Maryland
November 13, 2017
November 14, 2017

These minutes are draft and subject to approval by the Atlantic Menhaden Management Board
The Board will review the minutes during its next meeting

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Monday November 13, 2017

Tuesday November 14, 2017

PLEASE NOTE: PROCEEDINGS OF THE FIRST FEW MINUTES OF THE BOARD RECONVENING ON THE AFTERNOON OF NOVEMBER 14 ARE UNAVAILABLE.

INDEX OF MOTIONS

1. **Approval of Agenda** by Consent (Page 1).

2. **Approval of Proceedings of August 2017** by Consent (Page 1).

3. **Move to adopt reference point Alternative E: BERP Workgroup continues to develop menhaden-specific ERPs with interim use of 75 percent target and 40 percent threshold as described in Draft Amendment 3** (Page 24). Motion by David Borden, second by Nichola Meserve. Motion substituted.

4. **Move to substitute Option B: The BERP Working Group continues to develop menhaden-specific ERPs with the interim use of single-species reference points as described in Draft Amendment 3** (Page 25). Motion by Pat Keliher, second by Russ Allen. Motion carried and becomes the main motion (Page 37).

   Main Motion: Option B: The BERP Working Group continues to develop menhaden-specific ERPs with the interim use of single-species reference points as described in Draft Amendment 3. Motion to amend (Page 37).

5. **Move to amend to add set the TAC at 200,000 metric tons for the next two years (2018-2019)** (Page 37). Motion by Robert Boyles; second by John McMurray. Motion fails (Page 39).

   Main Motion: Option B: The BERP Working Group continues to develop menhaden-specific ERPs with the interim use of single-species reference points as described in Draft Amendment 3. Motion carried (Page 39).

6. **Move that if a fixed minimum option is selected the following conditions would govern the activity: at the start of each fishing year and no later than January 31, states must declare if they want to participate in the fixed minimum program. States have the option to opt-out of the program and decline their fixed minimum allocation, or maintain 10,000 pounds of bycatch purposes and decline the remainder of their quota**

   States also have the right to opt-in to the program and receive their full allocation. In declaring its intent to receive its fixed minimum quota, a state can also choose to receive all, or part, of this amount. If a jurisdiction declines its full allocation it must specifically identify the amount requested. States which opt-in must demonstrate that the state has the intent and the ability to commercially harvest some, or all, of its menhaden quota for the directed or bycatch fishery.

   This can be demonstrated through the issuance of permits for applicable gear types or species, historic landings, or the abundance of menhaden in state and/or federal waters. Any quota that is not received by a state is re-distributed to the other jurisdictions based on historical landings

from the time-period selected by the Board in this Amendment (Page 51. Motion tabled until Issue 2 is addressed on Page 55. Motion by Pat Keliher; second by Ritchie White.

7. **Move to table under Issue 2: Allocation Methods and Timeframes has been decided** (Page 55). Motion by Adam Nowalsky; second by Rob O'Reilly. Motion passes (Page 55).
8. **Move to set a total allowable catch; not to exceed 216,000 metric tons until such time that ecological reference points are utilized for Atlantic menhaden management** (Page 56). Motion by Jim Estes; second by Spud Woodward. Motion to substitute (Page 57).

9. **Move to substitute to set a total allowable catch of 240,000 metric tons for 2018 and 2019** (Page 57). Motion by Adam Nowalsky; second by David Bush. Motion fails (Page 60).

Main motion: to set a total allowable catch not to exceed 216,000 metric tons until such a time that ecological reference points are utilized for menhaden management. Motion to substitute (Page 61).

10. **Move to substitute to set a total allowable catch not to exceed 220,000 metric tons for 2018 and 2018 or until menhaden-specific ecological reference points are available for management use, whichever is first** (Page 61). Motion by David Bush; second by Rachel Dean. Motion fails (Page 67).

Main motion: to set a total allowable catch not to exceed 216,000 metric tons until such a time that ecological reference points are utilized for menhaden management. Motion substituted.

11. **Move to substitute to set a total allowable catch not to exceed and be set at 216,000 metric tons for 2018 and 2019 or unless menhaden-specific ecological reference points are available for management use** (Page 67). Motion by Rachel Dean; second by Steve Train. Motion carried (Page 73).

12. **Move to limit debate** (Page 72). Motion by Dennis Abbott; second by Lauren Lustig. Motion carried (Page 72).

Main Motion as Substituted: Motion to set a total allowable catch to not exceed and be set at 216,000 metric tons until such a time that ecological reference points are utilized for menhaden management. Motion carried (Page 74).

13. **Move to choose the following options in Draft Amendment 3: Section 4.3.2 Allocation Method Option C with a jurisdictional allocation with a Minimum Base Allocation of 0.75 percent fixed minimum for the Quota Timeframe of 2012 to 2016. Section 4.3.3 Quota Transfer Option A: Quota Transfer would be permitted. Section 4.3.4: Quota Rollover Option A: Unused Quota May Not Be Rolled Over** (Page 75). Motion by Pat Keliher; second by Ritchie White. Motion to amend (Page 75).

14. **Motion to Amend: Section 4.3.3 Allocation method Option C; jurisdictional allocation with a minimum base allocation of a 1.0 fixed minimum** (Page 75). Motion by Emerson Hasbrouck; second by Nichola Meserve. Motion fails (Page 77).

15. **Motion to Amend: To substitute the first bullet with "Option F under Section 4.3.2; Allocation based on TAC level"** (Page 78). Motion by Rob O'Reilly; second by David Bush; Motion fails (Page 80).

    Main Motion: to choose the following options in Draft Amendment 3: Section 4.3.2 Allocation Method Option C with a jurisdictional allocation with a Minimum Base Allocation of 0.75 percent fixed minimum for the Quota Timeframe of 2012 to 2016. Section 4.3.3 Quota Transfer Option A: Quota Transfer would be permitted. Section 4.3.4: Quota Rollover Option A: Unused Quota May Not Be Rolled Over. Motion carried (Page 80).

16. **Move to bring the tabled motion back for consideration by the Board** (Page 80). Motion by Adam Nowalsky; second by Emerson Hasbrouck. Motion carried (Page 80).

    Tabled Motion: Move that if a fixed minimum option is selected the following conditions would govern the activity: at the start of each fishing year and no later than January 31, states must declare if they want to participate in the fixed minimum program. States have the option to opt-out of the program and decline their fixed minimum allocation, or maintain 10,000 pounds of bycatch purposes and decline the remainder of their quota.

    States also have the right to opt-in to the program and receive their full allocation. In declaring its intent to receive its fixed minimum quota, a state can also choose to receive all, or part, of this amount. If a jurisdiction declines its full allocation it must specifically identify the amount requested. States which opt-in must demonstrate that the state has the intent and the ability to commercially harvest some, or all, of its menhaden quota for the directed or bycatch fishery.

    This can be demonstrated through the issuance of permits for applicable gear types or species, historic landings, or the abundance of menhaden in state and/or federal waters. Any quota that is not received by a state is re-distributed to the other jurisdictions based on historical landings from the time-period selected by the Board in this Amendment. Motion to Substitute (Page 85).

17. **Move to substitute that "at the start of each fishing year and no later than January 31st, states may declare if they want to opt-out of the fixed minimum program. States may declare to opt-out of the program and decline all or part of their fixed minimum allocation. If a jurisdiction declines part of their allocation it must specifically identify the amount they do not wish to receive. Any quota that is not received by a state is redistributed to the other jurisdictions based on historic landings from the time-period selected by the Board in this Amendment** (Page 85). Motion fails (Page 93).

    Main Motion: Motion that if a fixed minimum option is selected the following conditions would govern the activity: at the start of each fishing year and no later than January 31, states must declare if they want to participate in the fixed minimum program. States have the option to opt-out of the program and decline their fixed minimum allocation, or maintain 10,000 pounds of bycatch purposes and decline the remainder of their quota.

    States also have the right to opt-in to the program and receive their full allocation. In declaring its intent to receive its fixed minimum quota, a state can also choose to receive all, or part, of this amount. If a jurisdiction declines its full allocation it must specifically identify the amount

requested. States which opt-in must demonstrate that the state has the intent and the ability to commercially harvest some, or all, of its menhaden quota for the directed or bycatch fishery.

This can be demonstrated through the issuance of permits for applicable gear types or species, historic landings, or the abundance of menhaden in state and/or federal waters. Any quota that is not received by a state is re-distributed to the other jurisdictions based on historical landings from the time-period selected by the Board in this Amendment.

18. **Move to reconsider the allocation method** (Page 93) Motion by Robert Boyles; second by Roy Miller. Motion carried (Page 94). **NOTE:** ***No verbatim transcripts included for this motion***

19. **Move to reconsider the allocation method: To select Section 4.3.2 Allocation Method: Option C, Jurisdictional Allocation with a Fixed Minimum with a 0.5 percent fixed minimum; Allocation Timeframe: 2009-2011. Section 4.3.3 Quota Transfers Option A: Quota Transfers Permitted**

    Section 4.3.4 Quota Rollover Option A: Unused Quota May Not Be Rolled Over. Section 4.3.5 Incidental Catch and Small Scale Fisheries: Option B modified to include purse seines smaller than 150 fathom long by 8 fathom deep would be considered small scale gear. Section 4.3.6 Episodic Events Option A: 1 percent Set Aside (Page 95). Motion by Robert Boyles; second by David Bush. Motion carried (Page 104).

20. **Move to select under Section 4.3.7: Chesapeake Bay Reduction Fishery Cap, Option A. Cap set at 87,216 metric tons, and Sub-option A; limited rollover of unused cap permitted up to 10,976 metric tons** (Page 105). Motion by Rob O'Reilly; second by Adam Nowalsky. Motion substituted.

21. **Move to substitute to select Option B: cap set at 51,000 metric tons and Sub-option B; no rollover of unused cap permitted** (Page 105). Motion by Allison Colden; second by John McMurray. Motion carried (Page 110).

    Main motion as substituted: to select Option B: cap set at 51,000 metric tons and Sub-option B; no rollover of unused cap permitted.

22. **Move that states must declare any relinquished quota by December 1st of the previous year. States have the ability to declare how much of their quota to relinquish. Any quota that is relinquished by a state is redistributed to the other jurisdictions based on historic landings from the time period selected by the Board in this Amendment** (Page 110). Motion by Pat Keliher; second by David Borden. Motion carried (Page 111).

23. **Move that states implement the provisions of Amendment 3 by January 1, 2018** (Page 113). Motion by Tom Fote; second by Loren Lustig. Motion amended.

24. **Move to Amend: That states submit implementation plans for Amendment 3 by January 1, 2018, and implement by April 15, 2018** (Page 114). Motion by Robert Boyles; second by Jim Gilmore. Motion carried (Page 116).

    Main Motion as amended: That states submit implantation plans for Amendment 3 by January 1, 2018, and implement by April 15, 2018. Motion carried (Page 117).

25. **Motion to recommend to the Commission: the approval of Amendment 3 to the Atlantic Menhaden Interstate Fishery Management Plan as amended today** (Page 116). Motion by Robert Boyles; second by Jim Estes. Motion carried (Page 117).

26. **Move to elect Nichola Meserve as Vice-Chair of the Atlantic Menhaden Board** (Page 118). Motion by Robert Boyles on behalf of the Atlantic Menhaden Board. Motion carried (Page 118).

27. **Motion to adjourn** by Consent (Page 118).

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Cheri Patterson, NH, proxy for D. Grout (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Raymond Kane, MA (GA)
Nichola Meserve, MA, proxy for D. Pierce (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Robert Ballou, RI, proxy for J. Coit (AA)
David Borden, RI (GA)
Colleen Giannini, CT, proxy for M. Alexander (AA)
Sen. Craig Miner, CT (LA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Boyle (LA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Tom Fote, NJ (GA)
Russ Allen, NJ, proxy for L. Herrighty (AA)
Loren Lustig, PA (GA)
Andy Shiels, PA, proxy for J. Arway (AA)
John Clark, DE, proxy for D. Saveikis (AA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Roy Miller, DE (GA)
Rachel Dean, MD (GA)
Dave Blazer, MD (AA)
Allison Colden, MD, proxy for Del. Stein (LA)
Rob O'Reilly, VA, proxy for J. Bull (AA)
Cathy Davenport, VA (GA)
Michelle Duval, NC, proxy for B. Davis (AA)
David Bush, NC, proxy for Rep. Steinburg (LA)
W. Douglas Brady, NC (GA)
Malcolm Rhodes, SC (GA)
Robert Boyles, Jr., SC (AA)
Spud Woodward, GA (AA)
Jim Estes, FL, proxy for J. McCawley (AA)
Martin Gary, PRFC
Derek Orner, NMFS
Mike Millard, USFWS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Jason McNamee, Technical Committee Chair
Jeff Kaelin, Advisory Panel Chair

Staff

Bob Beal
Toni Kerns
Katie Drew
Shanna Madsen
Megan Ware
Max Appelman

Guests

Fred Akers, Newtonville, NJ
Julie Akers, Newtonville, NJ
Lew Armistead, Hollywood, MD
Dana Austin, CBF
Amiele Barakey, CBF
Blair Blanchette, CBF

John Bello, VA SSA
F.L. Benson, Lanexa, VA
Sarah Boynton, CBF
Kathryn Bush, CBF
Kim Cable, CBF
Benson Chiles, Chiles Consulting
Robt Crockett, Richmond, VA
Colin Crozier, CBF
Jeff Deem, VMRC
Monty Deihl, Omega Protein
Katherine Denel, PEW
Mark Driscoll, Richmond, VA
Butch Eason, Chesapeake, VA
Paul Erdman, Menhaden Defenders
A.J. Erskine, Lottsburg, VA
Lynn Fegley, MD DNR

Guests (continued)

Christine Fletcher, PEW
Manley Fuller, FL Wildlife Fed
Shaun Gehan, Omega Protein
Rebecca Gagnon, Norfolk, VA
Joseph Gordon, PEW
Ken Hastings, Mason Springs
Marin Hawk, MSC
D. Heinemann, Marine Mammal
Peter Himchak, Omega Protein
Ken Hinman, Wild Oceans
Rich Hittenger, RI Saltwater Anglers
Richard Holewinski, CCA MD
Jerry Hughes, Chesapeake, VA
Jason Hoffman, *Undercurrent News*
Deane Horowitz, CBEC
John Jaackst, Severn, MD
Chris Johnson, CBF
Robert Jones, VSSA
Ron Ketter, Easton, MD
Robert Kersey, MD NRP
Jimmy Kellum, Kellum Maritime
Howard King, Queenstown, MD
Aaron Kornbluth, PEW
Ben Landry, Omega Protein
George Lapointe. Omega Protein, ME
Ken Lewis, CCA ME
Ed Liccione, CCA MD
Bill Lucey, LI Soundkeeper
Rudy Lukavovic, CBEC
Janet Mackey, Easton, MD
William Martin, CCA MD
John Matson, Hampton, VA
Drew Minkiewicz, KDW
David Mussina, Mystic River W
Thomas Miller, FORVA
Chris Moore, CBF
Henry Neville, Ashland, VA
Christiana Perry CBEC
Ken Pinkard, UFCW Local 400
Jamie Pollack, PEW NY
Drew Robinson, CBF
Elizabeth Ronson, CBF
Robert Ruck, Sr,.CCA MD
Jim Seagraves, Portsmouth, VA
David Sikorski, CCA
Jonathan Stone, Save the Bay, RI
Thomas Strachle, Westminster, MD
Stan Sutliff, Hampton Roads, VA
Cameron Taggert, PEW
Jeff Taylor, Mayforth Group
Jack Travelstead, CCA
Donna Waddell, UFCW Local 400
Marvin Wells, Dundale, MD
Mike Wills, VA Beach, VA
Michael Wissel, CCA MD
Liz Worsham, Heathville, VA
Tom Zolper, CBF

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened in BWI Airport Marriot, Linthicum Heights, Maryland, Monday, November 13, 2017, and was called to order at 1:00 o'clock p.m. by Chairman Robert Ballou.

CALL TO ORDER

MR. ROBERT BALLOU: I would like to call this meeting of the Menhaden Management Board to order. My name is Bob Ballou. I have the honor of serving as Board Chair. I would like to begin by extending a warm welcome to all Board members; as well as the many members of the public here in attendance, and listening in via the webinar. We deeply appreciate your time and interest.

Next I would like to introduce the members of staff and committee chairs who are here at this end of the table. To my immediate right is Megan Ware; the Commission's menhaden fishery management plan Coordinator. To Megan's right will be Jason McNamee; the Menhaden Board's Technical Committee Chair.

To Jason's right, or next going to my right is Dr. Katie Drew; the Commission's senior stock assessment scientist. Next to Katie is Shanna Madsen; the Commission's Fisheries Science Coordinator. To Shanna's right is Max Appelman; FMP Coordinator with the Commission, who will be handling the screen as motions are made and considered during the course of this meeting.

At the corner of the table is Toni Kerns; the Commission's Fisheries Management Program Director, and to Toni's right is Bob Beal, the Commission's Executive Director. To my immediate left is Jeff Kaelin; who serves as Chair of the Menhaden Board's Advisory Panel, and to Jeff's left is Major Rob Kersey, who serves as liaison to the Management Board from the Commission's Law Enforcement Committee.

Gathered around the table are the 48 members of the Commission's Atlantic Menhaden Management Board; representing 16 east coast states and our two federal partners. I'm sorry, 16 east coast states in jurisdictions from Maine through Florida; as well as our two federal partners, NOAA Fisheries and the U.S. Fish and Wildlife Service.

All Board members will be afforded the opportunity to participate fully, with regard to all matters that will be before the Board, with the exception of meeting-specific proxies; and I believe we only have one, who will not be able to participate in final voting on final action items. In my capacity as Board Chair, I will be exercising my prerogative to caucus and vote with the Rhode Island delegation; primarily for the purpose of avoiding a null vote from Rhode Island on any given issue, slim as those chances may be. Before we jump into our agenda, for which we have a total of 11 hours allocated through the rest of this afternoon and tomorrow, please indulge me for about two minutes for some brief opening remarks. Without knowing, or even having a reasonable guess as to how this meeting will unfold, I do know one thing and I know it with absolute certainty; and that is that we have reached a major milestone with regard to Atlantic menhaden.

That milestone is characterized by our universal recognition of the soaring importance of this resource; the ecosystem services it provides, and the enormous numbers of people who value and depend on the resource as a source of income, and as a lynchpin of the marine environment along the entire east coast.

On behalf of the entire Board, I want to express our deep appreciation for the many thousands of people, indeed hundreds of thousands of people from all walks of life, who have contributed to the development, analysis, and consideration of the issues that are before us today and tomorrow via Amendment 3.

The contributions from the scientific community, fishing community, environmental community, and all others, including those wearing no particular hat other than one that might read "I care" are duly noted, highly influential, and deeply appreciated. In particular I want to give a shout out to staff, members of the Plan Development Team, and members of the several committees and workgroups who have all leant enormous support to the process; ushering us to where we are today.

This meeting, whatever the outcome, indeed constitutes a milestone for all the reasons just mentioned. Milestones are neither beginnings nor ends; they are points along a journey. With that let's now move forward with our journey; and to all my esteemed colleagues on the Board, may we be guided over the next eleven hours or so by the spirit of doing what's right. Amen.

APPROVAL OF AGENDA

CHAIRMAN BALLOU: Our first item on the agenda is the agenda itself. Before I seek input from the Board, I would like to offer one clarifying suggestion and one minor tweak. First, with regard to Agenda Item 8, which reads Set 2018 Atlantic Menhaden Specifications, I suggest clarifying it to read, Set 2018 (Annual or Multi-Year) Atlantic Menhaden Specifications.

That exact wording is already set forth in the meeting overview; and speaks to the fact that the Board will be deciding upon a total allowable catch, or TAC, for the fishery, and deciding whether to set it for one year or more than one year. As such, I suggest clarifying the wording for Item 8 as indicated; to better reflect the nature of that agenda item.

Are there any objections to making that clarification? Seeing none, we'll make that clarification. Second under Item 4, I would just like to suggest that we reverse the order of two of the four presentations. After Megan provides the management option review and the summary of public comments, I would like to move next to the Law Enforcement Committee report, and then immediately follow with the Advisory Panel Committee report.

I suggest that only because I think the flow might work a little better. Are there any objections to that really minor tweak? Seeing none; we'll make that minor tweak. Does anyone else on the Board, or does anyone on the Board have any other recommended modifications to the agenda; yes, Rob O'Reilly?

MR. ROB O'REILLY: Before I make a recommendation it may be solved by a question, which is other than Item 8, there is no specific mention as to the order of business for the biological reference points and the allocation as to where they fit within this agenda. If there is already information on that that would be fine, otherwise I will make a recommendation.

CHAIRMAN BALLOU: My intent with regard to Item 4 is to take up the Amendment 3 issues; beginning with reference points, and then proceeding with allocation and the other issues in the amendment. As currently proposed, we would then conclude Amendment 3, and move on to specifications for the fishery; as the item after that. Right now that is the proposed order of business. Do you have a suggested revision to that? Rob O'Reilly.

MR. O'REILLY: I would just wonder why the quota setting doesn't precede the allocation; because certainly one is going to bear on the other, and I just wondered if there was given any thought to that by staff for this meeting.

CHAIRMAN BALLOU: We'll give it a lot of thought at this exact moment; if you want to recommend making that change.

MR. O'REILLY: I would move that change to establish the quota setting to precede the allocation.

CHAIRMAN BALLOU: The request as I understand it is to amend the agenda by inserting Item 8; which is final action on spec setting into Item 4, which is final action on Amendment 3, such that as we are moving through the provisions of the Amendment, which we plan to take up in the order presented in the draft. When we get to allocation methods, we will pause consideration of the amendment issues to take up final action on spec setting; then continue with the rest of the provisions of the amendment. Is that your request?

MR. O'REILLY: Yes, simply to have the specification prior to the allocation.

CHAIRMAN BALLOU: I realize I gave it more words, but I just wanted to make it clear as to what I understand the intent to be. Is there any objection to that request by any members of the Board? Eric Reid.

MR. ERIC REID: Does that preclude any motions that might be bundled in one shot from being discussed at the same time?

CHAIRMAN BALLOU: My interpretation is that it would not; provided that we first move through reference points, after that there can be bundling. Any further discussion is there any further yet concerns? Dennis Abbot.

MR. DENNIS ABBOTT: Going along with Eric's question. Could we not have a more inclusive motion, but yet divide the question at that time if necessary?

CHAIRMAN BALLOU: If it's the will of the Board we'll do that. It will be my recommendation as Chair that we first move through reference points and then take up the other issues in either a bundled form or issue by issue; whichever the Board would prefer. Seeing no other hands, I will take that to indicate that there are no objections to revising the agenda as recommended by Rob O'Reilly. Are there any other recommended changes to the agenda? Seeing none, oh I do have one; I'm sorry, yes Dr. Rhodes.

DR. MALCOLM RHODES: This isn't to change the agenda, but just a quick question. We'll need a Policy Board meeting. Would we have that before the close of this? Would we adjourn, then have Policy Board, not only to accept these actions but also we had some actions at the South Atlantic Board that we need to get accepted by the entire Commission. I just wanted to know where in the order that comes.

CHAIRMAN BALLOU: Thank you for the question. I'll refer to Bob Beal to answer it.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Yes, Malcolm, you're correct. At the end of the Menhaden Board meeting, once all the decisions are made for Amendment 3, as well as the specifications for next year and any subsequent years. The Menhaden Board will adjourn; we'll go into a Business Session. The Business Session will tackle Amendment 3, the final approval for menhaden, as well as the cobia FMP that was approved by the South Atlantic Board; so at the very end, hopefully tomorrow afternoon, early afternoon.

CHAIRMAN BALLOU: Anything further on the agenda? Seeing no hands, the agenda as revised stands approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN BALLOU: We are now onto the next item which is approval of the proceedings from the Board's last meeting, held on August 2, 2017. Are there any recommended changes to the minutes?

Seeing none; is there any objection to approving the minutes as proposed? Seeing none; the minutes stand approved by consent. I don't see our stenographer, but I assume this meeting is being recorded; and I just received a nod in the affirmative on that.

PUBLIC COMMENT

CHAIRMAN BALLOU: Next on the agenda is Public Comment, Item 3.

This is an opportunity for anyone from the public who would like to comment on any issue that is not on the agenda for this meeting, to do so. Given the nature of the agenda, this is a very narrow opportunity. Through the public comment process the Board has already sought and received extensive and valuable public comments on all components of the draft amendment, and all 158,106 comments are before the Board as part of our meeting materials.

That part has been done and done well. When we get to the issue of setting specifications for the fishery, there will be an opportunity for public comment on that issue; but for now the floor is only open to comments pertaining to non-agenda items, that is items not related to menhaden management. We have only ten minutes allotted for this portion of the agenda, which means we have a hard stop at 1:23. We have just one person signed up, and I am going to go to that person first, and that is Mr. Robert T. Brown. Welcome, Mr. Brown.

MR. ROBERT T. BROWN: My name is Robert T. Brown; President of the Maryland Watermen's Association. I want to talk to you today about eels. The Eel Management Plan, if the east coast quota is exceeded by 10 percent in one year, or less than 10 percent in two consecutive years, it sets off a trigger that all states must have individual quotas. The quota was exceeded by approximately 20,000 pounds or less than 2 percent in 2017. Maryland has already, with its fishermen, agreed to close Saturday's and Sunday's harvest during the months of September, October, and November; and will close the entire month of December. Hopefully to avoid being over the quota in 2017. Remember, if it exceeds a quota by one pound in 2017, individual states will have quotas.

CHAIRMAN BALLOU: Mr. Brown. I should have clarified that we're really looking for comments having to do with menhaden; but not on menhaden management issues. You're welcome to go on, but eels do not seem relevant to this Board's meeting.

MR. BROWN: I've only got about one more minute and I'll be done.

CHAIRMAN BALLOU: Go ahead.

MR. BROWN: Okay. With a quota of approximately 900,000 pounds and only 20,000 pounds at 2 percent, this should be considered good management. There are many things that cause this; with an amendment every three to five years, eel population increases, and with less effort and better harvest. You've heard me say before best science available is a guestimate. Reviewing my statements, it was a poor choice of words, and so many assumptions into fishery management.

Fishery management has many assumptions. It assumes that harvest reports are correct. It assumes that the data collected gives a true representative of the biomass, spawning stock, age classes, et cetera, and then draws an equation to manage the resource. Let's not have any triggers that mandate a reduction. Let's bring these matters back to the Full Board of the Atlantic States Marine Fisheries Commission for commonsense solutions; and remember, this applies to all species, no triggers with mandatory reductions.

CHAIRMAN BALLOU: Is there anyone else from the public that would like to address the Board on any issue pertaining to menhaden that is no on today's agenda?

AMENDMENT 3 FOR FINAL APPROVAL

CHAIRMAN BALLOU: Seeing no hands, we will move on to Item 4 on the agenda; which is Amendment 3 for final approval. This is clearly

the main focus of this meeting; and here's how we plan to proceed.

First, Megan Ware to my right will be reviewing the management options in the draft amendment. I believe she has about a 20 minute presentation. If any of the Board members have any burning questions for Megan at the end of her presentation, we can take those up; but my preference would be to move through the other presentations first, then return to questions on key parts of the amendment on an issue-by-issue basis, which is how we plan to move through the next 11 hours or so.

Megan's second presentation will summarize the public comments received during the public hearings and public comment period for the amendment. Megan will then summarize, or Major Kersey perhaps, I'm not sure who, will then summarize the Law Enforcement Committee report on the amendment; and take any questions on it.

Then for our fourth and last of our initial presentations, Jeff Kaelin will summarize the AP, the Advisory Panel report on the amendment and take any questions. We will then be ready to roll up our sleeves and begin addressing the first major issue in the amendment; which is reference points. We will allow ample time for questions before getting into motions. If all goes well, we will finish up with reference points by 5:00 p.m. today or thereabouts; and then recess until tomorrow morning, at which time we will take up TAC, allocation, and the remaining issues in the amendment. With that Megan, the floor is yours.

REVIEW OF MANAGEMENT OPTIONS AND PUBLIC COMMENT SUMMARY

MS. MEGAN WARE: Today we'll be reviewing Draft Amendment 3 and the associated comments. Just for an overview, the Chairman just spoke about this, but I'll actually be combining the management options and the public comment summary in one presentation; I mean I'll try and focus on those public comments.

For an overview of the public comment that we received, for public hearings there were 15 hearings conducted in 13 jurisdictions; ranging from Maine through Florida, 602 individuals attended those hearings. For written comment, a total of 158,106 comments were received. The vast majority of those comments were received through form letters.

However, 99 organizations did submit comments on the draft amendment, and the remaining comments (about 450), generally came from individual stakeholders; including commercial fishermen, recreational fishermen, and concerned citizens. I'm going to jump right into the reference point options.

Just to orient everyone to the screen, the five options are going to be on your left; and I'll highlight which one I'm talking about. Then these are the same figures that are used at the public hearings, so it's just a reminder as to what those reference points look like. The red dotted line was our fishing rate in 2016.

Option A is single-species reference points. For this option the Board would continue to use the single-species reference points in place; and the Board would not pursue ecosystem reference points for menhaden. Here the solid black line is our threshold; and the dotted black line is our target, so that red line is below both the target and the threshold. According to this reference point we are not overfishing.

Next is Option B; which is the BERP continues to develop menhaden-specific ERPs, and in the interim we use our single-species reference points. Here it's the same graph, the same reference points. For this reference point we are not overfishing. Option C is again the BERP continues to develop menhaden-specific ERPs; and in the interim we use the hockey-stick

control rule, which recommends a fishing mortality rate that linearly decreases with changes in biomass until 40 percent unfished biomass, at which point there is a moratorium on fishing.

Here the solid green line is that maximum fishing rate when we're at 100 percent unfished biomass; and the dotted green line is the recommended fishing rate for our current abundance. This reference point is saying that we are fishing at a higher rate than we should be; based on our current biomass.

Option D, again the BERP continues to develop menhaden-specific ERPs, and in the interim we use the 75 percent rule of thumb; which recommends a fishing mortality rate that achieves 75 percent unfished biomass. That is represented here with the mustard colored line. That red line is just above the mustard colored line, so according to this reference point we are overfishing.

Then finally, Option E. Again, the BERP continues to develop menhaden-specific ERPs, and in the interim we would use a reference point that recommends a target fishing mortality rate that achieves 75 percent unfished biomass, and a threshold mortality rate that achieves 40 percent unfished biomass. Here the solid blue line is the threshold, and the dotted blue line is the target; so we're just above the target but well below the threshold. I have received several questions about what action is associated with either a target or a threshold.

I just took some of the text from the draft amendment to preemptively address some of these questions. What this says is, if the current F exceeds the threshold level, the Board will take steps to reduce F to the target level. If the Board exceeds the target, but is below the threshold, the Board may consider steps to reduce F to the target level. If current F is below the target F, then no action is necessary to reduce F.

These are the public comments we received on the reference points; and it might be a little hard to see in the back, but these are the same tables that were in the meeting materials. The greatest support was for Option E, which is that 75 percent target, 40 percent threshold; those who supported E, commented on the implementation of ERPs now to account for menhaden's role as prey for larger fish, for whales and for birds.

Many commented that a precautionary approach is best for the long term management of this species; and will lead to stocking improvements for many other species. As a result, many individuals also commented on the economic benefits associated with this option; in terms of other commercial and recreational fisheries, as well as wildlife viewing operations such as whale watching.

Particularly in the Gulf of Maine and in Florida, individuals commented on the decline of other forage fish species, and the need to conservatively manage menhaden. In the southern states, individuals at the hearings commented that they have not seen the resurgence in menhaden populations that the northern states have seen.

The next most supported option was Option B. Those who supported Option B commented that the existing reference points are precautionary enough, while the BERP continues to develop menhaden-specific ERPs. Some questioned why drastic action is needed if the stock is not overfished, and overfishing is not occurring.

A couple of individuals commented specifically on the work by Hilborn, which raised concerns about the applicability of generalized rules to menhaden. At one of the Virginia hearings, many commented on the potential economic impacts; not only to the reduction plant, but also to associated businesses and local towns.

In reviewing the other reference point options, so I'll start with Option C. Those who supported the hockey-stick control rule commented that is the most conservative option; and some stated that it represents the best available science, commenting that a minimum biomass threshold is used in other fisheries such as in Antarctic krill.

For Option D, individuals supported managing to the 75 percent target; and some expressed concern with the high threshold in Option E, stating that Option D ensures management to that 75 percent unfished biomass. Finally, Option A, those who supported this option generally did not feel that the data on predator/prey relationships is strong enough to develop ERPs, and others did not want to see the management of menhaden tied to predator species, pointing towards horseshoe crab management. I'll now review the allocation options here. We have six allocation options.

First is a coastwide allocation, so there is no division of the TAC. Option B is our current jurisdictional approach; where we would divide the TAC between the different states, and this is the same table from the amendment that shows what those percentages would be for the various timeframes.

Option C is a fixed minimum approach; where each jurisdiction gets a minimum percentage of quota. There are three sub-options here, a half percent fixed minimum, 1 percent fixed minimum, and a 2 percent fixed minimum. Option D is regional fleet capacity. Here we would first divide the TAC into two gear types; a large fleet for purse seiners and pair trawls, and then a small fleet for all other gear types.
Then we would divide those gear types into regions; a New England Region, a Mid-Atlantic Region, and a Chesapeake Bay/South Atlantic Region. There is an option here for a soft cap for that small-scale fleet, which would set a target quota for those gear types; but it does not subject them to a closure.

That soft cap does come with a 25,000 pound trip limit per day. Option E is the disposition allocation, where we divide the TAC between the bait and the reduction sectors, and there are two options here; either a 75/25 split or a 70/30 split. That bait portion can be further divided by jurisdiction, gear type, region, or through a fixed minimum approach.

Then finally, Option F is allocation based on TAC level. The level of the TAC would determine the allocation method. If the Board chose a TAC that is higher than 212,500 metric tons, the difference between that higher TAC and the 212,500 metric tons could be allocated in a manner that's more favorable to the bait sector.

There are two sub-options there. That green box can be allocated such that 50 percent goes to the reduction fishery and 50 percent to the state bait fisheries; or 30 percent can go to the reduction fishery and 70 percent to the state bait fisheries. This is our public comment. Obviously this table is quite large with all of the options; so I'm going to break it up a little bit.

But I'll just highlight that the two allocation options that got the greatest support were allocation based on TAC level, followed by fixed minimum. I'll start with that allocation based on TAC level, and discuss that as well as the disposition. The greatest support was for this allocation based on TAC level.

Those who supported Option F stated that this option looks to make all states whole, before allocating more quota to the bait sector, and that specifically the reduction fishery is willing to give a little once the pie is whole from the 2012 reduction. Those who supported this option generally stated that other allocation options represent a fish grab by the other states.

Then I'll talk about the bait versus reduction, because it's on the screen now. There was some support for this option. Some expressed

concern that one company has such a large share of quota; and that this is a way to increase quota for the bait sector without increasing the TAC. I'll switch to the other side of that table now. This is going to include the fixed minimum option, which got the second-most support. Many commented that the current allocation scheme is unfair, given one state has 85 percent of the quota, and they felt the fixed minimum creates fishing opportunities for all states.

Others commented that this reduces the complexity of menhaden management, given the Episodic Events Program and the bycatch provision may not be needed. Some noted a biological benefit of spreading quota out along the coast. There were comments clearly against a fixed-minimum approach; commenting that it moves the Commission away from a allocation based on historic catch, and rewards states which have not invested in the fishery.

Then I'll just move left to right on the screen here. Coastwide allocation: some individual's, mostly commercial fishermen, supported a coastwide quota. However, others expressed concern that it could create a race to fish and shut out certain states from the fishery. Next is the jurisdictional approach: there was some support for continued use of a jurisdictional approach, since it secures quota for each state, and provides flexibility for states to divide between gear types or create trip limits.

Finally, the regional fleet capacity option: there were a couple of individuals that did support a soft cap. However, others did not like this approach, since it groups states with different fishing capacities together, and may limit some states participation in the fishery. Next there are timeframes.

There are five timeframes here; 2009 to 2011 is status quo, 2012 to 2016 is the most recent timeframe, 1985 to 2016 is the longest timeframe, 1985 to 1995 is the most historic timeframe, and then Option E is a weighted allocation. The intent here is to consider both historic landings and recent trends in the fishery.

In terms of public comment, there weren't as many comments given on the allocation timeframe as on the method. However, the greatest support was for that 1985 to 2016 timeframe. Those who supported this timeframe commented that a longer period is better; because it includes more data, and instead of focusing on recent years the Board should consider a longer and more historic perspective.

The next most supported option was 2012 to 2016. Those who supported this option generally felt that it reflects current fishing efforts in the states. There was some support for keeping the timeframe at 2009 to 2011. Those who supported these years commented that it does not include years under a TAC, and therefore is a fair reflection of all states landings prior to implementing that TAC.

Particularly at the Rhode Island hearing, there was support for the more historic timeframe; which is 1985 to 1995, and there was even support for a more historic timeframe than 1985, commenting that fish were more spread out along the coast. Then there was some support for a weighted allocation, and those who supported this option saw it as a compromise approach.

Next are quota transfers. We have three options here. We can continue quota transfers as they are now, so two states mutually agree. Under Option B we add in accountability measures, such that if the state exceeds its quota by more than 5 percent in two consecutive years, it cannot receive a quota transfer in the third year. Then Option C is quota reconciliation, so if the TAC is not exceeded coastwise then any state-specific overages are automatically forgiven. If the coastwide TAC is exceeded, then any unused

quota is automatically pooled and distributed to states or regions.

Of the options in the amendment, the greatest support was for leaving the quota transfer process as is. Those in favor of this option stated that if the states agree to transfer quota then that is fine. There was some support for Option B, and those who supported this option liked the idea of accountability measures, and liked the idea of dissuading states from perpetually exceeding their quota.

Finally, Option C quota reconciliation, those who supported this commented that completing quota transfers at the end of the year eliminates the race to secure unused quota from specific states. I will note that the greatest support was for no quota transfers. Many commented that this supports horse trading of quota between the states.

Some commented that quota transfers are intended to use every bit of unused quota in the fishery. Next is quota rollovers, there are four options here. Option A is no quota rollovers, Option B is up to 10 percent of the total quota could be rolled over if unused. Option C is a 5 percent quota rollover; and then Option D is 50 percent of your unused quota can be rolled over.

The greatest support was for no quota rollovers, which is Option A. Those who did not support quota rollovers commented that there is generally a reason why a state does not catch all of its quota; and this could foreshadow issues with stock abundance. Others commented that unused quota should not be rolled over, as this leaves fish in the water.

Others noted that quota rollovers distort the quotas initially assigned. Of those who supported quota rollovers, Option D received the greatest support. Those who supported Option D commented that quota rollovers make sense; because if you underharvest what was a safe and allowable catch that unused quota is allowed to spawn before it is harvested the next year.

Others commented that whenever a state goes over its quota it has to pay it back; so it is only fair that if a state is under its quota it should be allowed to roll that unused quota over into the next year. Next is the incidental catch and small scale fisheries provision. There are six options here, three of which are on the screen now, and what ties these three options together is that the incidental catch is not included in the TAC.

Option A is a trip limit for non-directed gears, so things like pound nets and gillnets. Option B is a trip limit for non-directed gears and small scale gears. This includes the pound nets and the cast nets, and Option B is probably closest to what we have now. Under Option C, we build on that so we maintain that trip limit for the small-scale gears and the non-directed gears, but we set a cap at 2 percent of the TAC.

This is not a set aside, but a threshold by which we measure landings in the incidental catch fishery; and if that cap is exceeded by more than 10 percent in a single year, or by any amount two years in a row, the Board is triggered to take action. The next three options are tied together, in that incidental catch is included in the TAC; and we do this through set asides.

Option D is a 2 percent set aside for incidental catch after the quota is met. Option E is a 1 percent set aside for small-scale gears, and what is unique about this option is that it's for their harvest year round. Regardless of what allocation option the Board chooses, the Board can secure quota for those small-scale gears, and then Option F, all catches included in a TAC. Once the directed quota is met the fishery closes.

The greatest support was for Option F, so no incidental catch fishery. Those in favor of this option supported the statement that all catch needs to be counted towards the TAC. Some

stated that the set aside was designed to accommodate certain fishing methods; but this should not be needed if reallocation is successful. Others expressed concern that it's created a loophole in the fishery.

Those who supported continuation of a trip limit, so either Options A or B, were generally commercial fishermen; and they commented that they are dependent on the current bycatch provision. They frequently commented that unless there is enough quota for a year round fishery, an incidental catch trip limit is needed to sustain the fishery and provide bait for the lobster, crab and recreational fisheries.

Some also noted that with stationary gears fishermen have no controls over what swims into the net; and without a trip limit there would be a lot of dead discards. Those who favor the set aside, so Options D or E, generally supported the idea of including all catch in a TAC, but also wanted to provide a way to reduce discards in the fishery.

They expressed concern that without some sort of incidental catch provision, menhaden would be discarded and the resource wasted. Some fishermen did express concern with a set aside; mainly that since it is a coastwide set aside catch in one state could cause an overage, which would then have to be paid back on a coastwide level, and there was no support for the catch cap and trigger.

Next is the Episodic Events Program. We have three options here. We can keep the set aside at 1 percent of the TAC. Option B is to increase the set aside to 3 percent, or Option C is 0 percent; so that would remove the Episodic Events Program. The greatest public comment was for Option C, so that's ending the Episodic Events Program.

Many commented that if reallocation is successful this set aside will no longer be needed. Others commented that while the set aside was appropriate during stock rebuilding, menhaden are consistently in New England, and so the set aside is no longer appropriate. Some were against the Episodic Event Set Aside, commenting that it artificially increases New England state quotas.

Those who supported the continuation of the set aside, either Options A, or B, stated that his is needed in the New England state; particularly if a fixed minimum approach is not chosen for allocation. Some commented that it is a worthwhile program which presents fish kills. Finally, our last issue is the Chesapeake Bay reduction fishery cap.

There are three options here. We can maintain the cap at the 87,216 metric tons, reduce the cap to 51,000 metric tons, or Option C is to remove the cap. There are sub-options under A and B which allow for a percentage of unused cap to be rolled over to the next year. For public comment, the greatest support was for reducing the cap to the 51,000 metric tons, and having no rollovers. Those who supported reducing the cap commented that the Chesapeake Bay is an important nursery area for many species, and this is an opportunity to provide greater protection to the Bay. Some commented that if the cap is not being met there are not enough fish in the Bay; and others commented that if the reduction fishery actually caught the cap it would be devastating to the Bay ecosystem.

Those who supported maintaining the cap commented that the cap was started as a way to restrict and ultimately eliminate the reduction fishery. They commented that science shows that there is no localized depletion in the Bay, and there is no scientific basis for the cap. A similar rationale was stated for removing the cap. With that I will take any questions on the public comment.

CHAIRMAN BALLOU: Questions for Megan, recognizing that we will be returning to each of the major management issues for thorough vetting starting with reference points, after the

next two presentations. That said, John McMurray.

MR. JOHN G. McMURRAY: Megan, could you put that I think it was the third or fourth slide; it was a quote about the 40-75 percent. I think, well there it is. The Management Board may consider management measures to reach target. But there is no mandate to manage for 75 percent. If I'm reading this correctly, as long as the Board is in between 40 and 75 percent we're good. Well, maybe you could clarify that before I go on.

MS. WARE: Yes, the management trigger is at the threshold; that's what this is saying. The Board is required to take action when you hit that threshold.

MR. McMURRAY: Mr. Chairman, so there is some management flexibility when you're within those two parameters, there is no set thing that we have to manage for.

MS. WARE: The action is required at the threshold.

CHAIRMAN BALLOU: I think that's a fair characterization, the way you put it, John; other questions for Megan, yes, Craig Pugh.

MR. CRAIG D. PUGH: Megan, I noticed that there was repetition of names between the state hearings; is that commonplace? Was that accounted for?

MS. WARE: It is commonplace for menhaden, I would say. How I did those is if they attended the hearing then they were accounted for at that hearing. If an individual did attend multiple different hearings at different locations and they spoke multiple times, they got a vote. Their comment was written down at each hearing.

LAW ENFORCEMENT COMMITTEE REPORT

CHAIRMAN BALLOU: Other questions. Seeing no hands; our next issue is the Law Enforcement Committee report. Megan, is that you? Okay, we'll go back to Megan for that.

MS. WARE: I'll be very brief here. Whoever was at the Policy Board meeting for annual meeting did hear this. But the LEC met to discuss Draft Amendment 3 at annual meeting. There was really no major enforcement concerns brought up by the LEC. But the discussion did focus on the incidental catch provision, or that bycatch provision. The comments were generally that there is no enforcement challenge with a trip limit. However, a simple closure of a directed fishery when quotas are met is less of a drain on enforcement resources. That's the comment that they gave.

CHAIRMAN BALLOU: Okay, any questions on the Law Enforcement Committee report; yes, Pat Keliher?

MR. PATRICK C. KELIHER: Was there any discussion about the difference between the incidental and small scale fisheries within the Law Enforcement Committee; as far as enforceability? There have been a lot of comments in Maine about the small scale fishery turning into a directed fishery, and the ability to even prosecute; just by saying we're targeting something else.

MS. WARE: There were no comments given by the LEC on that specific issue.

ADVISORY PANEL REPORT

CHAIRMAN BALLOU: Other questions? Seeing none; we'll go to our last presentation; that will be Jeff Kaelin presenting the Advisory Panel report. Jeff is going to run through the whole report briefly, and I've asked him and he's agreed to return tomorrow morning to sort of refresh on the key issues that we'll be addressing tomorrow. He'll run through the

whole report now, and then he'll be back first thing in the morning to refresh. Jeff.

MR. JEFF KAELIN: Good afternoon members of the Board, members of the public. I'm Jeff Kaelin with Lund's Fisheries, and I'm privileged to sit as the AP Chair. We met on October 26. I'm not going to read the seven pages of summary that Megan prepared. It's on the table. But we will go through the slides that quickly summarize the discussion.

I wanted to thank the Chairman and the leadership of the Commission for allowing us to have a face-to-face meeting last month. It was very well attended. Several advisors are here today. Everyone has had a chance to review these slides and the report. We attempt to run these meetings on a consensus basis.

But as you can imagine, that is very difficult to arrive at in most cases, so we just simply record the comments to make sure that all the AP members have their perspective recorded. Motions are appropriate by the process outlined by Robert's Rules of Order, so we had some motions; none of which passed.

On reference points, I'll read through these to get them on the record. There were six AP members that supported Option B; stating that the stock is in good condition, so no need to alter course. Today we're fishing below the F target, and well below historic levels. The Board is already precautionary in managing menhaden. Concerns about applying generalized forage fish rules to menhaden due to lack of stock recruitment relationship and fishery selectivity, commented that other reference point options don't represent the best available science.

There was confidence in the BERP process. Ecological reference points would be appropriate when there is more confidence in the science specific to the menhaden resource. Option B supports industry and provides stability for businesses. Concerns that the goalpost by which menhaden is managed keep changing. The final comment that increased menhaden abundance in recent years is due to favorable environmental conditions, and not the implementation of the 2013 TAC. Four members supported Option E. Generalized rules for forage fish are more appropriate for menhaden, given their ecosystem role. There is a need to leave fish in the water for ecological purposes. Option E allows the Board to fulfill the needs of the bait states, while keeping the stock moving in the right direction.

Important to implement ecological reference points now, the concern with the BERP completing the menhaden-specific ERPs by 2019. Option E doesn't prescribe how quickly the Board needs to get to the F target, so the Board can phase in management to the 75 percent unfished biomass reference point.

Comment that the 2013 TAC after that was implemented stock abundance increased, so there is a need to err on the side of caution and continue to control catch. On allocations, two AP members supported a fixed-minimum approach. There was support for a 2 percent fixed minimum, giving states that don't want a quota can give it back.

A recommendation that unused quota on November 1st be given to other states. Current allocation method prevents some states from having a fishery; including those that have fishery infrastructure. Three AP members didn't support a fixed minimum approach, moving the Commission away from a history-based allocation was argued. Method does not recognize states which have made an investment in the fishery, and that there are clear losers with the fixed-minimum approach, including New Jersey and Virginia.

Two AP members supported the allocation based on the TAC level. The argument was that if that makes states whole again prior to implementation of the TAC in 2013, and then a greater percentage can be allocated to the bait

fishery. The recommendation that the Board use the 2012 to 2016 timeframe for quota above the 212,500 metric ton threshold in Option B.

On the allocation approach, one AP member supported the 70/30 split between reduction and bait. This is Option E, the disposition quota, the freestanding option. All states have joined the Commission's compact and everyone should get a share of the resource it was argued, and that this option gives the bait fisheries more without increasing the TAC.

Three AP members didn't support the 70/30 split between reduction and bait as the freestanding Option E. Allocation option is arbitrary and not based on historic landings. Under that option it was argued. You can't transfer quota between the bait and reduction sectors without focusing n history, catch history.

Two AP members supported the 2009 to 2011 timeframe. This does not include the years when the harvest was capped under the TAC was the suggestion there. On general comments there was one AP member that recommended that trawls not be included in the small-scale fleet list of fisheries of gear types.

On transfers and rollovers four AP members supported quota reconciliation with accountability rules, Options B and C as outlined by Megan previously. This prevents a state from continually exceeding its quota. Six AP members supported quota rollovers; two supported the 50 percent rollover, Option D. Three supported 5 or 10 percent quota rollovers, but not higher, which are B and C, and stated there may be extenuating circumstances, which makes a small quota rollover reasonable. A 10 percent rollover is used in federal fisheries management, it was pointed out. One supported a rollover of 10 percent or higher. On the incidental catch there were four AP members supporting Option F, no incidental catch fishery, concern there that the catch is not counted towards the TAC. The 6,000 pound trip limit bridged the gap between Amendments 2 and 3, but should not be used after implementation of Amendment 3.

Bycatch competes with the directed bait fishery, it was argued. One AP member did support an incidental catch limit, and pointed out that the 6,000 pound trip limit provides critical fishing time for the bait fishery. In general comments the current bycatch allowance was noted as a loophole; particularly for purse seines.

It reiterated that trawls should not be included as a non-directed gear type, and a recommendation to clarify definitions of gear types, particularly if purse seines are prohibited to harvest under the trip limit. Finally episodic events, three AP members supported the continuation of this set aside. If there is no reallocation of the quota New England needs this program.

The program should remain no matter what allocation New England gets; but should be increased to 3 percent if New England states don't get more quota. Some New England states have the capacity to harvest large amounts of menhaden; so the set aside is needed today. The set aside is further needed to prevent fish kills.

Three AP members didn't support a set aside. New England states are no longer having episodic events; abundances have been higher for several years. The set aside shouldn't be needed with allocation and a higher TAC. Episodic Event Program has just created another fishery, and this is not equitable that other states have their quota but no access to Episodic Events Program.

Quickly the AP report on Chesapeake Bay Cap, two AP members supported the status quo; saying that studies have shown the possibility for localized depletion in the Bay is small. Three

AP members supported reducing the cap to 51,000 metric tons with no rollovers; Option B and Sub-option B.

Studies on localized depletion were inconclusive and couldn't determine it was happening, concerned about increased reduction harvest from the Bay if cap is not reduced. Chesapeake Bay is an important spawning ground for many species and warrants greater protection. Concerns about the change in ownership of Omega Protein with Cook Aquaculture purchasing that company recently; an international company which may not have a vested interest in the Bay, it was stated.

One AP member supported the removal of the cap, Option C. Since there is a coastwide TAC there should be no Bay cap, and then Virginia purse seiners were already restricted from going in the majority of the Bays; in the Maryland portion of the Bay and the rivers. On the TAC, six AP members supported increasing the TAC.

This is where we had some motions, none of which were successful; very interesting discussion, all with good humor I might add, Mr. Chairman. Two supported the 280,000 metric ton TAC; comment there that one state lost access to 60 percent of the menhaden fishery due to 2013 TAC implementation. One member supported the 250,000 metric ton TAC, helping the industry, not going to hurt the stock. One supported 240,000 metric ton TAC, 20 percent increase. New England Council uses a risk policy of a 50 percent chance of exceeding the OFL, where the Mid-Atlantic has a risk policy of a P-star 40 percent. TC projections show the 314,500 metric ton TAC has a 50 percent risk of exceeding the F target only. One supported a 220,000 metric ton TAC to offset bad years in a fishery you need good years, and to the current cap TACs harvest levels in mediocre years.

Two AP members supported maintaining the TAC at 200,000 metric tons; stating that regardless of the reference points chosen the TAC shouldn't increase under Options A and B, and don't need to decrease under Option E. The increase in the TAC could negate the progress that has been made in stock abundance since 2012, these members argued.

The AP did make a series of motions regarding these options, but as I stated earlier none passed. In general comments, and there were consensus on these points. It was recommended the AP could be better utilized by the Menhaden Board to provide information on annual changes and trends in the fishery; including AP comments in the Commission's FMP review process was recommended, in a process similar to the Mid-Atlantic Council's Fishery Performance Report.

Finally, the AP expressed concern the fishermen harvesting under the 6,000 pound trip limit today are selling menhaden from their bunt, this is a purse seine gear terminology, and not reporting landings. Need for greater enforcement at the state level was recommended. Finally, the AP recommends that in the future the Technical Committee complete multiyear projections, and that the Board consider setting multiyear TACs for two to three years. With that Mr. Chairman, I end my report, thank you.

CHAIRMAN BALLOU: Questions for Jeff on the AP report. Dennis Abbott.

MR. ABBOTT: Jeff, how many people participated in your discussion? I note that on a lot of issues there were differing amounts of opinions. Were some people ambivalent to certain things? Would you explain that a little bit to me?

MR. KAELIN: Yes, we had 12 members of the AP. For those of you who know me you may be surprised I didn't say much, as the Chairman. That changed the count a little bit. I mean I really think it's important for the members to speak. We had a quorum. I think there are about 18 members of the AP right now.

Again, I wanted to thank the Board for recently repopulating the AP. If it doesn't add up, you know some people were quiet I guess on certain matters, Dennis. But what we wanted to do is just kind of record the breadth of opinion around the table; so the numbers might not add up, and it may just be that some people were more vocal than other people.

CHAIRMAN BALLOU: Russ Allen.

MR. RUSS ALLEN: Thank you for that report, Jeff. Just a quick question and it might be better for tomorrow's discussion. But I just wanted to hear the rationale behind the one AP member not wanting to include trawls in the small-scale fisheries; if you could give me a little bit more information on that.

MR. KAELIN: Sure. I think that the feeling was that the trawl fishery can produce fish at volumes at least as large as the purse seine fishery does. Since the Board had been clear that purse seines shouldn't take advantage of the 6,000 pound incidental set aside up to this point, it was noted that it may be an oversight by the Board to have trawls listed as a small-scale gear, because of their capacity to take large amounts of fish.

CHAIRMAN BALLOU: Additional questions for Jeff, seeing no hands, again Jeff will be back tomorrow morning to kind of refresh on some of the issues that we'll be taking up tomorrow. Questions along the lines of Russ's would be particularly appropriate at that time. But again, thank you, Jeff for your leadership.

The AP has really done an awesome job right through this entire process; and through you to the members, I know the Board very much appreciates the very thoughtful input that has been provided.

AMENDMENT 3 REFERENCE POINTS

CHAIRMAN BALLOU: Okay, now let's turn to the first issue under Amendment 3, which is reference points; and open the floor to questions from the Board on the reference point options set forth in the draft amendment.

This will be questions only for now. The time for motions will soon follow. I think Megan may be putting up sort of a summary slide just to orient ourselves. But the floor is open to any questions that any Board members may have on any of the issues associated with the reference point options. Does anyone have any questions? Rob O'Reilly.

MR. O'REILLY: I wonder if we could get a brief summary of the assumptions that the Technical Committee listed. There was a recent memorandum that was provided to the ASMFC; and in that there were a number of assumptions related to the different reference points. I wonder if that is available.

CHAIRMAN BALLOU: I'm going to give Jason McNamee the microphone, Chair of our Technical Committee.

MR. JASON McNAMEE: Mr. O'Reilly, could you repeat your question one more time, just to make sure I'm giving you the right info?

MR. O'REILLY: Yes, there were assumptions listed by the TC related to the generalized approaches to the biological reference points. That was just, I think at the end of the week last week; so that would be the first part. Do you have that in front of you?

MR. McNAMEE: I think so.

MR. O'REILLY: It was things such as lack of a stock recruitment situation. There were about four or five different assumptions listed and if you have that then I'll follow up to save time. I would also appreciate hearing how A and B relate; since they're menhaden specific, what type of assumptions there are there. I realize with both there will be recruitment assumptions, but I hope that gives you enough information to respond.

MR. McNAMEE: Yes, I think so. What I think you are interested in is we refer to them as caveats for the projections. I've got that in front of me. If I had my presentation that I'm going to give tomorrow open I could get you a quicker version. But I'll do my best here. We've got a set of general caveats that apply to both; the ecological reference point projections as well as the standard projections that we run, and then a subset that is just about the ecological reference points. One of the first caveats that we noted was that the fisheries are assumed to continue from this point forward.

In the projections they're assumed to continue at their current proportions of total effort. That's important with regard to how selectivity works with the projections. Recruitment, so we're not using a stock recruitment relationship in any of the projections. It's sort of a re-sampling of the existing range of recruitment that we've seen through the time series.

But what's important about that is that we're using a median; and so if conditions are that recruitment has a series of years with low recruitment or high recruitment that is going to impact the performance of those projections. Another big one is that we're using the Baranov Catch Equation, and so that is assuming that catch is occurring for the entire year.

Changes to things like seasons and other items like that again will impact the performance of the projections; because of that underlying assumption. Just a general statement that projections, whether it be menhaden or any other fish in the sea, are highly uncertain. One other less clear one that we often include is that we are basing a lot of the projections on these functional forms; so a single selectivity function, a single recruitment function which I've just described.

What we don't include is structural uncertainty in the model itself. We include a lot of uncertainties and we sample within the range of those uncertainties; but when it comes to the model that we're using, we're not doing a full blow simulation analysis to identify what that uncertainty might be. Then we had a set of caveats on the interim reference point calculations as well. You're interested in those as well?

CHAIRMAN BALLOU: Rob.

MR. O'REILLY: I guess in particular what I had read was since the BAM model uses a dome-shaped approach, and the generalized Pikitch et al do not that with a biomass-based approach, the selectivity did not go down with age with those particular approaches, and could. In fact, there was a statement and it's been a few days since I've read it, but a statement about how that would denigrate the spawning stock, because it was on all ages. Can you comment on that?

MR. McNAMEE: Yes. What you stated is correct. That is one of the major differences between the models used to develop the generalized interim ecological reference points that you all are looking at; versus the single-species menhaden reference points that we've been working with. That selectivity is one of the big issues, or differences not issues.

One of the big differences between the two approaches. You characterized it correctly that in the ecopath with ecosim approaches, the selectivity sometimes they do split it out by groups of the ages. But in either case the selectivity is constant for those groups; whether they're a single group or multiple groups.

Whereas, in the BAM model we do use dome shaped selectivities in a couple of spots, not in all of them, but in a couple of the fleets. That statement that you made is correct. I'm a little puzzled about the linkage you made. The other comment you made is correct that with some of the interim reference points you could fish the population down. It's because those are developed without that context of the age structure; and that was through work that we

did with the Pikitch et al group, to try and create this translation between the two. That is true that selectivity is a part of that but it's not the complete cause of that.

CHAIRMAN BALLOU: Next I have Emerson Hasbrouck.

MR. EMERSON C. HASBROUCK: I have a three-part question, relative to B-0. I'm wondering the first part of the question is what is the value of B-0? Part two is how is it estimated? Then the third question or the third part of that question is what is the 95 percent confidence intervals around that estimate?

CHAIRMAN BALLOU: Jason.

MR. McNAMEE: Excellent questions. I think I will start with the middle question; because that's the one that I can answer most directly. The concept of B-0, I think you were asking, how it is estimated. The way that we generally do that and the way that we did it here for menhaden is you run a projection.

What you do with that projection is you remove fishing, so you set F equal to zero. Then you run that population forward. What's happening at that point is all of the population dynamics are being dictated by recruitment; so new fish coming in, and it's based on all of those assumptions I just talked about a moment ago and natural mortality.

That's the only removal that's occurring, and so what happens over time is that population will reach an equilibrium level. It's that battle between the removals of natural mortality and the recruitment coming in, and I've got a plot I'll show you tomorrow maybe; depending on what happens today, where you can kind of see what it looks like.

In the projections it kind of goes up and wobbles around; and then it eventually flattens out through time, and that's when that equilibrium level is reached. What that value is you'll have to give me some time. I don't have that off the top of my head. I'll have to hunt that down. Then I don't remember your final question. I have a capacity of two questions, and then I need it repeated.

MR. HASBROUCK: Actually the third part of the question may be more important than the first part. But without the first part I don't know if you can answer the third part and that is; what are the 95 percent confidence intervals around that estimate?

MR. McNAMEE: Yes so that will also, I'll need to look at that. I imagine there are confidence bounds, although the interesting thing with these projections is the uncertainties. The further out you run it they get stable and they shrink. I would have to look that up as well. I don't know that off the top of my head either.

CHAIRMAN BALLOU: Additional questions. Was it Alison or David or both? Okay, David, I saw your hand first. David Blazer.

MR. DAVID BLAZER: I have two questions, and Jason I'll do one at a time, if that will help; because it's kind of a long question. You know there is a lot of confusion surrounding the ecological reference point options; because of the necessity to translate everything into the same currency, based on the total biomass.

This approach does not explicitly account for changes in population reproductive potential; which seems to have led to particular concern about the threshold of the 40 percent unfished biomass. In the projection memo that we got last week, on Page 3 it makes a comment that the workgroup has concerns about the use of reference points that preserve a certain proportion of a total biomass, instead of a spawning stock biomass or fecundity, because they may result in a level of spawning potential well below the fecundity limit.

It goes on to say the level of fishing pressure that reduces the total biomass to the B of 40

percent is higher than anything seen in the history of the fishery; and results in almost total loss of spawning adults. That statement indicates that Option E is kind of risky for the stock; which is a little worrisome, given the discussion that we're having today. I'm trying to get an explanation. If you could explain to me some of the issues and the risks of applying this ERP option as it goes forward.

MR. McNAMEE: That was an excellent retelling of the memo. I think you captured everything really well. I think with regard to Option E. The intent of the Technical Committee, the risk is highest with regard to that threshold level, so that is what those comments about nothing seen before in the fishery and that part of it was with relation to that threshold level.

I think you've captured that well and you're interpreting our intent well. I'm trying to think how deep in the weeds you want to get on this. I think when we received the task from the Board it seemed pretty straightforward to us. I'm sure to you all as well. But then when we sat down and started to think through, we understand this population through our age-structured assessment.

That was where we first ran into this issue of, well we need to figure out a way to translate between how the generalized ERPs are developed and the information that we have available. This was in consultation with the Pikitch et al folks, not the whole group, but a subset of them, on a call.

What we came up with was total biomass, one of the main reasons for that is it gave us a way to weight the F levels that are coming out of the model. When we give you in the single-species context the F that is occurring, sort of our benchmark F that's on a specific subset of the population that the most fishing is occurring on, and so this is different than that.

This is now taking that F and spreading it out across the population; and you need to be careful when you do that and you need to weight it by the abundances in those various age classes. That's why we went with total biomass. I guess the final point is if you were to ramp up fishing mortality to the level that would allow you to achieve that threshold level, the vast majority of the biomass exists in zeros, ones and then as you enter in the twos the population really starts to decay for fishing and natural mortality and all of those reasons.

That is why that foible of that particular part of the ERPs exists, and that is you can really whack those older ages and drive them down to near zero; but you still have enough biomass in the zeros and ones and twos to meet that metric. But were you to then compare it to your fecundity metrics that you had been using that is where you would see that big difference.

CHAIRMAN BALLOU: Dave, did you have another question?

MR. BLAZER: I'll hold off on my second question for right now. I'm good, thank you.

CHAIRMAN BALLOU: Ritchie White.

MR. G. RITCHIE WHITE: Jason, if one was to select Option E and one was to adopt a quota that was status quo or slightly above status quo; and the plan allows us to fish over the target, so we could do that. Would it be precedent setting to fish over the target for other species?

My thought process is that it would not be, in that this is not single-species management if we select E, where I believe all the rest of our other species we manage are single-species. That is my question. Could you comment on whether you think it would or would not be precedent setting for some of the other species that we manage?

MR. McNAMEE: Me and Katie will tag team this one. I guess as far as precedent goes, I would suggest that in fact most of the federal fisheries fish to a limit and not a target; and so I think

that would be standard for how a lot of the federal fisheries are managed. I think depending on the management plan that you have, it dictates whether you manage to the target explicitly or I guess the intent of having a target is that's your eventual goal.

How long it takes you to get there and that sort of thing I think are usually negotiated within the management plan. But I guess that would be, I don't think it is precedent setting with other fisheries. Other fisheries don't have targets at all and they fish to that limit and try to stay above or below that limit; depending on which metric. But I think Katie wanted to add.

DR. KATIE DREW: Yes just to add to what Jay was saying is that in plenty of our other fisheries we actually do fish above the target; and as long as we're not above the threshold, we kind of let it go. I think striped bass is probably on everybody's mind recently, and that is. But that's because we specifically have a trigger within the plan to say if you're above the F target.

Even if you're below the threshold for a certain number of years and your biomass is between the target and the threshold, then you do have to come back down to the target. But in most of our other plans it's the threshold that triggers management, so we may or may not be above the target for those other fisheries. But you don't do anything about it until you go over the threshold; so in that case menhaden would be in the same boat as all of our other fisheries.

CHAIRMAN BALLOU: Next I have Allison Colden.

DR. ALLISON COLDEN: I don't want to belabor the point on the selectivity between the ERPs and the single-species reference points, but I did want to get clarification Jay, on a comment that you made in responding to Mr. O'Reilly's question. I think you said that in certain sectors of the fishery and in certain places that you don't apply domed-shape selectivity; and so can you clarify in what situations how the selectivity is addressed?

MR. McNAMEE: Yes the current single-species assessment has a number of fleets. If you remember this is the first time that we had split it into north and south; then there is bait and reduction. I'm pretty sure we're using dome-shaped selectivities in the southern fleets; and the idea behind that is at certain times of the year in particular, the older, larger fish are migrating further north.

It makes biological sense to use a dome-shaped selectivity for those fisheries that are occurring to the south. In the north we're using a logistic, which would be flat-top selectivity, at least for the survey indices up there, and I think for the fishery as well. I would have to dig in to give you exactly which ones we're applying domes and which ones we're not. But there are differences within the model.

CHAIRMAN BALLOU: Follow up?

DR. COLDEN: Yes, quick follow up, Mr. Chair. Do you know at what age in the logistic selectivities that you're moving from low to high selectivity by the fishery?

MR. McNAMEE: I was contemplating just winging it, but I think that is something I could look up relatively quickly and get back to you on.

DR. DREW: Just to add to that. For the single species model for the assessment, we are using the multiple fleets. But then to develop the reference points and to do the projections, we're using sort of a weighted average of a single selectivity to combine all of those different fleets into a single, sort of averaged fleet, based on how much effort they've applied in the past and what their selectivity curves look like.

Some fleets go up and flatten out; some are completely dome shaped, and the end result

sort of average for the reference points, ends up being that dome shaped on the basis of how much effort the fisheries have applied in the past. The different fisheries are sort of composited together into a single selectivity curve for the reference points.

DR. COLDEN: Thank you.

CHAIRMAN BALLOU: Pat Keliher. Roy Miller.

MR. ROY W. MILLER: Thinking about the questions that have previously been asked, and the answers offered by Jason and Katie. With regard to Option A, obviously if I could summarize what I've heard thus far, we're not bound to manage to the F target. But there is a lot of room between the F target and the threshold. What guidance do we have when it comes to picking a TAC that will be somewhere between the target and the threshold?

DR. DREW: There is essentially nothing written down in terms of guidance then, and it would be the Board's prerogative to decide. We can give you projections and say, this is what the stock is going to look like in the near term, over a couple years, under this level of fishing pressure. We can show you some different options between the target and the threshold, which as you say for Option E is a really wide range. Then it would be up to the Board to decide how they felt about the risk, how they felt about sort of the rewards of that.

The way essentially that we've done for our single-species process up until now to discuss, here is the risk of exceeding the target, or here is the risk of exceeding the threshold, and here is the associated TAC and how do you feel about that? How does that impact the fishery? How does that leave fish in the water for ecosystem management? It would be the Board's decision to balance those different competing objectives within the limits that the projections indicate.

CHAIRMAN BALLOU: Roy.

MR. MILLER: Katie, if I could. Would you have the ability to be fairly timely in providing such analysis; were specific TACs to be suggested between now and tomorrow?

DR. DREW: Between now and tomorrow? No. That's not happening. If we knew about what you guys wanted ahead of time, and we had plenty of lead up time. It's not excessively time consuming, but we would like some kind of limits on the range of options you would like.

CHAIRMAN BALLOU: Nichola Meserve.

MS. NICHOLA MESERVE: Jay, you answered a question about the Option E threshold and putting that F rate in the context of the histories of F, and the effect on spawning adults. I'm trying to put the single-species F threshold into a similar context; that's based on a maximum rate from 1960 to 2012. Is it also higher than most of the history of fishing mortality rates, and what is the effect there on spawning adults?

MR. McNAMEE: I may be missing your question, and so how I think I'm understanding it, let me say it back to you and then you can correct me. I think you're still thinking about the Option E and where that threshold is, and trying to compare where that is set relative to what that would look like from the single-species model where that threshold would get us with regard to that. Is that kind of what you're asking?

MS. MESERVE: Yes. Essentially I'm trying to see if the difference in the point estimate between those two thresholds is very different in what it produces in the stock; and how you would compare them. There was a statement about the Option E threshold is higher than almost anything seen in history. Can the same be said also for the single-species F threshold?

DR. DREW: No. The single-species F threshold, the earliest years of the time series are not included in the years that we've looked over.

As a reminder, the way the TC developed those reference points is we took a time period when we thought the fishery was relatively stable, in terms of the yields that it was able to produce, and the population was also relatively stable, and also recruitment showed variability but did not show extreme lows.

We thought over that time period that was a reasonable set of fishing pressure. The target is the median of those years of fishing pressure, and the threshold was the maximum observed during that time period. Prior to that time period, you did see Fs in the fishery that was higher than that maximum.

There was a point within that time period the maximum is the threshold that we proposed, so during that sort of stable period we met that once in the prior to that period. There definitely was fishing pressure higher than that; whereas for the Option E threshold, it really is beyond that F value that comes out as beyond anything we've ever seen in the fishery. In terms of then translating that into fecundity reference points, which is what – so we came up with the F rate based on sort of the empirical or historical observation of the fishery, and translated that into how much fecundity would we expect sort of under long term equilibrium conditions.

I think that is 36 percent for the threshold, so you would expect to see about 36 percent of the egg production of a virgin stock. Whereas, if you translated that into the Option E, it's almost complete loss of the spawning stock or the fecundity, under that sort of long term equilibrium conditions or assumptions.

MS. MESERVE: A quick follow up. I think it's the 21 percent MST for the threshold. How does that compare to benchmarks that are used for other species? What percent are often targets and threshold levels?

DR. DREW: The fecundity estimates or the fecundity reference points are very similar to the spawning potential ratios that you may be familiar, or SPR in other fisheries, where some of sciaenids which are quick to reproduce, quick to mature, very fecund. Those have targets and thresholds of about 20 percent to 30 percent SPR. Other species have reference points in the 30 percent to 40 percent range, in terms of targets and thresholds.

For sturgeon, we recently tried to look at one for about 50 percent. But again, being a slow to mature, long-lived species that has different, but you have a different risk tolerance for some of that life history. The 20 to 30 percent that we're seeing that we're estimating comes out of those reference points is comparable to some of our other reference points that we use for quick to mature, very reproductively capable species.

CHAIRMAN BALLOU: Robert Boyles.

MR. ROBERT H. BOYLES, JR.: I'm confused. I had my son in the woods last night hunting, and he had very specific instructions on what he was to do. The quarry came within sight. He aimed at the target. He shot. He missed; and he asked me, Dad what happens if you miss? It was kind of a profound question at the time.

We wandered around the woods last night for two and a half, three hours looking, following trails, and we made a mess. I have a son back home who is a little gun shy now, and we've got quarry wandering around the woods perhaps, wounded. Do they go on another property and make a mess for someone else?

Did they stay in the woods where we were hunting to provide biomass, feed for the system? I'm just concerned. You know we call the target a target. I think it's important that we're very, very clear about our intentions on how we manage the fishery. These are good questions and good technical questions.

Mr. Chairman, I would submit that some of these elements are more policy oriented, and I

appreciate the TC and their efforts to answer these questions. But I think I'm becoming more and more confused in terms of target. I told my son, aim for the target, aim for the target. That's what your goal is that's your objective, and if you miss there are pretty serious implications.

CHAIRMAN BALLOU: Additional questions, going next to Adam Nowalsky.

MR. ADAM NOWALSKY: Keeping with the same theme of the questions or concerns about Option E. I think we've made it very clear on the record here the earlier slide that the Board would have the flexibility under Option E to select a TAC; perhaps all the way up to the threshold, which would represent a 250 percent plus increase from where we are now.

As I look through the public comment letters, many of those comment letters that advocated for Option E, also advocated for other options in the document, i.e. no rollover, lowering of the Chesapeake Bay cap, removal of full accounting for incidental catch. That would be characterized as more conservative oriented.

I'm wondering what the sense was from the public hearings. As I look at these suggestions that we use E, which is potentially the least conservative option in this document. What is the thought that the public really expected us to do with Option E? What is the sense you got from the public hearings from input to the Commission from any other commissioners around this table today that have spoken with the members of their public, about what the public expects us to do if we select Option E?

MS. WARE: I can, I'll say briefly talk about those who supported Option E. There was support, I'll say up and down the coast for Option E. Those who tend to support Option E did see it as a more conservative approach to the management of menhaden.

They generally liked that it was an ecosystem approach, and that it was important for them to move to that now, as opposed to waiting for the BERP Workgroup to complete their menhaden-specific ERPs. There were comments in conjunction with the reference points about keeping the TAC at 200,000 metric tons or reducing it. Those were frequently comments given in conjunction with Option E.

CHAIRMAN BALLOU: I have Pat Keliher next.

MR. KELIHER: I appreciated Robert Boyles' hunting analogy. I finally understood one; and it reminded me that it's hunting season. I passed when I was going to ask my last question, and then Roy promptly basically asked the question I was going to bring forward. My concern with Option E is the fact that we seem to be leaning in the direction of knowing that we're going to be going over target; as it's associated to Option E.

I think that is problematic. While federal, Jay your comment on federal fisheries do it all the time. This isn't a federal fishery. I think it is precedent setting for the Commission to move in that direction; and I have a lot of concerns with taking that type of direction. I have many other comments associated with Option E, and I'll reserve those for later discussions.

CHAIRMAN BALLOU: Dr. Duval.

DR. MICHELLE DUVAL: Hopefully just a very quick question. If I recall correctly, as of the update to the benchmark assessment that we just received in August, even though I guess the target is 36 percent MSP Katie, that we are actually at 48 percent MSP. Is that correct as of the update to the benchmark?

DR. DREW: I don't have the number in front of me, but I believe we are above the threshold for the biomass. I believe we are above the target as well; but I don't have the numbers in front of me, I'm sorry.

DR. DUVAL: Just a follow up, Mr. Chairman. I think in terms of the associated fishing mortality rate, my recollection was that we were fishing at a rate that would allow for 48 percent of the maximum spawning potential. Not necessarily that we were actually above the fecundity target.

DR. DREW: Yes, I believe that is also true that the long term equilibrium fecundity associated with that would be about 48 percent.

CHAIRMAN BALLOU: Additional questions. John McMurray.

MR. McMURRAY: I just want to clarify what I think the public expects with E. I think that the intent, at least what the public perceives is the intent is that we would strive to manage towards 75 percent. But there is flexibility there. It doesn't have to be done in one year. It doesn't have to be catastrophic to industry. But it is a goal, and it's where the public expects us to go with this.

CHAIRMAN BALLOU: Dave Bush.

MR. DAVID E. BUSH, JR.: I guess a question, two-part question, very easy I would hope. In general for I guess the panel, as you would call it up front. How long have we been managing with the current single-species reference points that we're currently using, and what has been the general characterization of the overall biomass since we've been using them? Very general would be fine.

DR. DREW: We've been using the current single-species reference points, essentially since the last benchmark assessment. We've set the quota a few times based on that; and in general the biomass has trended up since the lows that we saw in the late '90s to the early 2000s, and it's maintained close to our SSB or fecundity target.

CHAIRMAN BALLOU: Follow out, Dave?

MR. BUSH: Yes, just very briefly. If we continued on this, I know this is hypothetical and you all have many crystal balls at your disposal. Continuing on this current pattern, using the biological reference points we have until we have something species specific, do you all see great concern in continuing with where we're headed at the moment?

DR. DREW: I think the BERP has always advocated for waiting until the reference points that are ecosystem reference points specific for menhaden can be developed. We would not advocate that if we thought that current management was detrimental to the single-species health of the stock. I think we can do what we can do with menhaden-specific reference points. It will be great and a great movement forward for the stock, but I don't think we would have advocated for that if we had serious concerns about the single-species management.

CHAIRMAN BALLOU: Are there any other questions, Emerson that would be your second, which I'm going to allow you. But first I want to make sure to give anyone else a chance to who hasn't yet asked a question to ask. I see no other hands, so Emerson, second bite at the apple.

MR. HASBROUCK: I'm a little confused as well. I thought that I had things pretty well squared away. But then in the response to Nichola's question I'm a little confused. In the document for public review, Table 1 is the reference point alternatives for Options A through E. My assumption there is that these have all been converted, if you will, to a common currency; that currency being the biomass weighted F, so that the single-species reference points in that table have been converted to this new currency. Is that correct?

DR. DREW: Yes, and that's why they don't look exactly. If you looked at the assessment update those numbers would be slightly different from what we sent out to public comment. They've

all been converted into the same scale; that biomass weighted F.

CHAIRMAN BALLOU: Additional questions on reference points? I see a hand in the audience, but we're not taking public comment; that has already been taken through the public comment period. This is for the Board's purview only at this point. Having exhausted questions, and realizing that the next phase would be motions, and given the timing. Let's take a ten minute break; biological break, ecological break, whatever suits your fancy. We'll be returning at 2:51 exactly. Thank you.

(Whereupon a recess was taken.)

CHAIRMAN BALLOU: Okay first, I think Jason McNamee was able to come up with an answer to one of Allison Colden's questions; so Jason.

MR. McNAMEE: Yes. If I remember the question, you were wondering where the logistic curve kind of peaked at what age. I looked that up and it is age 3 is where it reaches that plateau.

CHAIRMAN BALLOU: Allison.

DR. COLDEN: That is implying that the selectivity for ages 3 plus is constant?

MR. McNAMEE: For that combination of fleet and fishery, yes.

DR. COLDEN: Okay and the selectivity for the ERP options were constant at ages 2 and above? Is that correct?

DR. DREW: For the ERP options it was the dome shaped sort of composite selectivity that basically 2, 3 and 4 is where it is the maximized; and so it's much less at age 0 and 1, and less on ages 5 and 6.

DR. COLDEN: I'm sorry, for Option E.

DR. DREW: Oh, so for Option E that is how we calculated it. We used that composite selectivity that we see in the fishery from the model. If you're talking about sort of the EWE models that were used to develop those rules of thumb, those are essentially flat-topped curves that treat either all of them as a single selectivity or sort of small versus large.

CHAIRMAN BALLOU: Okay, I now open the floor to motions on the reference point options. Would any member of the Board like to make a motion? David Borden.

MR. DAVID V. BORDEN: I provided the motion to the staff. **I would like to move to adopt reference point Alternative E: BERP Workgroup continues to develop menhaden-specific ERPs with interim use of 75 percent Target and 40 percent Threshold as described in Amendment 3.**

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Nichola Meserve? It's been moved and seconded to adopt the Reference Point E: BERP Workgroup continues to develop menhaden-specific ERPs with interim use of 75 percent Target and 40 percent Threshold as described in Draft Amendment 3; discussion on the motion, David.

MR. BORDEN: I'm going to try to do this quickly, because I know we have divergent views around the table. There are going to be a lot of people that are probably going to want to speak to the point; also are possibly amendments or substitutes. I just point out for the record that the Commission has a long history of recognizing the critical importance of menhaden to the ecosystem along the coast; and particularly the two specific predator populations, namely striped bass where we've had a major focus.

I went back at one point and looked at the history of this. The history actually goes back to 2001, and I think if I dug further it would go back even further than that. In those days we

embarked on what we called multispecies management. Recently what we've done is we've kind of changed that into the efforts to focus on developing menhaden-specific ERPs.

Unfortunately, the menhaden-specific ERPs, personally I wish they were available today and we could have that debate. But that is not the case. They're not likely to be developed for a number of years. Once they do, most of the people around the table know that we will have to go through a fairly lengthy process to adopt those; which will include a full consideration of a lot of the assumptions that are included in that.

We haven't seen that analysis. One of my conclusions for making this motion in particular is that I think that process is probably going to be delayed beyond where we project it to be. Hopefully I will be proven wrong by the working group. I think this personal view that after 16 years of discussion, I think the Commission needs to get on with fashioning an ecosystem strategy on menhaden.

I think that transition, what I would view since the species-specific targets are not available at this point that we really need to begin the transition through this alternative. I would also note that the Commission has pretty wide latitude. There were a lot of really good questions Rob O'Reilly and others have raised very valid concerns about different issues.

But I would also point out that the Commission has wide latitude on where they set the TACs, which will drive what the removal rates will ultimately be. Just a few more comments, from a Rhode Island perspective menhaden are critical to the ecosystem in the state, namely because Narragansett Bay is one of the major economic drivers of the economy of the state. We have a very vibrant commercial and recreational fishery in the state; including charterboats and party boats. It's kind of the foundation of that is the state of the resource in Narragansett Bay, and that includes menhaden. Menhaden are a critical economic issue within the state. In recent years things have gone well. We've had fairly high abundance of adults, which has been very pleasant for most of the constituents, and we've also had fairly high abundance of peanut bunker.

I went fishing yesterday in fact, and there were vast schools of peanut bunker still around, even at this point. Things are going well. But my point in making this, I think we need to start the transition from the discussion phase we've been in for 16 years, to moving into the implementation phase. I think this motion; coupled with an appropriate TAC will do that.

CHAIRMAN BALLOU: (Audience Applause) Could I see a show of hands of those who would like to speak in favor of the motion; or perhaps speak in the direction of the motion. Just keep your hands up. We're just going to put together a list, and then I'm going to alternate between pros and cons, so keep your hands up until Megan gives me the okay sign. Show of hands now of those who wish to speak in opposition to the motion. Keep your hand up, please. We'll alternate and I'll begin with someone in opposition, and I'll just start to my right. Pat Keliher.

MR. KELIHER: Mr. Chairman, I actually have a motion to substitute along with my comments.

CHAIRMAN BALLOU: Go ahead.

MR. KELIHER: I would move that we substitute Option B: The BERP Working Group continues to develop menhaden-specific ERPs with the interim use of single-species reference points.

CHAIRMAN BALLOU: Is there a second to that motion to substitute; seconded by Russ Allen? It's been moved and seconded to substitute Option B: BERP Workgroup continues to develop menhaden-specific ERPs with interim use of single-species reference points as described in Draft Amendment 3. Here is how I

would like to handle Board consideration of both the substitute and the main motion.

I would like to afford the Board the opportunity to consider both on an equal basis. I will take comments on both motions; alternating between those wishing to speak in favor of the substitute motion, and those wishing to speak in favor of the main motion. During the process of considering both motions, both will be amendable.

Once both motions have been fully considered, there will be a vote on the substitute in its original form or as amended. If passed it will become the main motion and be subject to final consideration. If not passed we will return to the main motion in its original form or as amended; and it will be subject to final consideration unless there are any other motions to substitute, Yes, Dennis Abbott.

MR. ABBOTT: I don't like to disagree with the Chair, but when Pat made a motion to substitute that becomes what's on the floor. I don't see that we can be discussing the main motion now, because we have a motion to substitute. I think the conversation should be around the substitute motion, and if that passes then it becomes the main motion, and if it fails we go back to the main motion. I think that would be in order in Robert's Rules. I don't think we can discuss both of these motions; because we have one motion before us, and that is the motion to substitute. Correct me if I'm wrong, or I'll look to Bob Beal for a little more guidance. I will say that the Chair does have some latitude, but.

CHAIRMAN BALLOU: I certainly don't like to disagree with my colleague from New Hampshire, but. I do acknowledge that this approach is not one that we typically follow. It is however consistent with Robert's Rules. The intent is to provide for fair and balanced consideration of the two alternatives. If only the substitute were considered and potentially passed, then the proponents of the original main motion would not have the opportunity to advocate for and possibly improve their motion. This approach will enable the Board to fully consider both options at the same time before voting on them. That is my intent to move forward, unless there is an appeal that is my ruling in terms of how I plan to handle it.

MR. NOWALSKY: One other point of order.

CHAIRMAN BALLOU: Go ahead, Adam Nowalsky.

MR. NOWALSKY: I had heard you mention the ability to amend the main motion during this process. I would contend that should not be allowed; with regards to Robert's Rules allowing one motion at a time that we would be modifying. I don't see how we could go back and amend the original motion until we dispense with all of the subsequent motions.

CHAIRMAN BALLOU: I believe we can do it as described, but I would look to Bob Beal for at least an acknowledgement that this might be at the discretion of the Chair.

EXECUTIVE DIRECTOR BEAL: We made it farther into this meeting than I thought without having to get in the middle of a few commissioners, it's great. The initial conversation between you and Dennis, you know Option B and Option E is the crux of a lot of what is going to be talked about today.

I don't know how you can separate out those conversations. I think they are going to be intertwined regardless of how that is packaged, as far as procedurally. To Adam's point, kind of you, Mr. Chairman and Adam are both right. But I think logistically to sort out substitute motions or motions to amend, to two different motions at the same time is really hard to track.

I think if you let the conversation sort of evolve and talk about the pros and cons of Option B and E at the same time. I think that part is very manageable. But I would suggest to just have any potential amendments to motions just focus on the substitute for now; just for ease of tracking those, and making sure everybody is on the same page.

CHAIRMAN BALLOU: I appreciate that guidance. I'm going to follow it. I'm going to go forward as I had suggested, however I will take Adam's comment to heart and not allow amendments on either motion, unless or until they become a main motion. At which point they would be then opened up to further amendment. Thank you for that. I think we've reached a good compromise in terms of process, and now I'll look to Pat Keliher, who was the maker of the substitute motion for your comments on your motion. Pat.

MR. KELIHER: I made a comment earlier in the day about the precedent setting nature of it, and I do believe there is precedent setting as it relates to Option E. Option B is a continuation of Amendment 2; Amendment 2 is working. The fishery is expanding in size and in scope. When I say scope I mean geographically.

Managers already implemented precautionary reference points, while the BERP was finishing its work that was done with Amendment 2 in 2011. The statement of the problem for that action was the new reference points are intended to be interim benchmarks, while the Commission's Multi-Species Technical Committee develops the ecological reference points, so we would be continuing in that vein.

Option E, any of the options in the document, management is based on total biomass rather than reproductive capacity. While this is appropriate for the goals of providing more forage, it ignores the reproductive capacity of the stock. More biomass won't necessarily increase the reproductive output if most of that biomass is in juvenile fish.

Lastly, I would say the biomass approach ignores the known reproductive capacity of the stock, in particular ignores the known increase in fecundity with age at size. Therefore, it is inconsistent with the goals that we did set forth in Amendment 2. I have other comments, but I'll save those for a later time.

CHAIRMAN BALLOU: Thank you, and now I do plan to alternate between pro and con, and now given the new context it might be appropriate to start your comments with an indication of which option, either the main motion or the substitute you support and why. Next I have Ritchie White.

MR. WHITE: I support Option E, only if there is a TAC attached to it. I was just prepared to amend, which I'm not doing it now. I was prepared to amend that to add a quota. If Option E with a quota did not pass, then I'm willing to support Option B. My plan is if Option B fails, I'm going to make a motion to amend Option E to add a quota.

CHAIRMAN BALLOU: Next I have Steve Train.

MR. STEPHEN TRAIN: I'll speak in favor of the substitute motion, Option B. I was going to speak against Option E. I think one of the reasons I support Option B, Pat was real good about speaking about. But I hadn't decided until I got here where I was. During this meeting I heard at least three people say Option E is bad for the spawning stock biomass.

Now I'm not a scientist, I'm a fisherman, but that is one thing I learned a long time ago. If something is bad for the spawning stock biomass you don't do it. If Option B is better for that for the population of the fish, I'm for Option B.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: My comments are in regards to the main motion. You know this is an issue that we have struggled with considerably, and you know

we absolutely support the management of menhaden for its ecological role. We believe that one of the great benefits of the work that has been done by the Lenfest Forage Fish Taskforce and others is that it has raised awareness of the importance of forage species, and has provided managers with tools to evaluate the tradeoffs of different policy decisions. You know science does not tell us how to make those decisions; it just informs us what the impacts of those decisions could be. You know we support the types of approaches embodied in Option E and Option C, but we do have significant concerns about the metric, as others have expressed.

It's clear that while total biomass is absolutely the appropriate metric to meet the needs of predators; our concern is that it does not meet the needs of menhaden, and specifically that it is not protective of the reproductive component of the population that's actually producing the future biomass for predators. Other concerns have been expressed around the table about the TAC associated with the 40 percent biomass threshold, and the significant impacts that that would have on the mature ages in the population.

The department is offering extremely qualified support for Option E. Quite honestly we would prefer a metric that meets both the needs of predators and prey; which is why we are supportive of the efforts of the BERP Workgroup, and are anxious to implement the results of those efforts as soon as possible, and we appreciate all the efforts of the BERP Workgroup to date to work with the Lenfest Taskforce Members to develop the translations that we have in front of us.

CHAIRMAN BALLOU: Russ Allen.

MR. ALLEN: I'm speaking in support of Option B. I thought Robert and Pat hit some really good points that setting a target that you know you're going to exceed right off the get go is counter intuitive to what all the Boards that I've ever served on have thought about. That really bothers me for some reason.

I thought Katie answered a question earlier really well, and that the Technical Committee, who we're supposed to listen to and we hear that constantly at the Board meetings. Listen to the Technical Committee, listen to the BERP, listen to the stock assessment folks, because they're the ones doing the work, and they're comfortable under the current reference points that we are right now.

They know that where we're going to be once the BERP group is done will put us in a better place. I don't see why we would change things in mid flow right here on something that seems to be working. You know our egg production is constantly ramping up, and I don't understand why we would change that now. It's not overfished, overfishing is not occurring. I think we're better off staying the way we are. I don't see the need to make this kneejerk reaction to reference points that aren't even menhaden based. I'll leave it at that.

CHAIRMAN BALLOU: Allison Colden.

DR. COLDEN: I wish to speak in support of the main motion, Option E. I think it provides a lot of positives, which would be helpful in managing the menhaden fishery. Some of these have already been touched on. First is the flexibility. Some of the other options that are included within the document don't include the type of flexibility that is afforded by Option E, while also applying an ecosystem context.

This is not a harvest control rule; it allows the Board to manage to a target that would be protective of the ecosystem and all of the predators that depend upon it. But we've already seen from Megan this morning that there are different methods by which the Board can reach those objectives, and I believe that we will be discussing those later.

The other one is the relative stability. In my interpretation of the current single-species reference point is that they can fluctuate, because it's based on a mean and a median the addition of additional data points, as we saw in this year's stock assessment update means that those reference points change over time, because they're informed by the information that is coming out of the surveys and the indices.

We saw particularly in the stock assessment update that the Northern Adult Index had a very strong influence on the estimates coming out of that assessment; and there were some additional comments by the TC about looking into that. I would suggest that the 75/45 percent of B-0 is the stable proportion of the population that may not be as influenced by those types of fluctuations. I want to also touch upon the comment that Robert Boyles had earlier about managing to a target. There has been a lot of discussion thus far about the threshold associated with Option E.

I would argue, as this Board seems to have done in the past is that managing to the target is really where we need to be. If we were to be discussing the single-species reference points in the same context as people are discussing fishing to the threshold of Option E, we would also be looking at dramatic increases in the TAC, which I don't believe many members of this Board would be in support of either.

In terms of looking at the single-species reference points, if we were to harp on the threshold of Option E, I would offer that we should also be considering what sort of TACs would be associated with fishing to the threshold of the current single-species reference points, and whether or not the Board members think that those levels of fishing are also appropriate.

Finally, I just wanted to bring to bear again the vast number of public comments in support of Option E. I think that it's very indicative of the public's perception on this, how many people are following it. Obviously we have a room full of people here today; and I think that it should be within the back of all of our minds making this decision the types of activities that people wish the menhaden population can support, and the types of economic activities even beyond fishing that the ecosystem can support with a growing population of menhaden.

CHAIRMAN BALLOU: David Bush.

MR. BUSH: I guess to sum it up very briefly. I know that we've had a lot of conversation already and a lot of great points have been made. I support Option B. I'm looking at Option E, and I've heard great concern over many of the issues with it, such as an arbitrary TAC. Why would we have a target if it's irrelevant?

As long as you don't cross over the second line we're good makes plenty of sense to me, because I'm looking for direction as someone new here, trying to figure out why we're here. Why would we have a target at all if we're not going to pursue it? The second thing is the transition to an ecosystem-based fisheries management style. If we're going to do it let's do it right. Let's not just do it just because we've got to do it. Put one foot in front of the other until we get somewhere. We know where we want to be, we're headed there, and it's not like we've got another 16 years to go before we're going to see results. We've actually got fairly time-certain commitments on when this will be available to us. Thirdly, addressing the fact that we do have a roomful of folks in this room that have also seen increases in the menhaden fishery, and they want to continue to see these increases.

Those have been achieved by using our current single-species reference points; and understanding that we're going to be chasing a biomass down or the spawning-stock biomass down with Option E confuses me. It would

make no sense for us to set fire to the house we're trying to build.

CHAIRMAN BALLOU: Jim Gilmore.

MR. JAMES J. GILMORE: I'm actually not going to commit right now, because I have a feeling these things are going to be changing, so I have a question maybe to help me and maybe the other commissioner's to decide. Through the plethora of e-mails that we all got, communications particularly the last week, I think the one concern maybe with the second motion was that on paper we have ERPs coming in two years.

But a lot of the discussion doesn't have a lot of confidence in that. We've heard, well it won't be for five years, it won't be for eight years. A lot of the support on one really seems to stem from not believing that we're going to have ERPs in two years. The question, and I hate to put staff on the –

This is more a feeling from you guys, because it would be nice if we have the probability of hitting the target or whatever. What is the probability of us hitting ERPs in two years, again, I don't want a percentage but a sense that maybe you could help me and everyone else in the room decide? Are we really going to have them? I mean is there a confidence of that or is it something that will take a lot longer?

MS. WARE: I am hearing from the BERP folks at the table that they are cautiously optimistic that they will be ready for peer review in 2019.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: That was a good question, Jim Gilmore. Certainly Dave Borden started off with the main motion, and gave a number of situations that are normal to our lives, which is a lot of things take time. I am in support of the substitute motion; and the reason is I think everyone in this room is united already, some are not as patient perhaps, and that's their choice.

I think that 2001 is a long time ago. My first memory of sort of looking at multispecies management in Chesapeake Bay was 1998. Everyone was very excited. We've maintained our excitement about ecosystem management in many different venues, and I don't think there is any reason not to continue that excitement and to look forward to it.

But we have to do it right. I'm not convinced that Option E is right, because it's not menhaden specific. About a year and a half ago or a year and three-quarters ago, I asked the Technical Committee when they came out and more or less indicated that the Pikitch et al approach was not for menhaden as such, because it wasn't menhaden specific. I came back about eight months ago; I'm using this loosely, and asked the same question, and the Technical Committee, which is a wonderful group said well, essentially we can accommodate our work to whatever we can. Whatever is put before us, and that's a good Technical Committee.

But at the same time, many of the comments that have been mentioned today are pretty startling to me. I do believe we have to manage to the target. I do believe that if we go down the route of Option E, we will have to have a situation where we look for 75 percent unfished biomass. I just believe that.

I also think that we haven't looked at the risks carefully. The risk to the reference point, I may be incorrect but I think we're at 46 percent of unfished biomass, and 40 percent is a real problem, essentially a moratorium. I also think there is a risk to the fleets, there is a risk to the communities, and I think that my timeline starts in 2010, where the Board was told it would be two to three years before we'd have the biological/ecological reference points.

But this takes time, and I think we need to make sure that we get it right. I'm not against anyone who wants Option E; it's just that I think the better course for management is to wait for the biological/ecological reference point group to finish their work. Now we hear it is 2019, a little bit of patience, we get it right. It's not going to be perfect

I think that Jay has already told us that in the workshop we had about a year and a quarter ago that you can't encompass everything into this approach. But you can certainly accomplish a lot more than we've been able to look at so far. The substitute motion is what I'm going to support, thank you.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: Originally when I raised my hand it was to amend the main motion to put a figure in there. I think that we've been hearing for some time now that overfishing is not occurring, we're not overfished and we should be increasing the quota. I thought there was a realization that we should modestly increase the quota from, presently I think it's 200,000 to some figure.

I was in support of Option E, and to put a number on that of somewhere in the vicinity of 216,000 metric tons would have been my motion. We did hear strong arguments, I thought on the one side; that even though we would be above the target we would be well, well below the threshold. It wouldn't be precedent setting, so therefore we wouldn't be doing anything so damaging. That was my original intent, and I'll leave it at that.

CHAIRMAN BALLOU: Adam Nowalsky.

MR. NOWALSKY: I think the comments, particularly from the public with regards to Option E, the expectation was clear. While it's great to hear the words of well the TAC right now is okay, or maybe as Mr. Abbott just alluded to an increase might even be okay. That would move us further away from the target, and to Mr. Boyles' anecdote earlier, I hope that his son quickly learns that our biggest asset as human beings is to have a short memory. While that would be very beneficial to his son, I think it would be very detrimental to this Board in the not too distant future, when people are asking us why are you setting a TAC that is moving farther away from the target? That is the reason why I cannot support Option E at this time; and Option B would keep us at or below the target, which I think is consistent with the expectations of the public and the actions of this Commission as a whole.

CHAIRMAN BALLOU: John McMurray.

MR. McMURRAY: Allison covered some of what I was going to say, but I'll try to simplify it some for the public, and maybe take it a little bit farther. The public doesn't support Option B; because we have this benchmark stock assessment, a single-species stock assessment that allows us to increase, if I'm understanding correctly, by another 40 percent.

That's pretty scary, given what's happened and where we are now. With that assessment, we will continue every year to get pressure from industry to increase our quota. I'm sure that we're probably maybe will increase the quota again today or tomorrow. I think the idea with this interim 75/40 deal is to try to avoid some of that. The question is, and really this is kind of the first I'm hearing about it is the risk to the spawning stock biomass.

I think we could still go with Option E and clarify that the intent is to manage towards 75 percent, and I think we'll still be okay. I don't think it would be terribly hard to do that. Again, with the timeline, and I think everybody wants these menhaden-specific reference points and we want them quickly. But a lot of us find it hard to believe that we're going to have peer reviewed, ready for primetime reference points in 2019. They have to be

tested somehow. I'm not a scientist, I don't know that process.

But I do know that particularly if they appear like they're going to be constraining, the public is going to want to comment on them. I don't know how we do new reference points for a species, without doing at least an addendum. Anyway that is really the rationale for E, and frankly if we could get rid of some of that uncertainty I support Option E, and I think the vast majority of the public does also.

CHAIRMAN BALLOU: John Clark.

MR. JOHN CLARK: I think most of the points have been made. I mean I appreciate the concern the public has shown in support of E, but all the problems with it that have been reiterated around the table about managing, with the situation where we're already fishing above the target, and yet we're so far below the threshold stand.

For Option B, we want to manage with the best available science. Our BERP Working Group has several times come out in recommendation of continuing with the single-species reference points that we're now using until the new menhaden-specific ERPS are available. With those also, I just don't' want to see another fishery that we take a reduction where we're not overfishing and overfishing is not occurring.

CHAIRMAN BALLOU: Nichola Meserve.

MS. MESERVE: I speak in support of the initial motion for Option E. Many of the points have already been raised for them, but there is a growing body of scientific work that supports the 75 percent Target and 40 percent Threshold. I feel that they provide an acceptable intermediary step to managing menhaden in the context of their environment, on our way to adopting menhaden-specific ERPs, which is the end goal from everyone around this table it sounds like. Because the Option E reference points are not specific to menhaden, as raised some concerns from our Technical Advisors, which deserve some serious consideration.

However, it is because the Option E reference points are general that I have comfort in not immediately managing to the target and even with a possible increase in the TAC as has been suggested might be a motion to amend. There have been comments that the stock is growing and expanding since the Amendment 2 reference points have been put in place; but it's notable that the Board has not set a TAC that corresponds with that target.

The concern regarding Option E, the threshold there, it's certainly not my intention to manage menhaden to the threshold for either Option E or Option B. I feel that Option E will provide the Board with the guidance to set a risk prone TAC in the interim and safeguard the stock growth that we've seen since Amendment 2 was put in place, and support the wide age structure of menhaden that is responsible for the availability and abundance of menhaden throughout the range, including New England and the South Atlantic.

CHAIRMAN BALLOU: Dave Blazer.

MR. BLAZER: I'm speaking in favor of Option B for a couple different points, one that I think we're in a pretty good place right now as far as the fishery is concerned. As has been referenced, we've got an expanding stock. The stable harvest over the last couple years, and we're still leaving about 40 percent of the unfished spawning potential in the water right now.

To me Option B seems to be working. I don't want to change that approach. Option E, although as mentioned, I think everybody here is very favorable of ecological reference points; setting those guardrails of the target and threshold with Option E from 147,000 metric tons to a threshold of 744,000 metric tons.

Those guardrails are way too wide compared to what you've got with Option B, of only going to like a 314,000 metric ton option. To me I'm in favor of Option B. I would also like to say this discussion today just puts more emphasis on the importance of the work of the BERP Group, and I wish them all good luck and Godspeed to you.

CHAIRMAN BALLOU: Mike Millard.

MR. MIKE MILLARD: The Fish and Wildlife Service support the substitute motion; and we do so taking very seriously the first phrase about continuing to move towards ecosystem reference points. The Service is a strong supporter of that and as has been mentioned around the table several times, we really hope the Board is committed to keeping that train on track.

Second point and I hope I'm not misquoting you; Jason was I think I heard Jason say, and again this has been brought up. Option E has the potential to allow complete removal of the spawning stock biomass. That is fairly one of the more alarming statements I think I've heard around this table, and it strikes me as a rule of thumb which is probably not mature yet and ready to be put to use.

CHAIRMAN BALLOU: Emerson Hasbrouck.

MR. HASBROUCK: I support the substitute motion, Option B, and my comments are science based, based on the science that we have before us today. One item is that we heard earlier that the Technical Committee recommends that the BERP Working Group has always advocated for keeping single species until the menhaden-specific reference points are available.

Also, if we went from Option B to Option E, we would be going from a very conservative management approach for menhaden to a very high risk approach for menhaden, where the guidance from the Technical Committee shows us that there is an 88 percent risk of exceeding the target, even at the current TAC under Option E.

Then thirdly, again in the Technical Committee memo, it states that the level of fishing pressure that reduces total biomass to 40 percent B-0 is higher than almost anything seen in the history of the fishery and results in almost total loss of spawning adults. Those are my reasons for supporting the substitute motion.

CHAIRMAN BALLOU: Senator Maker, welcome to the Board, the floor is yours.

SENATOR JOYCE MAKER: Of course I'm in favor of Option B. Setting a quota over the target, or making false targets that are not managed will land the stock in trouble if recruitment declines.

CHAIRMAN BALLOU: Andy Shiels.

MR. ANDREW L. SHIELS: I would like to speak in support of the main motion, which is Option E, and the reason for that is this provides an opportunity for the Board to seriously commit to ecosystem management. We've heard a lot of discussion about we want to get there. We all agree we want to get there. We may get there in a year or two; we may get there in three years.

This is a more realistic approach to getting there sooner and not kicking the can any further down the road. In addition, as mentioned earlier by some other commenter's, Option E gives the opportunity for some flexibility in management since there is a range, and it buys some time to get the ecological reference points developed, while not losing any ground.

In addition to that the public support for this, I think I heard the word was unprecedented. The number of public comments in support for Option E, compared to all other options is unprecedented. That has to have some weight

up and down the coast, from folks that interact recreationally, commercially through headboats, through the procurement of bait, through people that just go fish off the dock and use menhaden for crabs.

All the letters and all the correspondence we've received in Pennsylvania has been very specific, and has supported Option E. That is the first time that's happened in my short tenure with this particular group. In addition to that I would like to tell a brief story; and somebody mentioned earlier about memory. I have a very good memory on certain things, of course. A memory that I have is from the late 1970s. When I look at the updated stock assessment, and look at the graphics for biomass and recruitment, I see that the population in the late 1970s is very similar to what it is now, with a big dip in the 1990s and early 2000s. I would like to paint a picture for you that is very etched in my own memory. Even though I might be from Pennsylvania, I grew up fishing in New Jersey every weekend at the Jersey Shore. I've mentioned this more than once in the past. It is early fall in late 1970s, and it's flat calm and there are wave after wave after wave of what we call bunker, not menhaden. Schools of bunker just outside the surf zone off of Ocean City, New Jersey, literally as far as your human eye can see.

There is nothing like the roar when those menhaden all come out of the water in a school the size of this square in front of us, at the same time, because there are predators under them. It is awe inspiring. What is also awe inspiring is the first time you ever see a whale. We never saw whale before, but there was a whale in the middle of the pack of one of these schools of bunker.

They came out of the water; the whale came out of the water. We had bluefish and weakfish and sharks. We were pounding the bluefish and weakfish, it was epic. It's one of the best days we've ever had. While we're in the midst of this late in the afternoon, here come some airplanes, zipping along just above the water.

My Dad says, "Those are bunker planes." What's a bunker plane? "Those are bunker planes, they spot the fish, and the nets will show up after." We get up early the next morning, because we had such an epic day and evening the night before. We're ready to roll, and what do we see when we get there? I don't remember what the rules were off the Jersey coast back then.

I thought you weren't supposed to net within two miles of shore. But the boats were there, the bunker was gone, the predators were gone. That image sticks in my mind through this entire discussion; and that's the lens that I see this through, because I can picture what an abundance of bunker can do.

From the reports I've seen on the internet, what I've heard from people who have testified up and down the coast in these last two or three years. They're seeing the same thing that I saw once in my life, and they're seeing it throughout the range. For that reason I support the first motion and Option E; because I can picture what this can become. Thank you very much for my time.

CHAIRMAN BALLOU: (Audience Applause) Thank you, thank you. We need to continue on, thank you. Doug Brady.

MR. W. DOUGLAS BRADY: I'm just trying to get my arms around Option E. I mean I think we are all for moving toward ecological reference points. I don't think there is anybody on the Commission that wants to slow that down or is not in favor of getting to that as quickly as possible. Now, maybe I'm wrong.

But I'm having a hard time, unless with Option E saying we want to support Option E, but we don't want to pay attention to the 75 percent Target or the 40 percent Threshold issues that drive what that will be. We want to feel good

that we are adopting BERPS, but we're saying we're going to throw the rest of it out.

We're not going to reduce the TAC. Maybe there are people; I think we just need to be frank. If you adopt Option E, you may support dropping the TAC to 143,000, I'm not sure. I think we need to say that if that is why we're wanting to support Option E. If not, we're just saying we're going to adopt Option E, because we feel good about getting quicker to saying we're adopting ecological reference points, although they are not menhaden specific. But we're not going to pay any attention to what Option E says. I mean I just don't understand where we're going with that one. You know we talk about where we are in the menhaden abundance. I think everybody agrees that the stocks are in great shape.

They've been managed with a stock-specific reference point; and they are in good shape. Can they be in better shape with the BERP, with the ecological reference points that we'll get to three years, or hope two to three years down the road? Of course, and I think everybody supports that. But I just cannot support moving to an option that says, this is what the option says we're going to do from a Target and Threshold perspective, but we're not going to pay any attention to that. For that reason I support Option B.

CHAIRMAN BALLOU: Are there other members of the Board who have not yet spoken; who wish to speak on this issue? Yes, Marty Gary.

MR. MARTY GARY: I would like to speak in support of the substitute motion. For our jurisdiction and our 20 pound net fishermen, the current status quo allows us with our quota and the bycatch allowance to get through the season to provide bait for our crabbers, to provide bait for our charterboat fishermen.

By going to the alternative for E, it would be counter intuitive to not manage to the target; so I'm assuming that we're going to do that and by doing that that would upset the fragility of our fishery, and risk the season for our pound net fishermen. I cannot support the original motion, and I would support the substitute motion.

CHAIRMAN BALLOU: Again, before I go to any members of the Board who wish to speak a second and final time, I'll ask is there anyone on the Board who has not yet spoken who wishes to speak? Seeing no hands; I'll go to Robert Boyles.

MR. BOYLES: If I may quote the author, Oliver Wendell Holmes, who said "I find the great thing in this world is not so much where we stand as in what direction we are moving." I too appreciate the vibrant and robust public comment and public engagement that we have seen from our constituents, who have come here today.

On behalf of the Board, thank you everyone who has commented, everyone who has come here today. I find myself in the position, I support both motions. I think Doug Brady said it rather well. We've committed to moving to ecosystem reference points, and that is something that I think we should not lose sight of.

That train is on the tracks. It is my great hope that in fact in two years that we will see that submitted for peer review, and then we will update menhaden management accordingly. Given that we are now with the substitute motion, I will support the substitute motion. I think it's important that we recognize, I have a very, very difficult time in trying to share with you all the illusion of my son; frantic, pacing around the woods last night, having missed his target.

I just think it is very, very important that we be honest with one another. I think it's important that we be honest with our constituents, and I think it's important that we be honest with the 160 some odd thousand people who weighed in

on this discussion. I want us to do ecosystem reference points. I don't think there is any argument about that around the table. But I think this is important that we do this; that we do this right. We had a very important meeting that came out of a recent noncompliance finding.

I think now more than ever, it is important for us to be intellectually honest with our constituents, intellectually honest with each other, and do the right thing. I support both motions. The question before us will be the substitute motion, so I will support that.

CHAIRMAN BALLOU: Are there any other comments before I call the question? Dennis Abbott.

MR. ABBOTT: I was just going to say, I think everybody probably has their mind up. It might be time to take a vote, and I would like to request a roll call vote.

CHAIRMAN BALLOU: We'll caucus for one minute, and then we'll vote and it will be a roll call vote. All right I'm going to call the vote. I'm going to ask Megan to go down moving north to south. Megan.

MS. WARE: All right, Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MR. ABBOTT: No.

MS. WARE: Massachusetts.

MS MESERVE: No.

MS. WARE: Rhode Island.

MR. BORDEN: No.

MS. WARE: Connecticut.

MS. COLLEEN GIANNINI: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. SHIELS: No.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: PRFC

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

MR. BUSH: Yes.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: Georgia.

A.G. "SPUD" WOODWARD: Yes.

MS. WARE: Florida.

MR. JIM ESTES: Yes.

MS. WARE: NOAA Fisheries.

MR. PETER BURNS: Yes.

MS. WARE: U.S. Fish and Wildlife.

MR. MILLARD: Yes.

CHAIRMAN BALLOU**: The motion to substitute passes 13 to 5; it now becomes the main motion.** Is there any additional discussion on what is now the main motion? If not, is the Board ready to vote on this as now the main motion? Allison Colden.

DR. COLDEN: I just wanted to add one quick observation relative to the stock assessment update under the current single-species reference points; and that is we're not currently meeting the fecundity target for the stock under the single-species reference points. I hope all the comments that have been made that were relative to the previous motion in Option E, in terms of managing to a target will remain true when we move forward with this as the main motion.

CHAIRMAN BALLOU: Robert Boyles.

MR. BOYLES: I would like to motion to amend, please.

CHAIRMAN BALLOU: Go ahead.

MR. BOYLES: **Mr. Chairman, I would like to amend the motion to tie this to TAC specifications for the next two years; that the TAC specification would remain at 200,000 metric tons.** (Audience Applause)

CHAIRMAN BALLOU: Moved by Robert Boyles, seconded by John McMurray to amend the motion to add that the total allowable catch for the menhaden fishery shall be established over a two-year period at 200,000 metric tons. Do I understand your motion correctly?

MR. BOYLES: Yes, sir.

CHAIRMAN BALLOU: Discussion on the motion to amend. We are obviously now moving into the TAC issue sooner than I had anticipated; but it certainly is in order to do so, if the Board feels comfortable doing so. If not, we can suspend and take up TAC separately. Really by your vote on this, you would be dispensing with the issue of specifications for the fishery and there would be no returning to this tomorrow. I'll just pause for a second and again ask if there is anyone who wishes to comment on this motion to amend. Jim Gilmore.

MR. GILMORE: I apologize, but could you remind me of the modifications to the agenda in terms of the sequence we're going to be doing this.

CHAIRMAN BALLOU: We are in sequence now in that I had asked, well it's arguable. We're in a gray area right now, I'll say that. I had urged that the Board deal first with reference points; then with the rest of the issues, including TAC, including allocation. This does change that dynamic, but it's the will of the Board as to how you would like to proceed. Thank you for reminding me that this is not exactly the way that I had urged we go forward; but I think it's close enough, in terms of the way the agenda has been laid out that it's in order. Rob O'Reilly.

MR. O'REILLY: I'm not sure I would call this a point of order, but when we went to the agenda earlier the request was made to take the ecological reference points or the biological reference point issues first, and then subsequently look at the TAC specification, and then after that look at allocation.

Again, I can understand that while yes the TAC is coming second here. But I had envisioned that we would also have a situation where we were able to debate at the TAC independently of the ecological reference points or biological reference points. This greatly bears on the third step, which is the allocation. It has obviously implications.

We've heard at least one comment that we're underachieving on the quota that we have on the total catch, in that we're not keeping up with what the assessment says the capabilities could be for a quota. Certainly, 200,000 metric tons would be underachieving. I was hoping we would have that discussion as well. Again, a little different than what was expected.

CHAIRMAN BALLOU: I thank you for that and I think it's clear that given the nature of this amendment, it speaks to both process and substance. It speaks to the Board's willingness to take on a shift in order, which Rob just spoke to, as well as the substantive issue of what the TAC should be.

If this were to be approved, as I said earlier, and then of course it becomes the main motion. It would have to be voted on again. But it would dispense of the specification setting discussion. If it were to be not approved, we would be back to the main motion solely on the issue of reference points, and we would then take up TAC separately. I think that really is the two-part aspect of the motion to amend that is up on the board. I saw some hands up. Dennis Abbott, you were one.

MR. ABBOTT: Though I don't disagree with a quota of 200,000 pounds as it probably affects my little state. I see us if we pass this, well back up a little. I think there was an expectation when we arrived here that we were probably going to try to do what we could to make the states a bit more whole.

We were going to try to do something to help the state of New York with an increased quota, and I know Maine wants quota. Adopting this and then getting into tomorrow's discussion about who's going to get the numbers when we've talked about allocations. No one will accuse me of being a friend of Omega Protein, particularly I'm only a friend of equity, because it's my strong belief that when we advantage someone we're going to disadvantage someone else.

By adopting a quota of 200,000 pounds and then getting into tomorrow's discussion. There may be a lot of people who end up feeling very disadvantaged. I'm concerned about where 200,000 gets us; because it really is going to put us in an adversarial mode tomorrow when we're trying to give some of the states what they surely deserve. One of the outcomes of this should be some sort of equity.

I liken this to the fact on the one hand that one state has been getting a very high proportion of the catch, and things have changed. It's like the geese are migrating down to the Chesapeake Bay area for years and the good hunters like Robert Boyles is shooting them all down there. Now, those geese are landing in New Hampshire on the one hand, and we can't shoot anything because we've never had any quota. What my point is, I think if we vote this in we're really setting ourselves up for some battles tomorrow.

CHAIRMAN BALLOU: Are there any other comments on the motion to amend? David Bush.

MR. BUSH: I know I'm sitting precariously close to the maker of the motion. However, I might remind him of the story I heard recently about setting a target. This seems to achieve just that. We've set a target and then we've sort of disregarded that target and decided something else.

CHAIRMAN BALLOU: Any other comments before I call the question? *This is on the motion to amend, and I'll read it into the record.* ***To amend to add to set the TAC at 200,000 metric tons for the next two years (2018-2019),*** 30 second caucus and then we'll vote on the motion to amend.

MR. ABBOTT: Request for a roll call.

CHAIRMAN BALLOU: We'll have that roll call vote.

MS. WARE: NOAA Fisheries.

MR. BURNS: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: North Carolina.

DR. DUVAL: No.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: Potomac River Fisheries Commission.

MR. GARY: No.

MS. WARE: Maryland.

MR. BLAZER: No.

MS. WARE: Delaware.

MR. CLARK: No.

MS. WARE: Pennsylvania.

MR. SHIELS: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: New York.

MR. GILMORE: No.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: No.

MS. WARE: New Hampshire.

MR. ABBOTT: No.

MS. WARE: Maine.

MR. KELIHER: No.

CHAIRMAN BALLOU: **The motion fails 5 to 13. We're back to the main motion.** Is there any further discussion on the main motion? Seeing none; is the Board ready to vote on the main motion? Is there a need to caucus? Seeing no need; is there a need for a roll call vote? Seeing no need; all in favor of the main motion please raise your hand.

Keep your hands up, please. Hands down, thank you. Those opposed please raise your hand. Are there any null votes? Are there any abstentions? **The motion passes 16 to 2; with no abstentions and no null votes.** I take this to mean that we have completed our work on reference points, and given the time we now have to decide whether we want to forge ahead.

We do have time left in the agenda, so it seems like the appropriate thing to do. Let me just confer with Megan for a second, just to make sure I'm clear on what would be the next step. All right, so here is what we're going to do. Given the way I had suggested the agenda should go, we are now essentially at specification setting.

By the way that was pursuant to the Board's agreement to modify the agenda; to now do specification setting. To launch that part of our meeting, Jason McNamee I believe has a presentation and we'll ask Jason to provide that. Then we'll have time for questions afterwards. We'll be at ease for five minutes while Jason gets ready.

Please don't leave the room or go anywhere. We're just going to be at ease for five minutes.

SET 2018 (EITHER SINGLE OR MULTI-YEAR) ATLANTIC MENHADEN SPECIFICATIONS

CHAIRMAN BALLOU: Okay, the next item on our agenda, given the change made to the agenda is to Set 2018, either single year or multiyear Atlantic menhaden specifications**.** To begin that part of the agenda Jason McNamee, Chair of the Technical Committee has a presentation. Jason.

MR. McNAMEE: Not that I wasn't paying rapt attention to the discussions that were going on, but I slimmed this down from the original version, so it should be pretty quick. It is something that you all have seen a couple times already; because we are now back to the original reference points. I thought I would start off just refreshing folks on current stock status.

Here is a look at current stock status with the single-species reference points with regard to fishing mortality. You can see we are under both the target and the threshold. This is based on the update assessment from 2017. This is what is the fecundity reference points. You can see we are above the threshold but below the target; though closer to the target than the threshold.

A couple of slides on the methodology, again I've said this to you guys probably about a dozen times over the past year and a half. I'm going to go pretty quick through these. But the way that we run the projections is we have a Monte Carlo bootstrap run from our base assessment. This one of course is based on the 2017 update.

That is the basis for the projections. The original standard projections were run under the Board requested scenarios for four years since the terminal year; so that's 2017 through 2020. The starting conditions include initial numbers at age, which were estimated numbers at age for year 2017 from the update assessment for each of the Monte Carlo bootstrap runs.

It kind of goes in and it grabs one of these different runs, and that's how we are getting the uncertainty around those estimates. Just to put a fancy equation up on the board, here is what the numbers at age look like, and the main takeaway here, we should have showed this slide to the gentleman we were talking to on the break.

You can see you've got your numbers at age, and that decays based on Z, which is total mortality, and so that is both fishing mortality and natural mortality. That is how those age classes progress from year to year. Natural mortality for each of the projections was a vector, again from each of the Monte Carlo bootstrap runs.

Selectivity also a vector also has uncertainty around it, and those are selected for each of the fisheries northern and southern fisheries. Those are from the last time period; so some may recall that we have a set of blocks within the model that we estimate separate selectivities for, and they're based on changes to the fishery.

For instance, the reduction plants up and down the coast going out of business or closing up shop, and so that's all in the assessment document. But just so you know, we are grabbing the selectivity from the most current period of time. Fishing mortality is estimated to

match the annual landings for the constant total allowable catch projections.

The annual landings are calculated using the Baranov Catch Equation and the weight of those landings; so we convert everything into weight. The recruitment is projected without an underlying stock recruitment function. It's based on the median recruitment observed for each of the runs. Then variability is included as a deviation from that median; and it's selected randomly with replacement from each of those Monte Carlo bootstrap runs. The outputs that we get include fecundity, fishing mortality recruitment, and landings. You can ignore those sub bullets now.

Fecundity is the number of fish in each age times the reproductive vector at age; and so we have information on the level of maturity for each age class of menhaden, and that's how we're deriving our spawning stock biomass and then applying an equation that gives us the number of eggs each of those can produce.

Specifically, maturity from the final year of each of the runs, we assume a 50/50 sex ratio and a mean fecundity at age were used to produce the reproductive vector at age. Back into the caveats, I gave you these already today so I'll go really quickly. There is no structural or model uncertainty considered.

All of this information is conditional on a set of functional forms. The fisheries were assumed to continue at their current proportions of allocation; and so the bait and reduction fisheries are assumed to continue proportionately like they are now. If future recruitment is characterized by runs of large or small year classes, this would impact the information coming out of these projections.

Again, the projections apply the Baranov Catch Equation, which assumes mortality is occurring throughout the year, and so changes to that assumption by way of seasonal closures and things like that would affect a performance of the projections. These are the projections that we have run. These were tasked to us by the Board.

You asked us for six versions of increasing the TAC, and so what you see in this table is what the current TAC is, 200,000 metric tons, and then you asked for a series of increases to that TAC from 5 percent, 10, 20, 30, and 40. What you see to the right are the TACs associated with those increases from that 200,000 metric tons.

Then what you see in this chart is the risk of exceeding the target. You can see there is a certain level of risk of exceeding the target for each of these variations on what you wanted to see. They increase as you increase the TAC, not shockingly; that risk decreases as you go forward in time, and that's because that recruitment is coming in underneath to bring that population size back up.

Here is the same structure as the last table, but in this case what you're looking at is the risk of exceeding the F threshold. Here you can see there is virtually no risk of exceeding the threshold for the first three runs that you wanted to consider; and then very small risk for the remaining three. You also asked for a set of projections that were based on risk; and that is risk of exceeding the F target.

The first one you asked for was a 50 percent probability of being below the F target in 2018, and then a 55 percent and then a 60 percent. What you see to the right of the descriptions are the TACs associated with those varying degrees of risk. The risk is decreasing as you go down the rows. Just a quick slide or two on the graphs, and this is not necessarily, well this one is. What you're looking at, we wanted to explain again what we're trying to indicate to you is the uncertainty that we're estimating with all of these different metrics. The first two arrows that you see up there are the 75th and 25th, I'm sorry the 95th and 5th quantiles. In this case we're looking at the recruitment. If

Max should click one more time that is the 75th and 25th quantiles, and then a final click gets you to the median. In our normal context that median is the answer, like that is the point estimate that we're usually looking at.

But it's important to note that it is actually not a point estimate. There is uncertainty around that middle zone. If you now go to the next slide, what I wanted to show you here was there were a lot of questions about our new memo with the ERPs and what you are looking at. I think it's still worthwhile in case we revisit this in the future.

Max, if you click that is the fishing mortality rate plot from the previous set of plots I was just showing you. What you are looking at in the newer memos was a cross-section from a single year, and so that red line is kind of a slice through 2018. Then as you click again, Max, here are the new plots, what they look like.
You can probably click I think three more times, four more times. These line up with what were horizontal lines on the old plots, are now vertical lines, but they match. I just wanted to give you a sense of that and it will allow you to interpret that information a little bit better. But that's it. I'm not going to tick through all of those plots. With that I will stop and answer any questions.

CHAIRMAN BALLOU: Excellent presentation as always. Questions for Jason on the presentation, yes Allison Colden.

DR. COLDEN: Hopefully this gets back to some of the process questions, but I just wanted to have a clarification. Jason, you said that these projections can change with any changes in assumptions about the fisheries or the allocation among sectors. Can you provide some sort of insights on what parts of the model would you expect to change, or how you would expect the projections to change, considering several of the allocation options, which we will be taking up after this would presumably set different proportions in terms of the fisheries and the various sectors?

MR. McNAMEE: It's a good question and thank you for paying attention to our caveats. We're often not sure if people are actually listening to those. I think to illustrate the example; I think your question was directly relating to how the fishery might change. A lot of it stems from the selectivity that we have in those assumptions; and remember that those are static.

They have uncertainty around them but they're a static functional form that we're using for each of the projection years. If the fishery were to shift into one of the fleets where if you had a fleet that had a let's say logistic flat-top selectivity, and the amount of harvest that was occurring in that fleet were to increase that would change a lot of the information that goes forward now into the subsequent years of that projection.
In other words, that protection that would be offered by a dome-shaped selectivity function for those older year classes wouldn't be there anymore, they would all be, if that assumption is correct, those fish would be equally harvested by the fishery at that equal selectivity rate. That's what we're talking about there. Those are things that kind of impact, and if that were to occur that would reduce whichever fleet you're talking about, it could reduce the number of adults and then that would feed back into the projections as less adults, and that would bring fecundity down as an example.

DR. COLDEN: Is it fair to say that moving into this discussion there is an additional level of uncertainty associated with these projections; because of the opportunity to change the allocations after the TAC is specified?

MR. McNAMEE: Yes that is exactly the point we are trying to get across for a couple of reasons. It impacts the performance of the projections, and so when we come back in year 3 and stock status is different than what we anticipated per

the projections, this would be one of the reasons why that can happen.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: My question is, Jay I think you did the risk analysis back for the February, 2015 meeting. I think that may have been the initial time that you did the 5, 10, all the way up to 40 percent. Has very much changed in the interim time period, in terms of the risk? You may not have that with you, but I mean just sort of qualitatively?

MR. McNAMEE: I can answer that very specifically, and that is what you're looking at up there is exactly the same thing that you were looking at back then. That hasn't changed.

CHAIRMAN BALLOU: But just to clarify, Rob. I think you said 2015. There was a memo underlying these projections based on the stock assessment update, and that memo was provided to the Board and reviewed at our August meeting. I don't think anything has changed from that memo, but I think things have changed since the prior 2015 memo and associated projections. Go ahead.

MR. O'REILLY: That was my question, and I know Jay didn't bring everything with him, but that was the first time I think we saw the risk.

MR. McNAMEE: Yes, so sorry about that Rob. I didn't mean to misinterpret, I thought you were asking about the existing projections based on the update. Yes, I do not have that. I mean I could, not right now on the spot, if there is a chance to chat afterwards I can look that up quickly, and I can let you know. I mean there was a big shift in our understanding of the population based on that update assessment, and we talked about that a little bit earlier.

CHAIRMAN BALLOU: Go ahead, Rob.

MR. O'REILLY: Here is where I get in a little trouble with this next question, because I think I've asked it before and it's not an easy one to ask, but your portraying risk. But does risk occur on either side of that type of a projection? In other words, when you say 240,000 metric tons has a 2.5 percent risk to exceed the target. Not to call confidence intervals, but is there anything else besides that sort of finite line of risk? How does that work?

MR. McNAMEE: I think I understand your question. All of the proportions that we're talking about, with regard to risk, are from a symmetrical distribution. I think you said 2.5 percent, let's make the math easy. If it was a 2 percent risk of exceeding some target there would be, if there was a 2 percent risk of exceeding it that would mean there is a 98 percent risk of probability of not exceeding it.

CHAIRMAN BALLOU: Emerson Hasbrouck:

MR. HASBROUCK: Just to follow here; Jason, thank you for your presentation. I'm wondering in the memo that we're referencing here, in terms of the risk. Is that the June 30 memo from the Technical Committee, does anybody know?

CHAIRMAN BALLOU: That's correct, Emerson, and unfortunately it's not in the meeting materials for this meeting. It was in the meeting materials for our August meeting. Additional questions for Jason? Seeing none; what I would like to do now is offer the public an opportunity to comment on the issue of specification.

This was not an Amendment 3 issues per say, as such it was not subject to public review and comment during our recent comment period. I think this would be an appropriate time to offer the opportunity for anyone that's here today from the public who wishes to comment on the issue of specifications to do so.

By a show of hands, is there anyone who would like to do that? I see at least three. Could you please come up? The microphone is up in the

corner here, the public microphone, and I'm pointing to it. I don't know if you can see where I'm pointing; if you could just come up, and actually it would help if you sort of lined up.

Maybe those waiting could be on the side over here, and as each speaker is done the next person could slide right in. I would appreciate it if you could limit your comments to a minute or two, just given the number of people who apparently would like to comment. Please introduce yourself first. Welcome. You'll need to press the button.

DR. PAUL SPITZER: Okay, well somebody has got to go first, I guess. My name is Paul Spitzer; I'm an independent scientist. I live over on the eastern shore of Maryland on the Choptank River. Over the last 50 years I've studied the biology of ospreys, which in many areas from Virginia up to southern New England have a heavy dependence on menhaden.

The last 30 years I've studied the migration and winter biology of loons, which from the Carolinas up to Chesapeake Bay also take a lot of menhaden, running heavily to peanuts. My particular question today actually is mostly addressed to Lund Fisheries, because Lund has initiated a winter trawling harvest of fish off New Jersey, and the way this relates to the model is the question of R, and how R might vary, how management strategies might vary over the course of the year.

As I learn my menhaden biology down in Beaufort when I was a visiting scientist there, although reproduction occurs throughout the year, it's concentrated heavily in the winter season, and also the recent papers Buchheister and Miller suggest that these northern populations which are showing recovery now, may be self-generated.

Therefore, I'm suggesting there may be a possibility of risk in winter trawling off of New Jersey by Lund and any other agents. Again, the issue of what the R might be specific to the time of year of harvest and then the larger question that this is not quite as much a uniform, broad Atlantic population as the book might have suggested it is that the emerging data on that suggests that it's more complicated than that. Thank you.

CHAIRMAN BALLOU: Thank you. The next speaker is welcome to now take the microphone. Welcome, and please introduce yourself.

MR. KEN PINKERT: Good afternoon, Mr. Chair. My name is Ken Pinkert, and I've been traveling this Atlantic Coast for the last 33 years on a menhaden boat with Omega Protein. I also serve as Vice President of United Food and Commercial Workers Union Local 400 out of Landover, Maryland; representing myself and coworkers on these vessels.

My concern, I fully supported Option B, and my concern is that it does give the science that's necessary and it's good science, it seems. But we haven't gotten back the 20 percent we were cut three years ago, four years ago maybe. We were actually cut 20 percent. What we have to think about with bunkers, as we call them, and others around the table call them.

We are paid by how many bunkers we catch. Either way, any decision that is made by this Commission is made by the Council at actual dollars in my membership's packets and in our family's livelihoods. I would like for you all to be conscious of that as you make decisions, either way that you make them.

Normally I would have yellow shirts, I'll have you all know, a couple of busloads of them, but they are actually out there fishing. This is the first year in my 33 years on the Atlantic coast that we've had four named storms in less than three weeks-time, two named storms in one week on the Atlantic coast. That affects us as a resource. That's one of the other variables that we have to consider when we take jobs on these vessels that are dangerous jobs. Just be

mindful of that as you make your decision today, and I appreciate your support.

CHAIRMAN BALLOU: Thank you; next.

MR. JEFF REICHLE: My name is Jeff Reichle; I'm the Chairman of Lund's Fisheries in Cape May, New Jersey, and I would like to first address the statement made by one of the previous speakers, and just let him know that even though, first of all it's not our boat. The boat's owner-operated vessel are trawls in the wintertime, been fishing with us for generations. The quota in New Jersey is strictly limited for trawl. I think it's less than 5 percent of the New Jersey quota is allowed to be trawled.

That 5 percent is shared with other fisheries as well, so it's very, very limited. First of all I would like to thank this group for voting for Option B; I think that's the best way to go forward at this moment, until we get a little further down the road move to act something like Option E. I would hope that we would pick one of the, at least middle to higher ranges of options that were put up before you here not too long ago. I would like to remind the Board that in 2012 or 2013, New Jersey took a 60 percent cut in our quota.

Our boats and the people that work on those boats, and the people that work in our plant went from starting work in April and finishing in October, to starting work in April and finishing before the end of July. The economic impact on our company and the people that work for us was pretty huge. If we managed the resource well, which it certainly looks like we have, we should get an increased quota. Thank you.

MR. THOMAS LILLY: Ladies and Gentlemen of the Commission, I'm Thomas Lilly; I live in White Haven, Maryland, and I would like to speak to you and recommend that if you do make a change in the TAC that you be conservative. Any change in the increase in the TAC, as you well know, will be felt by us in Maryland, more than any other state.

We are the state that is on the receiving end of the loss of menhaden. We have a terrible menhaden deficiency in the Maryland Bay. I'm an old guy. Twenty years ago I can remember going out on the Bay and seeing those beautiful schools of adult menhaden that may have stretched, you know three-quarters of a mile.

Now, you won't find menhaden schools in the Bay. Recent fishing has shown us that our rockfish, it's a 20 inch limit right now, and nine out of ten of them have empty stomachs. They are fighting like crazy to find something to eat out in our Maryland Bay. The same thing is true of our ospreys.

This Commission is not studying the effect on the Maryland Bay of what the factory fishing people are doing. We don't know how many of those schools, and keep in mind that Omega takes thousands, thousands of those schools of adult menhaden in their purse nets, not hundreds but thousands. We don't know if any of those schools are making it into Maryland.

There is no evidence that they are. We don't know whether Omega is taking 50 percent of the fish that should be coming into Maryland, 80 percent, 90 percent, it's not being studied. It should be studied. People in the Maryland Bay, millions of people, a lot of saltwater fishermen, and our communities are suffering. You know I can just leave you with this thought. We want our menhaden back. Thank you.

MR. STEVE WEINER: My name is Steve Weiner; I am the Chairman of CHOIR, which is a coalition that is focused pretty much on herring in Gulf of Maine, Georges Bank, New England, founding member of East Coast Tuna, founding member of Atlantic Bluefin Tuna Association. I've been harpooning tuna fish for longer than I want to remember.

I would advocate, had I been able to speak on the reference points, I would have advocated

for E. I think what I heard was, I guess what I heard, and well that's a dangerous option because it's got such a wide range between the targets. In other words it could be a high number; it could be a low number.

I advocate for it to stay at 200,000 as a Mainer. Seeing menhaden when I was a kid and periodically during my life, there are more of them there now than there has been in a long time. It's probably got as much to do, I guess with Mother Nature and environmental situations, as it does good management. But it seems awful coincidental that as you took a reduction in catch, that we've got more fish north. I think this group has to look at the spatial concerns of all the members.

Having menhaden ranging pretty much from the backside of the Cape all the way to downeast Maine, and my guess is if we manage them properly in the future they're going to range even further east. You have an obligation to all of us in New England, in northern New England to keep this quota at a safe place and I hope you do it. I was disappointed at the last discussion that none of us had an opportunity to say something about reference points. This discussion today kind of changed what was going on; and I think it changed the situation so some of us in the public should have been able to speak to it.

I really think it felt like a pretty hypocritical discussion when E was shot down; that somehow it was the more dangerous option. No way was it the most dangerous option. This group of people has the ability to set the quota, whether it was B or whether it's E. It could have just as easily been E with the responsible.

CHAIRMAN BALLOU: Sir, we're on specifications now. We've already dealt with reference points.

MR. WEINER: Okay, I hope you keep it at 200,000. Thank you.

CHAIRMAN BALLOU: Next.

MR. RICHARD HITTINGER: My name is Rich Hittinger; I'm with the Rhode Island Salt Water Angler's Association, and I just want to point out that in Rhode Island, well we represent 4,500 recreational anglers. Our members understand how important menhaden is to those fisheries that we're involved with.

We have members who spend a lot of money fishing for striped bass, fishing for bluefish, fishing for bluefin tuna. Those members are very concerned about the health of menhaden stocks. We've been fighting the menhaden issue for about 20 years in Narragansett Bay. Our members, when they see a commercial purse seine boat in Narragansett Bay, they call us.

They are saying, why are they allowed to take so many fish, when all we want to do is leave fish as forage for those fish that we spend our lifetime pursuing? They get very angry about this. Now, we're trying to leave as many fish in the water as possible. We were very much in favor of ecological reference points.

We understand that they may be coming in two, four, six, eight years from now; depending upon on how everything goes with peer review, with putting together a management structure. But for now, the best science on ecological reference points recommends 75 percent to remain in the ecosystem. The only number that the Technical Committee gave you regarding achieving that goal, is achieving that goal in one year, 2018.

Now that was 147,000 metric tons. Anything that is a harvest level above 147,000 metric tons goes against what is the best ecological data right now from the scientist. We would have been in favor of 200,000 with ecological reference points. At this point I don't think you're going to be able to pass anything below 200,000, but you should.

I think you need to keep it at 200,000 metric tons at a maximum; because what's going to happen is as soon as those boats come in to harvest in Narragansett Bay, the recreational fishermen are going to be calling our office by the hundreds, and actually they're going to be calling Jason McNamee's office too, so he'll get some of those calls.

I urge you to be conservative with this species. I think you already understand, and that's how you've been managing. You've been managing at roughly half of the target F value to date. You know you could have set a much higher harvest level based on single-species management, but I urge you to stay at 200,000.
CHAIRMAN BALLOU: I'll take three more. I see three folks standing, so we'll take those last three comments. Welcome, sir.

MR. ROBERT T. BROWN: Robert T. Brown; President of Maryland Watermen's Association. Throughout my travels across the Chesapeake Bay Bridge over the past several months, have been some calm evenings when I've been going across it; the amount of menhaden that you see school after school on top of the water. I don't know where these people are coming from saying that they don't see menhaden in the Chesapeake Bay.

What we have is fish have changed their migration patterns some in the river, because of the amount of rockfish that we have there. I am a pound netter, I fish on the Potomac River. The rockfish that we're catching and selling are top quality. They've had plenty to eat. Also, these fish, what they have done to me on the Potomac with the amount of rockfish that we have.

I've had to move my nets in different areas, to try to get where I wasn't catching as many rock, so I could catch the menhaden for my crabbers. In Maryland, our quota gets caught probably about August of most years, and we need that bycatch to keep us fishing the rest of the season to provide crab bait for our crabbers and lobstermen, it goes up north too.

Also we need it for our charterboats and our sports fishing industry. With the quota the way it is now, and the way it's divided up, we cannot remain fishing an entire season unless we have a bycatch, or incidental catch, however you want to talk about it. But we can see where we have plenty of menhaden, but they have just changed their practices. They're staying more out in the middle of the rivers and in the Bays. I urge you to see that you can keep us fishermen fishing the entire season. Thank you.

MR. SCOTT SNIDER: My name is Scott Snider; I'm from Charleston, I grew up fishing, big advocate right along the coast there, watched menhaden over time. Our smaller menhaden size of the schools, frequency of the schools, we've got a lot of menhaden down there. Schools seem to be a little bit fewer and further in between, but we can still find menhaden for sure, definitely still some menhaden there.

I'm listening to this panel mention repeatedly about they're dedicated to restoring the population to the 70 percent target number. I hear about the unprecedented amount of public feedback that we've gotten on this specific discussion, which from your words are talking about how much people care and how much people are passionate about this topic.

I just wanted to say, I really hope that we're not about to increase this quota and continuous skirting along right along at that threshold number, just 40 something percent or whatever that was, and not let this overflow happen and spillover effect happen, and boost in the numbers to get towards that 70 percent number, which was really a lot of the energy behind Option E. Let us really start building towards that number. I hope we're not about to drastically increase this quota. Thanks.

CHAIRMAN BALLOU: Thank you, last comment.

MR. PATRICK PAQUETTE: Patrick Paquette, I'm a recreational fishing advocate from Massachusetts, and I am a member of the AP; speaking on behalf of the Massachusetts Striped Bass Association. We had a discussion at our board meeting a couple of weeks ago, and we talked about what would happen if this is exactly the way this meeting played out.

I would urge the Board to put some teeth in the rationale, in the discussion of the decision that was just made. What I mean by that is that we just hinged a lot that a transition to ecosystem management to menhaden-specific ERPs was going to happen in 2019, or the discussion that those models will be in that action, so I'm assuming it goes in the water in 2020. I would say this.

To put some teeth in that decision, real teeth in that decision, to keep the commitment to the public what it is today would be two actions regarding the TAC. One would be that you set the TAC today, or tomorrow however this discussion plays out this afternoon; that you set that for two years and not a day more than two years.

The TAC should be set for the 2018 and 2019 season, because if we're really going to have a management action in the fall of 2019 that's going to effect on-the-water management in 2020. If the ERPs, if the menhaden-specific ERPs are out, then we only have to set the TAC for two years. The second thing is, if we're actually going to wait for models that aren't finished.

If we actually believe, and that's based on the decisions made today that that is the opinion that carried the day here today earlier. If that is actually true that we believe they're going to be peer reviews, that we believe the action is going to happen for 2019, then I would suggest that there is no reason for a significant raise in quota.

It's clear that people want a raise in the single-species quota based on that management, to go above 2012 without knowing what the cutting edge, menhaden-specific reference points are, would be irresponsible to industry, never mind to the general public or the recreational community, because industry should not be fooled into thinking there is going to be a higher TAC, when you've got menhaden-specific science coming.

After 20 years of a downtrend, it is absolutely the public's belief that the 2012 reduction is what kicked off the recent growth in menhaden. I understand that there is science that doesn't believe that. But menhaden-specific ERPs should give us some guidance on that to go to a high increase today is irresponsible to trick industry in thinking that a high increase, and that the markets that develop.

Today was a bad day for striped bass and a good day for Canadian owned pet food. That being said, please carry your commitment through, and if you're going to wait until 2019 to take specific cutting edge science, then it only makes sense that you be conservative until you know what that science says. If not, maybe somebody knows something else here.

If not, maybe ASMFC continues its absolutely horrible, horrible reputation of continued delay. But the commitment to me, looking here and being hurt and not liking the decisions that were made today is that if those decisions are really based on what was discussed around this table, it would be no more than a two-year TAC, and it would be a modest increase at best, not bigger than 2012, until the new science comes in, in two years. Thank you. (Audience Applause)

CHAIRMAN BALLOU: Thank you to everyone who commented. We very much appreciate your input. I need to gauge the interest of the Board, in terms of how you would like to proceed. It is 4:46; we had scheduled the

meeting such that we would recess today at 5:00. We're not bound by that. That's really just a forage fish guideline. But we should probably think carefully about whether we want to get into motions now, or whether we want to recess now and begin anew tomorrow morning; given the possibility that motions might involve just TAC, or potentially be bundled with other allocation methods.

I think there is interest in potentially all of the above. This could be a situation where we could start, and just simply end wherever we may be in 13 minutes, if that is how the Board wants to move forward, or we could end now. I say end, I mean recess now, or any other direction that the Board wishes to go. I am now seeking input from the Board as to how you would like to proceed. David.

MR. BUSH: I'm usually chomping at the bit to get things done, but as over the past year I've seen in quite a few of the different meetings. At the late hour weird things start to happen, so I would be very much I guess for possibly starting this in the morning when we can finish it with a much safer mindset than some of us who have traveled since 4:00 this morning might be able to offer you. Thank you.

CHAIRMAN BALLOU: That sounds like one vote to recess now. Dennis Abbott.

MR. ABBOTT: It's always been my belief that you don't make good decisions on empty stomachs, so maybe a motion to recess might be in order.

CHAIRMAN BALLOU: I don't think we need a motion; I'm looking for a consensus. Pat Keliher.

MR. KELIHER: I don't have, I actually have a bundled motion prepared that I'm not going to make right now; but prior to that I have a motion prepared that would set governance on specifications in regard to opting into fisheries, and would like to ask if you would consider that type of a motion now, or if you would rather wait until tomorrow.

CHAIRMAN BALLOU: I think that really speaks to the overall issue that I'm looking for guidance on. That opens the can of worms, so to speak, on a range of potential motions on a range of potential issues. We can either start now or wait until tomorrow morning. Tom Fote.

MR. THOMAS P. FOTE: I agree, we basically make decisions bad after we're sitting around here for a long time; and a lot of us traveled long distance driving and you're tired right now. It would be nice to come with a fresh mind in the morning and think, oh we'll have some discussions over dinner tonight too.

CHAIRMAN BALLOU: Is there any objection to recessing now? Seeing none; I am going to make the call that this Board is in recess until 8:00 a.m. tomorrow morning. We're going to begin at 8:00 a.m. sharp. Enjoy your evening, thank you very much.

(Whereupon the meeting was adjourned at 5:00 o'clock p.m. on November 13, 2017)

November, 14, 2017
TUESDAY SESSION

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission reconvened in BWI Airport Marriot, Linthicum Heights, Maryland, Tuesday, November 14, 2017, and was called to order at 8:00 o'clock a.m. by Chairman Robert Ballou.

CALL TO ORDER

CHAIRMAN BALLOU: Good morning everyone, welcome back. I'm going to call this meeting of the Atlantic Menhaden Board back into session. This is a continuation of the meeting that began yesterday, and is slated to continue through a good portion of today. Just a quick sense as to how we plan to proceed today.

First, I just thought it might be helpful to provide a brief reset on the issues that remain before the Board for final decision that includes the specifications, and the allocation issues and other issues other than reference points that are in Amendment 3. Megan is going to quickly run through those, just to make it clear as to what the suite of issues and options are that are before the Board for final decision today.

I will then open the floor to questions. We really didn't get much into that yesterday, but any questions that any Board member may have for Megan on any of the remaining issues. I think we covered specifications well yesterday, so I think we're past that; in terms of questions, although I think Jason would be more than happy to answer any if there are questions on that.

But once we get through that which I don't anticipate should take much time, I'm going to open the floor to motions; and I'll just have a brief comment on that before I do so. But for right now I'm just going to give the floor to Megan for just a brief rundown of the issues that remain before the Board.

MS. WARE: Just a reminder, there are seven issues for the Board to decide today. The first is the total allowable catch, which is basically the size of the pie that we will be dividing, and then next would be quota allocation; so how we're going to divide that pie. The third is quota transfers; so how is quota move between the different jurisdictions.

The fourth is quota rollovers; can unused quota be rolled over to the next year. The fifth issue is incidental catch and small scale fisheries; so how do we deal with bycatch landings or landings after a directed quota has been met. Sixth is the episodic events set aside; so do we want to set aside quota for episodic events in New England, and how much? Then the seventh issue is the Chesapeake Bay Reduction Fishery Cap; so is there going to be a cap on the reduction fishery in the Bay, and what is that cap going to be?

CHAIRMAN BALLOU: Thank you, Megan. Just for the Board's edification, all of those issues are laid out in full detail in the draft amendment, beginning at Page 46 and running through Page 72. That is the chunk of the document that we're essentially working through for the rest of today. Are there any questions for Megan on any of the issues pending before the Board?

CHAIRMAN BALLOU: Nichola Meserve.

MS. MESERVE: Megan, regarding quota transfers, Option B, the quota transfers permitted with accountability measures for overages. Would a transfer that occurs before quota closure occurs that would not factor into the trigger, right? The 5 percent overage is just for transfers that would occur after a state closes a fishery. Is that correct?

MS. WARE: Let me see if I am understanding your question. If a state exceeded its quota two years in a row, in that third year are you asking? No, okay.

MS. MESERVE: If a state received a transfer from another state prior to a quota closure that would not count as a transfer in excess of the 5 percent that would factor into the trigger.

MS. WARE: Correct. Yes. That is part of their now quota, and they would have to exceed that by 5 percent, yes.

CHAIRMAN BALLOU: Other questions. All right, it looks like we are ready to go. I would urge that it might make the most sense to deal initially with specifications and then take on the various allocation and other issues in the amendment. That said, I'm fully aware that there is interest in perhaps bundled motions.

Any member of this Board may make any motion that they wish to make, and it would be

in order, at least ostensibly. But I just wanted to offer that suggestion for what it's worth; it's just a suggestion to kind of try to keep things as straightforward as possible. But consider that for what it is, which is just a recommendation not a decree by any means. With that the floor is open for motions on any of the issues left pending before the Board. Pat Keliher.

MR. KELIHER: Staff has a motion regarding an opt-in provision that I would like the Board to consider. If you could pull it up, if I get a second I'll be happy to give some further justification. **I would move that if a fixed minimum option is selected the following conditions would govern the activity: at the start of each fishing year and no later than January 31, states must declare if they want to participate in the fixed minimum program.**

States have the option to opt-out of the program and decline their fixed minimum allocation, or maintain 10,000 pounds of bycatch purposes and decline the remainder of their quota. States also have the right to opt-in to the program and receive their full allocation. In declaring its intent to receive its fixed minimum quota, a state can also choose to receive all, or part, of this amount.

If a jurisdiction declines its full allocation it must specifically identify the amount requested. States which opt-in must demonstrate that the state has the intent and the ability to commercially harvest some, or all, of its menhaden quota for the directed or bycatch fishery. This can be demonstrated through the issuance of permits for applicable gear types or species, historic landings, or the abundance of menhaden in state waters. Any quota that is not received by a state is re-distributed to the other jurisdictions based on historical landings from the time-period selected by the Board in this Amendment.

CHAIRMAN BALLOU: Is there a second to that motion? Seconded by Ritchie White.

MR. WHITE: For the purpose of discussion.

CHAIRMAN BALLOU: Thank you and Pat to you for discussion on your motion.

MR. KELIHER: I know this motion is a little Dave Pierce style. I apologize for that so there is a lot of moving parts. But according to the amendment the jurisdictions have the right to participate in the fixed-minimum program at their sole discretion. Under this option the states are entitled to receive a fixed percentage of the TAC. However, states have the rights to decline the fixed minimum allocation.

For the clarity purposes I'm calling this an opt-out provision. A potential concern is that the amendment does not provide specifics on how the forgone quota is to be redistributed among the other states. In addition, there are no specifications that a state must meet to keep their quota. At the August Board meeting concerns were raised about this opt-in process; and a motion was made to consider an opt-in provision, whereby a state would have to manually declare their intent to use the fixed minimum.

The motion failed as the prevailing side convincingly argued that the Board did not need to get into the details at that time. In addition, the Board retained the right to craft these provisions during the final approval process. That specific point is reflected in the minutes of the meeting; and since we're about to vote on the fixed minimum provision, I think it is imperative for us all to have a similar understanding of the conditions under which we operate before we vote on the issue.

CHAIRMAN BALLOU: Pat, for clarification, I believe I just heard you just heard you characterize this as essentially an opt-out provision; and I do see a lot of opt-out language in here. But I also see right up front, essentially an opt-in requirement as well. I therefore consider it to be both. Is that a fair characterization?

MR. KELIHER: Yes sir, Mr. Chairman.

CHAIRMAN BALLOU: Discussion on the motion; Ritchie White.

MR. WHITE: I guess a question for Pat. Would you be willing to, let's see where it says about if you prove abundance of menhaden in state waters. Would you change that to adjacent waters; because there can be large amounts just outside state waters that could be harvested and landed in a state?

MR. KELIHER: Yes, I would accept that as a friendly.

CHAIRMAN BALLOU: Is there any objection to amending the motion as just suggested? Seeing none; so if staff could just make that tweak to the motion. There was no objection to it, so that would be considered a friendly amendment, and that will go forward without objection from the Board, unless I see Robert Boyles objecting. Robert.

MR. BOYLES: No objection, just a question for clarification. Ritchie, do you intend, is adjacent indicating federal waters? We're not bunched up like you all are up there. I mean what is adjacent?

MR. WHITE: I would mean federal waters when I say adjacent, so I guess we could change it to state and federal, and/or federal.

CHAIRMAN BALLOU: Back to comments, and I have Jim Gilmore next.

MR. GILMORE: Pat, the concept of it is fine. The thing I'm getting stuck on is at the start of each fishing year. If you read through that we're going to be doing quite a bit of administrative work every year for staff; and then back at the states to go through this whole thing. It seems to be a lot of work. Is there a possibility that maybe we could do this at a longer time period?

Again, that is a lot to go through each year and again, some of it's going to be a bit of a crystal ball, because you're going to start at the fishing year and try to decide what's going to happen later on in the year. Like we've been seeing the last two years with menhaden, I don't have a problem this fall; last year I had fish kills all over the place. It just got a little bit more complicated. That's my only hang up is really that we would have to repeat this every year.

CHAIRMAN BALLOU: Pat, a response?

MR. KELIHER: It's not meant to be administratively burdensome. If a state is going to receive its allocation, it's just to ensure that that state gives a heads up that it doesn't need all of its allocation. Now I certainly understand that there is a crystal ball available here that is probably cloudy, depending on how the state wants to promulgate its fishery.

In this case what I'm looking for is for some more certainty up front, in regards to what may be available for a fishery. Then if a state does ask for it, tries to move forward with the fishery, you don't have the fish. There is a potential for a quota transfer provision to be voted on later in the day. Again, I'm not looking for making this administratively burdensome.

CHAIRMAN BALLOU: Let me go to John Clark next.

MR. CLARK: This is very interesting, Pat. I just had a few process questions on it. When you say a fixed minimum or receive all or part of this amount. Are you looking at that in increments or could a state just request anything up to whatever the minimum chosen? Then the second is how does this work in with the incidental catch? Are you looking to use this minimum so that we no longer have an incidental catch provision? Does it tie into that; because we're a state that has used the incidental catch provision pretty heavily over the last few years?

MR. KELIHER: I'm going to start with the second. This has nothing to do with any incidental or small-scale fisheries. This is purely for the allocation options that are potentially in play after a TAC would be set. John, remind me of your first question, because unlike Jay, I can handle one at a time not two.

MR. CLARK: I'm just wondering when you say a fixed minimum; receive all or part of this amount. This could get kind of messy each year. Would a state change how much they're requesting each year? For example, if it was like a 2 percent minimum that's I think about 100 times more than we're actually landing in a state like Delaware. We could just request part of that but do you want it in like half a percent, 1 percent, 2 percent? Just for administrative purposes, I'm just wondering what would be simplest here.

MR. KELIHER: I think it could come in just about any way, shape, or form; whether you wanted 50 percent of your quota available to that state or naming it as a pound. I think staff is going to have to translate that into what that number is for them to send out a redistributed amount to the states to be able to harvest.

CHAIRMAN BALLOU: Tom Fote. Are you passing, Tom? David Bush. David Borden.

MR. BORDEN: Not speaking pro or con, it just goes back to Jim's point about the administration. Would it simplify the administration if we just put a date in this? For instance, prior to December 31, or whatever other date. I'm not proposing that. January, well I think the problem as I understood Jim's issue is the fishing year starts January 31. Doesn't the fishing year start on January 1st?

CHAIRMAN BALLOU: Yes.

MR. BORDEN: To me, maybe I didn't understand Jim's point totally correctly. But to me the part of the mechanics of this is that this is going to have a direct impact on allocations that are spread in other portions of this FMP. To me it would make sense to just back it up to December 1. Prior to December 1 for the following fishing year you would specify this; and then the staff would then have the ability to calculate the shares and splits of the quota for the state, and send out a memo to that affect. Maybe I'm not following this.

CHAIRMAN BALLOU: Megan, do you want to just speak to the comment you just offered me?

MS. WARE: Yes, I'll just remind the Board that we don't finalize the quotas for that current year until April, when we get the compliance reports, because we're not going to know overages or unused quota, things like that. At the May meeting that's when we come to you guys with final quotas for that fishing year. The intent was to be a bit ahead of that. But that's how we do it now.

CHAIRMAN BALLOU: Dave, a follow?

MR. BORDEN: Yes, disregard everything I just said.

CHAIRMAN BALLOU: Next I have Adam Nowalsky.

MR. NOWALSKY: For clarities sake, the start of this motion begins with, if the fixed minimum option is selected. Is the intent of this to only apply if we select Option C or Option E from the allocation decision? Is that the belief here? If that is in fact the belief, I would consider. I mean I think this is good discussion to have as a precursor to that knowing what a state or some other states may be thinking. But if this would apply only to those, perhaps it might be best to proceed with tabling this motion until after we have the allocation method discussion. But at least we've had this precursor to know what we might be looking at.

CHAIRMAN BALLOU: If put in the form of a motion we could consider that suggestion. Next I'm going to go to Senator Miner.

SENATOR CRAIG A. MINER: I guess because this is such a new denomination in Connecticut, one of my concerns is that I don't know how quickly that is the first year, you could ever demonstrate that you have the ability to catch whatever your quota might be. I could almost imagine that after a year we could look at this again; and make a determination whether or not some states ever intended to catch any of their quota.

But the winner in that if that were to occur, would be conservation, in my view. If we were not able to get up to speed and completely allocate a million pounds or whatever; the harm in that case would be I guess that the environment wins, if you believed in conservation. I would suggest that this is premature.

I appreciate the conversation; but I think it's premature on that front, and also just because you didn't get your quota in one year doesn't mean. How would you then demonstrate, as the rest of the paragraph goes on that you have the ability to actually use your quota? I do have one question, I guess, and that is there any other species where we have this requirement; through you, Mr. Chairman?

CHAIRMAN BALLOU: I see heads shaking in the negative by staff; so it's my understanding that there are no other species for which we would have a provision like this.

SENATOR MINER: I know there were some other people that wanted to speak, but I think it's premature.

CHAIRMAN BALLOU: Loren Lustig.

MR. LOREN W. LUSTIG: I'm sorry for my sore throat. I was earning a living yesterday, so I didn't get a chance to be here. I'm going to defray my spot to speak to my colleague Andy Shiels, but I would like to be allowed to offer comments after he has concluded, Mr. Chairman.

CHAIRMAN BALLOU: Andy, go ahead.

MR. SHIELS: Senator Baker (Baker?) raises a good point. If I read this from the lens of Pennsylvania, it feels like we're being targeted here. I feel like the state of Pennsylvania should have the right to do with its allocation what it chooses to do. As he suggested, the winner might be conservation if you don't harvest your entire allocation, and then how would you prove it?

Somebody said hang on. Oh, he was talking on the phone. I thought he meant me. Who knows in this room? I'm concerned as I'm starting to understand what's going on here. I feel like Pennsylvania should have the right to do what it wishes with its allocation. If it chooses to use that allocation as a set aside or reserved for conservation that language doesn't allow us to do that.

CHAIRMAN BALLOU: Loren, did you want a follow on now?

MR. LUSTIG: Yes, thank you, Mr. Chairman. Everyone here knows that I am not a fishery scientist. I am an environmental educator. I always hearken back to the wishes of the children of Pennsylvania. My proposal is to vote for this amendment. However, we reserve in Pennsylvania, the right of the children to choose the gear that is used to collect our part of the commercial harvest.

I would be willing to bet they're going to use the lousiest gear you can possibly imagine, full of tears and rips, and about 99.5 percent of our commercial harvest is going to escape unharmed back into the water. But we will harvest. We will abide by the specifications of this amendment with about one-half of one percent. All right, because the children of Pennsylvania wish it. In fact my grandchildren demand it, and I'm not going to turn my back on them.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: I think if there is a motion made to table, I think that's the way to go. You know I know that Pat has put up sort of an idea here on how things could go, but it is too early, and there is no magnitude here. I think Pat did that on purpose just to sort of get the opt-in or opt-out; but it is too early, so I agree with that.

CHAIRMAN BALLOU: Pat.

MR. KELIHER: I would not be opposed to actually seeing this tabled for discussions as it relates to Option C and E. I think Adam's points are valid. That was going to be my original intent, but I wanted to ensure that we had a good conversation around this opt-in/opt-out concept. Frankly, from my point of view, allowing for this type of opt-in or opt-out provision allows me to consider a lower TAC amount.

Because if we know what we're going to get up front versus at the end of the season, the state of Maine could be better prepared to understand what our targets will be. Understanding that up front also allows us to consider a more conservative TAC at the end of the day.

CHAIRMAN BALLOU: Pat, would you like to make a motion to table? I'm sorry; I didn't want to put words in your mouth. I wasn't sure if that's where you were going; maybe not. Adam.

MR. NOWALSKY: Move to table until after we've had the Issue 2 discussion.

CHAIRMAN BALLOU: Is there a second to the motion to table.

MR. NOWALSKY: **The Issue 2 decision.**

CHAIRMAN BALLOU: Moved by Adam Nowalsky, seconded by Roy O'Reilly to table this motion, which would postpone consideration of it until later in the meeting; so it just sets it aside temporarily and it can be brought back later in this meeting. It's not debatable. Is there any need to caucus? Megan?

MS. WARE: Just get clarity on what Issue 2 is, what do you mean by that?

MR. NOWALSKY: Allocation methods and timeframes.

CHAIRMAN BALLOU: Tabling does not move it to a time or point certain in the meeting, although it can be brought at any time that anyone wishes it to. To me, the motion to table just simply puts in abeyance for the time being to be brought back at any point during this meeting. Are you comfortable with that Adam, or do you wish to change your motion to postpone to a time certain?

MR. NOWALSKY: I believe the motion to table is very direct about when this would come back off of the table and in front of the Board for discussion.

CHAIRMAN BALLOU: Understood, so let me read the motion into the record. Actually, I have it in front of me I think. No, I don't. **Move to table until after Issue 2: Allocation Methods and Timeframes have been decided.** Again, because it is a motion to table it is not debatable. Is there any need to caucus?

Seeing none; is the Board ready to vote? I believe so. **All in favor please raise your hand. Thank you, hands down; opposed, null votes, abstentions, the motion carries unanimously.** Would any other member of the Board like to make a motion? Dennis.

MR. ABBOTT: To remove it from the table is only going to require a majority vote?

CHAIRMAN BALLOU: Yes that is correct. The floor is now open for any other motions on any other issues. Jim Estes.

MR. ESTES: I would like to get back to specifications if we could please.
CHAIRMAN BALLOU: Go ahead.

MR. ESTES: I think that we have a motion. If I can put it up there I'll read it, and if I can get a second I'll explain**. I move to set the total allowable catch not to exceed 216,000 metric tons until such a time that ecological reference points are utilized for Atlantic menhaden management.**

CHAIRMAN BALLOU: Is there a second to that motion? Seconded by Spud Woodward, moved by Jim Estes and seconded by Spud Woodward to set a total allowable catch not to exceed 216,000 metric tons until such time that ecological reference points are utilized for Atlantic menhaden management. Jim.

MR. ESTES: I know that yesterday we disappointed a bunch of our stakeholders. I think we did the right thing. But part of the reason at their disappointment is, they fell like we could easily kick the can down the road; as far as developing these ecological reference points. I think that this motion does a couple things.

Number one, I think it would hopefully give them some confidence that we mean it; and also because we are tying it to allocation, or excuse me to the TAC, which we all think is important. It makes us somewhat accountable; and so that is the purpose of the motion.

CHAIRMAN BALLOU: Show of hands, who would like to speak in favor of this motion; keep your hands up, we'll take questions. First of all I just want to get a sense, so I want to be able to be able to allow for a balanced discussion. You can put your hands down. Those who wish to speak in opposition to the motion, or even leaning toward that.

I will give everyone on the Board a chance; I just want to get an initial list going. I'm sorry, was it Steve that you just had a question? Are you on the list? Did you put your hand up? Well, we'll put you on the list, Steve, so you're on the list. Okay, I'm going to ask Megan for that list then I'm going to go right down in order in which she wrote it; starting with Ritchie White.

MR. WHITE: I want to speak in favor of it; but first a question if I may, and that would be that this is open ended time-wise, and if a situation arose by which menhaden declined substantially, and we had to take a cut in the quota, this would not alter our ability to do that. That would be my question first; then I would like to speak to the motion.

CHAIRMAN BALLOU: Jim.

MR. ESTES: Oh that was my intention, was that we could go down but we can't go up.

MR. WHITE: Thank you. I agree with the concept. I think 216 is a compromise. I know there are states that would like to see 240, and there are states that would like to see 200. I think 216 is an excellent compromise in the middle. I think 216 with an individual state allocation that I also believe will come up later.

I think it allows Virginia and New Jersey to stay whole while allocation goes to all the states that don't presently have allocation, and I think that's a fair compromise. I think it also leaves menhaden in the water; compared to 240,000 metric tons. I think all said it is something we should support.

CHAIRMAN BALLOU: Adam Nowalsky.

MR. NOWALSKY: I'll get right to it. I've always said that menhaden is one of the easier species for me here around the table; because of the involvement of the assemblymen that I represent, very involved with the fisheries. His goal at home was that the health of the resource argues in favor of something more. **I'm going to move to substitute to set a total allowable catch of 240,000 metric tons for 2018 and 2019.**

CHAIRMAN BALLOU: The motion is up on the board; is there a second, seconded by Dave Bush? I'm going to stay true to my procedural plan to allow discussion on both the main motion and the substitute; as we did yesterday. Speaking in favor of the substitute is often the same as speaking against the main motion; so there really isn't much of a distinction here.

However, I just want to make it clear that as you comment on the now substitute motion, you are welcome to comment as well on the main motion, offering your support for the main or your support for the substitute. That is how I would like to handle the ensuing discussion. I'm going to continue down the list and go to Allison Colden next.

DR. COLDEN: I would like to speak in opposition to the substitute motion. There was a lot of discussion of this body yesterday about the concepts of intellectual honesty and integrity; and along those lines Option E was seen as, or characterized as a not conservative option. Along those lines I would challenge the Board to think about whether 240,000 metric tons is indeed a conservative alternative to that option.

Additionally, we talked about not selecting a target that is arbitrary; relative to the current reference points. We currently have a fecundity reference point which we are not achieving the target. It would seem following that conversation that a TAC should be set which would move towards achieving both the fecundity and the fishing mortality rate targets.

I would support in concept the main motion. I think that Jim provided a lot of strong suggestions on why we should put some real momentum behind the development of the menhaden specific ERPs. I think we heard in the spoken public comment yesterday some great points about really putting some weight behind the Board's commitment to moving toward the menhaden specific ERPs, and I think that the main motion would achieve that.

CHAIRMAN BALLOU: John McMurray.

MR. McMURRAY: I don't support the substitute, and I think it's important here to give you guys a perspective of somebody who spends most of their life on the water, and who is absolutely dependent on this resource. My season is dictated by spatial and temporal aggregations of menhaden.

It is absolutely the driver of my business; and a lot of businesses up the coast now. As you guys are very well aware, we've had this super abundance of fish that has flooded our coast. I'm enjoying it right now. It's right off of the south shore of New York. With it are striped bass, whales.

I took my son out the day before, we had one come up right by the boat, screamed his first cuss word, it was awesome. I tried to act angry; but I just couldn't. But the point is that this is not some oily bait fish that can just be sucked up without impacting everybody else. This is a huge increase.

I know that there is no stock recruitment relationship, and I understand environmental factors that probably contributed to this resurgence that we're having now. But to say that that reduction had nothing to do with this abundance of fish, I don't understand it. I think it defies common sense. Not only are we going back to those pre-2013 levels, we are exceeding them by a lot.

If there is anybody around this table who believes that that is not going to affect the coastal stock that we're not going to see a contraction again. I hope that you are in touch with the public about this. They want this abundance. This is good for them, it's good for us. This is absolutely irresponsible to even suggest this right now, when we had all this public comment. Frankly, I can't see how anybody would support it.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: I can't support the substitute motion. You know we have been on the record in the past as supporting modest increases in the TAC when the science allows for that. We received our assessment update in August; which indicated stability in the assessment, and indicated that we were below both our fishing mortality target and thresholds, based on our fecundity reference points.

One of the other things that we have emphasized in the past is that significant changes in the TAC do not provide stability to industry. That's why we would be more supportive of the main motion. I think also, echoing some of the comments that have already been made around the table, modest adjustments in the TAC better position us to implement the menhaden-specific ecological reference points that we've made a commitment to down the road.

CHAIRMAN BALLOU: David Borden.

MR. BORDEN: Ritchie made one of the points and Michelle just made the second point, so I'll make the third point, which is I'm opposed to the substitute motion. Just note that really to me the deciding difference here is Motion 8 caps the catch at 216,000 and Motion 9 basically establishes the catch for two years based on that level. There is a significant difference between the two.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: I'm going to look at this a little differently. I don't support the 216,000 metric ton TAC, because just like we heard with what Pat Keliher presented earlier, everything is nested here. You know if we had a huge blackboard with arrows, we could probably wend our way through this process a lot easier.

But to say 216,000 metric tons is right. We don't know what that means yet. Is that going to be the total? What happens to bycatch, what happens to episodic events, you know things that may make a difference? You've heard about the pound net fishery in Maryland and Virginia. Depending on what is attached to these 216,000 metric tons has a lot to do with where we end up today.

My particular desire here is just to say that I don't agree with 216,000 metric tons; because we don't know what else is going to go along with that. We have a menu, but really the menu as we go through it is interwoven, in a sense, and it makes it very difficult at this time to support 216,000.

CHAIRMAN BALLOU: Steve Train, did you still want to offer a question or comment?

MR. TRAIN: Yes, thank you Mr. Chairman. A lot of the questions I had have been answered. I think I like the hard dates in the substitute motion. The open-ended dates in the first part make me nervous. We're hoping to have everything out by 2019, but we might not. If we have a very healthy resource we have room to move up a little bit from 216, and we wouldn't be able to do that.

I think 214 sounds reasonable sometimes when I see the statistics we have, but I also see the pecuniary numbers, and I think that may be a little bit overreaching. I think we have a possibility of increasing the harvest on this resource for years and years, a little to a time, if we don't take too much at once. I think that benefits every user of it. There are parts of each one of these motions I could speak in favor of. Either one of them individually I'm not quite ready for.

CHAIRMAN BALLOU: Steve, just for clarification. You said 214; did you mean 240 in your comment just now? Thank you; that was a yes for the record. Roy Miller.

MR. MILLER: I think I oppose the substitute motion in favor of the original motion; for all the reasons that have been state thus far, but also I have to look at the optics of this situation.

The original motion has a modest increase, about 8 percent. I think that is prudent; considering the overwhelming public support that we heard yesterday. I think it's a little premature at this time to bump it up to 240,000 metric tons.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: Surely everything has been said on this subject at this point. I don't support the substitute motion like many of my colleagues, and I think we've heard enough discussion about where everyone individually stands. It is clear to me that it's time to make a vote on how big the pie is going to be; then following that we'll figure out how many pieces of pie that we're going to cut it up into. I would like to ask that we think about taking a vote; because I don't think that any further discussion is going to change anyone's point of view at this time.

CHAIRMAN BALLOU: I do have three others on my list. I would like to at least move through those and then see whether the Board does want to call the question. Next I Have Robert Boyles.

MR. BOYLES: I'll pass, Mr. Chairman. Thank you.

CHAIRMAN BALLOU: Loren Lustig.

MR. LUSTIG: If Dr. Seuss was here in the room with us, he would remind us of the limitless forest of truffula trees, and wouldn't you know it, something called a Thneed could be made from them. If you're wondering what the final outcome of over harvesting was I can tell you at our break? I do reserve the right sometime today to use the word unless. Some of you will also remember that.

CHAIRMAN BALLOU: Pat Keliher

MR. KELIHER: I'm going to refrain from my Dr. Seuss quota that I was going to go into. I'm going to speak against the substitute motion. While I support setting a TAC for the 2018 and 2019 years, I think as Dr. Duval stated, an incremental step in moving forward I think is called for at this time.

CHAIRMAN BALLOU: I was just going to ask the Board if there was any objection to ending debate and calling the question. Two hands went up. I'm going to go to those two hands, and then I'm going to ask that same question. Dr. Rhodes.

DR. RHODES: Listen, all the discussions we've had, this Board is committed to the ecological reference points. It's just a matter of how we're getting there. Thirty-three years ago, I took another doctor's commitment that was to first do no harm. But I really want to go back to what Hippocrates said, and of the epidemics. I'm going a Robert Boyles to get us all in place here. But the physician must be able to tell the antecedents, know the present and foretell the future. He must meditate these things and have two special objects in view, with regard to disease.

We can substitute menhaden; namely to do good or to do no harm. I think the 240, while it may be allowable, is not allowing for the least likelihood of doing no harm, and doing the most good for the resource. The 216 will make a lot of people whole, will allow for states that want allocation to get it without negatively affecting states that currently have allocation.

Having it set until the ERP is ready to go allows the staff to not get caught up or this management Board to get caught up, in setting these same discussions year after year after year. Hopefully, allowing the ERP to be done that much more rapidly, so in a two-year or three-year time period we're ready to have the next level of discussion, so a different doctor, but same process.

CHAIRMAN BALLOU: David Bush.

MR. BUSH: Obviously once again we've got some excellent points around the table and points of view to consider. Some of the things that we've talked about are stability, and we do need that. We need that in the industry, we need that in the environment. I completely respect that. But we talk about stability a lot more when we're considering an increase. However, whenever the numbers start dropping, well stability is not as important as the resource.

Okay well I get that. I mean it's got to play fair both ways, given that setup. But the other thing is, the promises that we made yesterday. I had some interesting conversations yesterday evening and you know was put on the spot. I agree. I think we made some promises and we wrote some checks that we need to make sure that the bank has the money to cover when it comes up here in a few years.

We've mentioned the conservative nature of one number over the other. Just to point a couple of numbers out. I looked up yesterday while we were discussing this. From 1950 to 2016, our average landings in metric tons were 333,000 metric tons. From 1950 to 1980, it was 410,000 metric tons, and from '80 to 2016, it was 266,000 metric tons. Keep in mind that we haven't exceeded 266,000 metric tons since before 1995, but up through 2016 that is still our average. As far as being conservative, we're talking about 216 to 240.

I was looking yesterday at the numbers put up on the board, and it seems like that 230, 240 appears to be a crossover point to where once you get above that some of the zeros start shifting into whole numbers. I don't know if maybe this would be appropriate if the makers of the motions might consider it, maybe amending the motion to include some of the better values of both of these motions. If so, I would be willing to do that if I could get some help.

CHAIRMAN BALLOU: I think first of all I would like to ask is there any member of the Board who has not yet spoken on either of these motions, who would like to speak? Seeing none, and taking David Bush's comment into consideration. Is there any objection to calling the question and moving forward with the vote on the substitute? Seeing no objection; we will caucus for one minute and then vote on the substitute. All right, I'm going to call the question. **This is a vote on the move to substitute to set a total allowable catch of 240,000 metric tons for 2018 and 2019. All in favor of the motion please raise your hand. Hands down, all opposed please raise your hand. Hands down, null votes, abstentions; the motion fails 4 to 14.** We're back to the main motion; further discussion on the main motion. David Bush.

MR. BUSH: As I mentioned earlier, there were some very valid points in both. I think we need to, in my opinion, as soon as the ERPs are out use them. That needs to be in there. I think specified years, it's been mentioned a few times that we need to mention those exactly as well. While I think I agreed to second the motion with 240,000, it was more for discussion purposes, but also because I believe that these modest increases while they are great, you know to say that they're modest.

You know these folks who rely on stability also rely on good years, and they never experience the good years, only the bad. I think looking at the numbers that we looked at yesterday, we can certainly see that there are quite a few higher numbers that have been shown to be more than fair to both the environment and the fishery. With that being said, if you're willing to take an amended motion or to amend this motion to include some of those finer points, I would appreciate the opportunity.

CHAIRMAN BALLOU: You're welcome to do so if you would like.

MR. BUSH: All right, and I'll need some assistance, but I would move to amend to set the total allowable catch and not to exceed 220,000 metric tons for 2018 and 2019. Sorry, help with the wording, or if the ecological reference points are available before then, however we would best word that.

CHAIRMAN BALLOU: Staff is putting the motion up on the board. Dave, I take this actually to be another move to substitute. Are you comfortable making that?

MR. BUSH: That's fine.

CHAIRMAN BALLOU: I don't see this as an amendment.

MR. BUSH: But I would want the maximum timeframe to be two years. I want it to be readdressed if we do not have these ERPs available by then it needs to be addressed, and not continue on. Whenever you're ready, I would like to speak to it for just a moment.

CHAIRMAN BALLOU: Yes let's just make sure we get it correct. First of all, and I realize this is a fine point. It could well be an amendment. But I just would like to suggest that it read; move to substitute, so Max if you could make that change, ***to set a total allowable catch not to exceed 220,000 metric tons for 2018 and 2019, or until ecological reference points are available for management use, whichever is first. Dave is that your intent to make that motion?***

MR. BUSH: **Yes.** I don't believe it needs to be specified, but I'm referring to the species-specific ecological reference points, but if that needs to be in there then that is fine as well.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Rachel Dean, Dave, discussion on the motion?

MR. BUSH: Yes sir and I mention this allot, I'm the new kid on the block here. I'm trying to understand what our goals here when we show up at each one of these meeting. I've talked to some of you earlier; you know on the federal side it's pretty easy, there is a lot more doctrine, there is a lot more guidance. These are the goals; this is what you should be striving towards.

Here it's not quite so easy. But I understand that we need to take care of the environment. I understand we need to take care of those who rely on it as well. I really do believe if we're willing to provide reductions to protect the fishery in a bad year, we should also have the intellectual honesty to provide the ability to harvest during good years as well.

Now that may go against the philosophy of stability; but at the same time you can't only have average years and bad years. There is only one way to get an average year, and that is to take a bad year and provide a good year to offset it. I think this does that. I think arguing once again for numbers, simply because they're round is silly, and I hate to be part of a discussion that does that like we did last year.

I chose 220, because I think 220 is the point where a lot of our zeros turn into again whole numbers, when we're talking about the possibility of exceeding certain targets or thresholds. That is my reason for choosing 220. If the seconder would like to provide any other comment, I would appreciate it.

CHAIRMAN BALLOU: Rachel, I will go to you, but first just by a show of hands, who else would like to speak? I'm assuming Rachel wants to speak in favor, although she doesn't necessarily need to. Who else on the Board would like to speak in favor of this motion to substitute? Just put your hands up so I can go down the list, at least initially. I see three hands. Thank you, those who wish to speak in opposition. I see two. With that I will go to Rachel Dean.

MS. RACHEL DEAN: Dr. Seuss, I am here, I am here. I struggled with this. My first meeting I got to go through as we were setting the TAC the last time. It was brutally painful. But there is something that has always resonated with me as I've participated in fisheries management, and that is that we are so quick to take and so reserved when it's time to give credit where credit is due.

I've heard both sides of the argument. I have heard that decreasing the TAC did nothing; which I would sit here and apologize to fishermen then. That weight is on me now as I look at a 0 percent chance; a 0 percent chance of exceeding the F target; which means 100 percent chance of not exceeding the F target.

If this was successful management, if this got us to where we are to where we're starting to see a resurgence of menhaden, bunker, peanuts, up and down the coast. Then I would ask that we give some credit where credit is due. This isn't putting us back to harvest levels that got us into an awful situation.

This is by no means putting us back to where we were. This is just putting us somewhere where we have put credit into the management system so far; and saying to our fishermen that management does work. Have a little faith, because it will be given back to you when it allows for it.

CHAIRMAN BALLOU: Ritchie White.

MR. WHITE: I'm going to oppose the substitute motion. There is also a piece of giving and taking, certainly is for the fishermen. But there is also for the resource that needs menhaden. We're certainly going to take some from all the description we've heard about the whales, the bluefish, the striped bass, and the birds that also need menhaden.

We've had a lot of comments about the support for ecological reference points. Clearly those, when we get those, are going to have us leave more menhaden in the water. I think the 216 is a compromise from the people I talked with last night and yesterday afternoon that I was hearing 201,000 as a possible motion and 240. I think the 216 is a fair motion.

I also oppose putting the dates in there. I oppose putting the dates in there, because what if the reference points are not ready in 2019? Do we want to go through this process again for one year? I don't think so. I think the original motion allows a little bit of time to make sure that the reference points are in place.

CHAIRAN BALLOU: Russ Allen.

MR. ALLEN: I thought Rachel hit all the points very well, so I won't reiterate what she had to say. I just know that this to me is a good compromise between the resource and the fishing industry. If we decide to move forward with some sort of fixed minimum, it should make everyone whole and give everyone enough of the resource for their own states.

I think it really is the good between 200 and 240. As Rachel said, there is a 0 percent chance of going over the target with this number. That came from the Technical Committee, which I believe would have no problem moving forward with this either.

CHAIRMAN BALLOU: John McMurray.

MR. JOHN McMURRAY: This is bizarre to me. This is a public resource. It's like nobody looked at or read the public comment or went to the public hearings. The public wants enough of these fish to stay in the water so they have access to these whales; they have access to the striped bass, access to the bluefish.

Does anybody care what the public wants? A 20,000-pound increase is a lot of fish; it is hundreds and millions of fish. The analysis that we have right now in impact is single species; it's based on a single species stock assessment.

We have no idea what the impact on predators will be.

I would argue that we should wait to see what that impact is, and that we know the tradeoffs. We have science to base those decisions on before doing something like this; which is just way over the top in my opinion. Frankly, 16,000 metric tons is a hard pill for me to swallow; but I think it's reasonable, 20,000 pounds is not. The public frankly is going to flip about this, and they have a good reason to. I'll leave it at that.

CHAIRMAN BALLOU: John, several times you said 20,000 pounds. You meant 20,000 metric tons, I believe.

MR. McMURRAY: Yes sir, thank you.

CHAIRMAN BALLOU: David Blazer.

MR. BLAZER: I'm in support of the substitute motion. I think the 220,000 metric tons is kind of a moderate increase; based on what the Technical Committee has provided for us and the risks that are involved there. I'm also supportive of just setting this for the two years. You know we fully want the ecological reference points to be here as soon as possible. We kind of mentioned that yesterday. But I think if we start to manage to that third and fourth year out, I think we need kind of a two-year timetable to kind of reevaluate at that time. If we've got to go through a TAC setting exercise in two years that is our responsibility. That is us as management Board, so I feel very comfortable in making those decisions in two years, and I think that's our job to do that so I'm fully supportive of the motion to substitute.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: I'm not in support of the substitute motion. One of the comments that struck me this morning, we've talked about Dr. Seuss and other things to add a little levity to the conversation. But a comment that John made across the table, having his son out there and seeing a whale and saying awesome.

Well, this spring or early summer Ritchie White took me and my grandson from Milwaukee out striper fishing. My grandson caught a nice striper; and his first comment was awesome. The awesome came from the fact that the stripers that we were catching this summer were extremely healthy. I don't know if it has a lot to do with menhaden in particular.

But Ritchie White and I fished a lot, and we would always when we had a fish on the line, how big, how big. Ritchie would always overestimate the size of them, because the fish seemed to be so strong. What I'm getting at is the general public wants to see menhaden in the water; thousands and thousands and thousands of people from, (Audience Applause) thank you but hold that back, we don't need that. We appreciate it, but we don't need it.

But, it's true that the general public wants to see fish in the water. Whether it's 216, 220, it might seem like a small figure. But I think the general public would really like to see that number under 200,000. If you really get down to it, they don't want to see the extraction of menhaden to go to fish meal or a lot of products for whatever that they don't understand.

But they understand what they see out in the water. For that reason I think that there is a compromise figure of 216, which comes out. It should keep most people whole, give all the states some piece of the pie, and keep the states of Virginia and New Jersey hopefully in a good position. I urge you to vote down the substitute motion. Vote on the main motion. I mean we could go on all day. We can go from 220, we can go 280.

Maybe I'll be prepared to make a motion next, or if 220 passes to make another motion for 214. But 216, seems to be the best compromise figure; and I urge my colleagues to vote down

the substitute motion. Vote for the main motion of 216,000 metric tons, and let's move on to the allocations.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: I don't know about a compromise when you start off with 216,000 metric tons. I'm not sure we have a flowing recollection of all the different steps that we've taken. But I have heard repeatedly about making states whole again; specifically Virginia, New Jersey, and also Maryland.

Starting in 2013, those were the three states that were above 1 percent, in terms of the allocation. I think that during the allocation process, when Robert Boyles was hosting at least eight calls. Most of the comments were about capacity; and I kept urging through the series of those phone calls, capacity isn't what you're doing now.

We want to know what capacity is as you look down the road a little bit. I'm not sure that that ever occurred. I'm not sure there were every enough discussions about what capacity really is. I do know Rhode Island has capacity that wasn't there many years ago; or at least the boats weren't ready to embark on taking some of that capacity from the total allowable catch.

I also know that Maine ran into a situation where the episodic problem was more than episodic; it was bordering on catastrophic, with the constructs that we have, and with the episodic being held at1 percent. I also know that New York was sweating bullets; having gone through two seasons of menhaden kills, and somehow being included with New England, which is fine, in the episodic events.

We have these situations that when I saw 216,000, if you'll notice, I didn't speak in favor of 240,000. I said 216,000 is not the right amount. We have a little way to go. Pat Keliher started the situation today and made me a little bit nervous; because it was sort of open ended on this minimal quota situation.

No matter where you look, you're talking minimum being 39 million, with a half percent, 70 million with 1 percent, and 83 million that probably couldn't be used out of 141 million that would be for 2 percent. I know everyone has good intentions; and I think they stand by that and I stand with them, in terms of the reference points.

But we made a decision, and the decision was we're still united. We want those biological/ecological reference points. We have a pretty good feel that it's going to be sometime in 2019 for peer review. I think the substitute motion gives a little more assurance that two things can be captured today.

One will be to make states whole on a situation which I'm not going to recount; unfortunately, many of you remember as I do what we've been through, all the steps. I won't recount them on where we are today compared to where we were in 2012. The second thing is there is capacity that hasn't been there before.

That has to be recognized, and that is fair. I can't tell you right now how many menhaden are left in the water; because when they did the updated assessment and you had the NAD situation, you had those northern fish, which sort of perturbed the model a little bit. It's difficult to say whether the 68 percent that were left in the water at the time of the benchmark is higher or not. We just don't know; and I have asked that question, because there is concern for forage, definite concern. There is also a concern by all of us for forage in the form of herring; forage in the form of the alosine. Menhaden is not exactly the only forage species out there; and I think as we go through this, whatever we do we ought to start making renewed commitments on the alosine, and we ought to get the New England Council to maybe make some renewed commitments

on herring. Thank you for your time. I do support the substitute motion.

CHAIRMAN BALLOU: Allison Colden.

DR. COLDEN: I would just like to make a comment, and maybe reframe. Actually Rob just touched on this. Reframe the concept of the timelines that are included in each of these motions. Option B was adopted as our reference points yesterday by this Board; with many of the comments expressing confidence that the menhaden-specific ERPs would be ready for primetime in 2019, or at least out for peer review.

Personally, I don't see if the Board was so confident in that fact yesterday, why it would be necessary to change or limit the TAC setting exercise here for two years, if there was a high level of confidence that those models would be ready as we saw in our discussions yesterday.

CHAIRMAN BALLOU: Ray Kane.

MR. RAYMOND W. KANE: Yes, I'm going to speak. I'm going to oppose the substitute. I'm in favor of the main motion. I've heard around the table fishermen want to see an increase. Well, if I'm not mistaken we started at 185,000 metric ton, and then we went to 200,000 metric ton. Once again, we're increasing.

Fishermen should be able to walk away from here saying well we did get an increase. What nobody has reflected on is the bluefin tuna fishery in New England. For the first time in years the vessels, 35 and 40 foot vessels, didn't have to steam 130 miles out to the Hague Line to catch the quota in general category.

We had fish, many a fish were landed within three miles of the coast this year, and I venture to say vessels didn't have to fish more than 30 miles offshore. If you've ever fished for a living, you know what I'm talking about. When you're on a 35 foot vessel or a 100 foot vessel; hundred foot vessels belong 130 miles offshore, 35 foot vessels don't.

My concern is also ecological reference points. I think this is a modest increase. People will be happy with it. I've had a lot of constituents back home, the bluefin tuna fishermen especially; tell me why are they going to raise it at all? We finally have menhaden back in our waters. I mean we had 800 pound bluefin tuna in 20 feet of water this year.

A pod of them came up in 30 feet of water. To address Mr. O'Reilly, you know there is an issue with herring. There is a reason why all these big animals came that close to the shore, because of the abundance of menhaden on the backside of Cape Cod. Once again, I oppose the substitute, and I'm in favor of the main motion.

CHAIRMAN BALLOU: Is there anyone who has not yet spoken on the substitute who would like to? David, you had your hand up. Last crack, final comment then we'll vote.

MR. BUSH: A couple of points I guess I would like to bring out. One, we've talked about reinvesting for a conservatory effect. Given the allocation schemes, states can do what they want with what they get; so if their particular state is now seeing an increase in menhaden and what not, and they don't want to use that as a fishery base. That is up to that state to sort of determine what they would do with that; and we'll be discussing that in other options here shortly.

I mean that's certainly the potential; I'm not saying that would be the case, but it could. Another thing I guess I would like to point out. You know our current trajectory, our management philosophy has gotten us where we are, not a particular number. While it's nice that we've finally seen an increase from where we were to 200,000 metric tons, you know we're also at the lowest point, the lowest harvest limit we've ever been at.

Again, I spoke of the averages over the years. We've never come close to our average, even over the past 20-30 years for the last ten years. It's not because they're not out there, it's because they've been limited from catching it. We've gotten to the point now where it's once again fighting over scraps.

We forget the big picture. We forget that there is more fish; and we certainly don't want to do things to cause harm to the ecosystem. But we don't even have the capacity to harvest what we use to harvest for decades; and we still have those fish and the predators that relied on them. I've talked to the bad guys, the big bad guys that are in the room before today, before this meeting.

I've never once had them come to me and ask me, we need you to get all you can get. We want you to double the quotas. They've never asked that. They said this appears to be what's fair. This appears to be what the science supports. You know I've talked to them. I've talked to the other folks. Well, they say the same thing; this appeared to be fair what the science supports.
If we're going to do a modest increase, and we have the range from about 200 to 240, 220, I mean my math is a little rusty. But that seems about in the middle. Again, it doesn't crossover that threshold that starts putting us in harm's way. Then I guess the final note. You know the abundance is either due to our management actions or it is not. If it is due to our management actions, we're doing the right thing. If it's not due to our management actions, then apparently we have less control than we thought.

CHAIRMAN BALLOU: One minute caucus and then we'll vote on the motion to substitute. Okay I'm going to call the question. I'm sorry, Andy.

MR. SHIELS: Could we have a roll call vote, please?

CHAIRMAN BALLOU: We can, and we will, and we will move south to north and Megan will call the roll.

MS. WARE: U.S. Fish and Wildlife.

MR. MILLARD: No.

MS. WARE: NOAA Fisheries.

MR. BURNS: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: Georgia.

MR. WOODWARD: No.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: North Carolina.

DR. DUVAL: No.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Pennsylvania.

MR. SHIELS: No.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: New York.

MR. GILMORE: No.

MS. WARE: Connecticut.

MS. GIANNINI: No.

MS. WARE: Rhode Island.

MR. BORDEN: No.

MS. WARE: Massachusetts.

MS. MESERVE: No.

MS. WARE: New Hampshire.

MS. CHERI PATTERSON: No.

MS. WARE: Maine.

MR. KELIHER: No.

CHAIRMAN BALLOU: **The motion fails 5 to 13. We're back to the main motion**; and I believe Megan has a suggested clarification on that so I'm going to turn the microphone over to Megan.

MS. WARE: For the main motion, this sets a number that the TAC cannot exceed, but this does not specify what the TAC is in 2018 and/or 2019. If the intent for the maker of the motion is to set it at 216, perhaps we could do a friendly amendment. It says move to set a total allowable catch to not exceed and be set at 216.

MR. ESTES: That's fine.

CHAIRMAN BALLOU: Let's put that up there. ***The revised motion, which is the main motion, which is the motion before the Board is to move to set a total allowable catch not to exceed, and be set at 216,000 metric tons, until such time that ecological reference points are utilized for Atlantic menhaden management.*** I was going to ask if there is any objection to making that friendly amendment. Seeing no objection; the motion as amended is before the Board, and we have apparently comments on it starting with Roy Miller and then Rachel Dean.

MR. MILLER: Did I hear Megan mention 2018 and 2019 as part of that friendly motion; because that wording didn't make it onto the board.

MS. WARE: I didn't. I think the intent, and makers of the motion please correct me, was that there not be years in this so I have not put in years. But I was just trying to clarify that the 216 is actually the TAC that they are interested in.

CHAIRMAN BALLOU: Rachel Dean.

MS. DEAN: I would like to think that this is a friendly amendment; but I think that we're probably going to want it as a substitute motion if I may. Can I do that at this time?

CHAIRMAN BALLOU: Well there is a big difference between a friendly and a substitute.

MS. DEAN: Let me read it out. Let me share where I'm going, and we'll go. I think that I would like to move to make a substitute motion that would say**: Move to set a total allowable catch not to exceed and be set at 216,000 metric tons for 2018 and 2019 or until such a time that ecological reference points are utilized for Atlantic menhaden management.**

CHAIRMAN BALLOU: I don't think that's a friendly. It could be an amendment, it could be a substitute. Let's just call it as substitute, just to kind of keep on track here.

MS. DEAN: I would like to speak to it if I could.

CHAIRMAN BALLOU: I'll give you that chance. I just want to make sure that it's up on the board clearly and accurately as you intend. This would be to, once Max gets done, move to substitute to set a total allowable catch not to exceed and be set at 216,000 metric tons for 2018 and 2019 or until such time that menhaden-specific ecological reference points be available for management use. Is that your motion, Rachel?

MS. DEAN: Yes.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Steve Train? Rachel, would you like to speak to your motion?

MS. DEAN: At this point in time I guess I'm really kind of, Ritchie White said it that you know, I don't really think that I want to go through this again. To be honest, I'll go through it as many times as I need to, I will. I'll come here, I'll pack the bags and I'll come here. To be honest, I think that the public will too.

This isn't necessarily so that only the fishermen can state their case. But I think that I want the reference points. I'm ready for them. I just don't know if we can accomplish the timeframe. If we see something that tells us that we can increase that TAC, then I think that we should come back to the table and we should have that discussion. Just like we included the language that says not to exceed, so suggesting that we could reduce that.

CHAIRMAN BALLOU: Just so I understand exactly what this would do. This would set the quota at 216,000 metric tons for 2018 and 2019. You know this issue that it can't exceed; I'm not really sure how that plays in now, so I'm looking for clarification from either you or other members of the Board as to how they would view this.

Then it goes on to say or until such time that menhaden-specific reference points, which I guess would imply that it could happen sooner and if it does they would trump. But if they don't happen sooner, it would be 216 for 2018 and 2019, and I'm just sort of wrestling in my own head with what not to exceed now, how that plays into this. Rachel.

MS. DEAN: Yes, and we would be back here at 2020, and I'll leave the second part of that question to I guess back to maybe the seconder.

CHAIRMAN BALLOU: That would be Steve Train, so Steve you're next.

MR. TRAIN: When I seconded this, my understanding would be that with the dates on there we could decide after 2019 whether to continue to wait if the numbers were not available, or we could act and set a new number. That's where the "or" is. That is what I thought I was seconding.

The reason I think that is important is although we have a lot of faith in getting the ecological reference point numbers out for 2020. If the peer review doesn't accept it, or we run into other problems, we could be into 2023, working under 216,000 metric ton. I think a date certain is important; but it gives us a chance to extend it if we think we're getting close with this "or" in this part of the motion.

CHAIRMAN BALLOU: Robert Boyles.

MR. BOYLES: This is good conversation, and I'm struggling with this as well. I think my interest in this portion of the discussion and the debate is and Mr. Estes made the comment at the very beginning about accountability. I think in some of my conversations over the last several weeks, I may have shared with you concerns over further delays in biological/ecological reference points.

My interest in the main motion as I understand it and in reference to Mr. Estes was this was some internal accountability. Having said that and I would look to you, Mr. Chairman. I don't know that anything that we do here today necessarily binds a future Board. If conditions

change, I would think that as Ms. Dean referenced, we would come back and look at those conditions to see, is it time for a course correction?

But again, my interest in the main motion, and I think in the substitute, I'm not clear, is some internal Board accountability. To take Mr. McMurray's point, you know we had thousands, tens of thousands of comments from the public saying you all commit, you all do this. You all do biological/ecological reference points.

I think the message, I hope that was sent yesterday is we are committed. I've seen no disagreement about that around the table. This is just designed to provide a little bit more internal accountability. I need to wrestle with the substitute; but again, if we can get to the substitute. If the substitute ensures that internal Board accountability then I can support it.

CHAIRMAN BALLOU: I've got Adam Nowalsky next.

MR. NOWALSKY: I'm in support of the idea of adding a timeline. My question with the two years at this point, as we've gone through the discussion and I know it was my motion earlier. Is that enough or if we're going to go down the road of holding ourselves accountable as a Board. Before I get to that question, let me just say that accountability to ourselves and the public. You know we've heard comments asking why we aren't doing exactly what the public asks us to do. Well, there were other comments that asked us to do certain things here.

Just because we didn't do exactly what any one of those people wanted us to do, didn't mean that we haven't considered it, and it hasn't strongly factored into our ultimate decision that we make around the table here today in future decisions. I think all of that public comment on both sides is excellent. It's needed; and it helps hold us accountable, and I think that we're being responsive to it. But my question at this point is that should the ERPs get done as we heard yesterday what their cautiously optimistic about, I think was the term I heard, and should they be peer reviewed in 2019. Would our spec setting process for 2020 already have occurred by the time they're available to use, and would the timeframe here not be better for 2018, '19 and '20, because our spec setting process would already have occurred in 2019?

MS. WARE: There is not obviously a date for that peer review yet in 2019; so I can't say what month that is going to occur. It is important to consider that specification process for 2020. What I can say is that Amendment 3 says that the Board can following peer review of those menhaden-specific ERPs, can adopt those through Board action or through an addendum process. An amendment is not needed, so if it's through Board action those could be implemented in 2020. An addendum would obviously take a little bit longer, but it facilitates public comment if the Board is interested in that.

CHAIRMAN BALLOU: Adam, do you have a follow?

MR. NOWALSKY: Does staff feel if the cautiously optimistic timeline of development of ERPs comes to fruition, is 2018 and 2019 spec setting enough? Would those ERPs be useful to us in a reasonable timeframe for 2020, or would we still need spec setting for 2020 without use of the ERPs?

CHAIRMAN BALLOU: Bob Beal.

EXECUTIVE DIRECTOR BEAL: Let me give it a try. Keep in mind that spec setting is not part of Amendment 3. That is outside the Amendment 3 framework. Specs are something that needs to be done either multiyear, single year, however this Board chooses to do that. If 2020 is added to this motion, and I'm not saying whether it should or shouldn't be.

Then if the ecological reference points are available and the Board wants to modify the 2020 total allowable catch that will take a two-thirds vote by the Board. Robert Boyles hinted at this a minute ago. You know the actions of this Board really can't tie the hands of any subsequent Boards or subsequent meetings of this Board.

Even though this motion says 216, not to exceed 216 for the next two years, if there is a compelling reason and this Board votes through a two-thirds majority to make a change, even in 2019. They have that ability. The Board can't tie the hands of future Boards. ASMFC and the Policy Board and the Charter reflect that.

There is a Commission-specific provision that any final actions taken by the Commission and spec setting is a final action, can be rescinded or modified through a two-thirds vote. Including 2020 in here would then have that two-thirds majority requirement in place to change 2020. The flexibility is still there, the hurdle is just a little bit higher, and I think it would need to be compelling to more of the Board to make a change in 2020. That is the quick procedural summary of where we are, and the Board can decide where to go from there.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: I'll pass.

CHAIRMAN BALLOU: Dr. Rhodes.

DR. RHODES: Well, this is just a question. I don't see a difference between these two motions; other than we're setting a limit for two years and having an "or" in there. If we do not have the ecological reference point's ready in 2020, we default back to 216. It's an identical motion the way it's written with the "or" in there, I believe. I mean I'll stand for other people reading it. But the way it reads is we're setting it for '18, '19, and then we have "or" so if 2020 it's not ready, doesn't it default back to 216 the way it's currently written?

CHAIRMAN BALLOU: Let me do this. I have several folks on the list, but I would like to ask if anyone has a response to the issue just raised by Dr. Rhodes; and I see three emphatic hands up, so I'm going to go left to right, Robert Boyles first.

MR. BOYLES: Point of parliamentary inquiry, Mr. Chairman. What is two-thirds vote of this Board?

EXECUTIVE DIRECTOR BEAL: It depends. The provisions of the Charter say that there are 18 votes on this Board, so two-thirds; you know you get the math. But there is a provision that if the Federal Services abstain, the denominator can change so it can be 18, 17, or 16, depending on the number of votes cast by the Federal Services, so it depends.

CHAIRMAN BALLOU: Rob O'Reilly, and if you could, Rob, just specifically to the point that Dr. Rhodes raised a minute ago regarding the difference between these two motions. I think it's important to kind of focus on that first, and then we'll go to the other comment.

MR. O'REILLY: Highly focused. I think, do we have a default position? Didn't we run into a little bit of trouble when we realized we really couldn't fall back to a quota from the previous year or a TAC? If that has not been remedied then Dr. Rhodes suggestion might run us into a problem again.

CHAIRMAN BALLOU: Are you speaking to the Indecision Clause that's in the document?

MR. O'REILLY: And what we did with the Indecision Clause, yes.

CHAIRMAN BALLOU: We agreed that if the Board could not agree on specifications for the next year that specifications in place for the last year, the current year as it were, would continue forward. It would be a status quo situation.

MR. O'REILLY: Thank you, Dr. Rhodes.

CHAIRMAN BALLOU: Rachel Dean, on the specific issue of the difference between these two motions.

MS. DEAN: Yes, I think that we've mentioned before that sometimes it's just to keep it in our memory, and by including the 2018 and 2019, my intention there was just that we would be reminded that these discussions can happen. That is not to say that those discussions wouldn't happen if it wasn't in there; but again, I just want that reminder that the option is there.

CHAIRMAN BALLOU: I have four more people on the list, and then I'm going to see if the Board would like to move forward with voting on this. Next is Tom Fote.

MR. FOTE: Our long history of setting two-year, three-year specs have not worked out so well; especially with some of the species we've gone through like summer flounder, black sea bass and others. I agree with Malcolm; this is a lot to do about nothing. Either one of the motions mean the same thing to me, because we're going to bring it up for discussion.

I guess the first motion is just clearer. I don't like putting years in, because we have a habit of pushing years off anyway. The Board can decide. It reminds me of New Jersey's budget. Most people don't realize in New Jersey that when you pass a budget every year it supersedes all the other budgets.

All the dedicated funds you made for the last 20 years can be superseded by the next budget, which is unusual I think for any other state but New Jersey, because we do things kind of funny there. This reminds me of that; because we always have the option of coming back and doing whatever we want the next following year, it just takes a two-thirds vote, and if anything is that strong we should do it. I support 11, just because it makes it clearer.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: It was really more a point of information. My understanding, in terms of timeframe, you know with regard to the menhaden-specific ecological reference points that the peer review is right now currently expected to be completed by 2019, in conjunction with the new benchmark assessment, correct? Okay I'm seeing nods from staff around the table. That was the only point I wanted to bring up is that those will be in conjunction with the new benchmark.

CHAIRMAN BALLOU: Loren Lustig.

MR. LUSTIG: First of all I would like to sincerely complement Rachel, for her use of the word honesty. Not only did she use it sort of introspectively for herself, she also referenced the honesty given to us by the recreational anglers who are in this room, who represent tens of thousands of additional recreational anglers.

I'm really big into honesty and civility during this discussion. Now, somebody mentioned the word levity recently; especially in regards to Dr. Seuss. I assure you I am deadly, deadly serious about this whole matter, okay. There is a time for levity, but there is also a time for serious consideration.

CHAIRMAN BALLOU: Ritchie White – pass, last comment on this, Doug Brady.

MR. BRADY: To Dr. Rhodes point. Under 13, do I take it to read that there is no possibility until ecological reference points are available that the TAC could be over 216,000 metric tons? I mean I think both motions are saying that if you adopt either one there is no possibility the TAC would be set over 216,000 metric tons until we get ERPs. Is that the way I would read this?

CHAIRMAN BALLOU: My reading is that Motion 13 specifies that for 2018 and 2019 the TAC shall be set at and shall not exceed 216,000 metric tons. That could be trumped, because it then says "or" until such time that menhaden-

specific ecological reference points be available for management use.

I take it therefore that it would be open; in terms of what the specifications would be for 2020. It would require a subsequent Board action versus Motion 12, which would enable that same metric, if you will, to continue forward beyond 2019. I don't see that and maybe I'm misreading it, and if I am and I see Rachel's hand up, please clarify, so Rachel.

MS. DEAN: I think it should probably say "or unless."

CHAIRMAN BALLOU: Do you want to urge that that be modified as such?

MS. DEAN: Please.

CHAIRMAN BALLOU*: **Let's see if there is any objection to modifying the substitute to replace the word "until" with the word "unless." Is there any objection to making that amendment to the substitute motion? Seeing no objection; the substitute motion is so amended.*** Are there any other particularly members of the Board who have yet to speak on this issue who would like to before we call the question? There has been obviously a little bit of an added wrinkle just noted. Eric Reid.

MR. REID: At this point we're splitting hairs, and in my case I don't have the luxury of being able to do that all that much. That's levity without Dr. Seuss if you don't mind, I appreciate that. That is what we're doing. What I would really like to see is take a five minute break. Let the four people involved in these two motions figure out what they really want to say and get it over with; instead of spending the entire Board's time trying to do the same thing, Mr. Chairman.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: I've been sitting here for, when I was going to speak the last time that I was interested in making a motion to limit debate; which would require a vote of the Board, because I think we've heard enough. Just like Eric just said, it's time to vote, and if the Board is interested in voting, **I think I would like to make a motion to limit debate.**

CHAIRMAN BALLOU: Is there a second to that motion? Seconded by Loren Lustig**, is there any objection to the motion to limit debate and vote on the substitute motion? Seeing no objection; we will close debate and we will caucus for 30 seconds and then vote on the substitute motion.** Okay, before I call the question I believe Robert Boyles has a point of inquiry.

MR. BOYLES: I was asking ISFMP Director and the Executive Director to clarify for me what staff's interpretation of the difference between the two. My question specifically related to the question of binding future Boards. I think Toni had some comments that helped clarify it for me that may help the Board.

CHAIRMAN BALLOU: Toni Kerns.

MS. TONI KERNS: Two things that Robert and I talked about; sort of the difference between these two motions. Under 13 the Board would come back and revisit specifications after 2019; regardless of the progress of the ecological reference points. Under 12, you could continue on until perpetuity, I guess.

Then under either motion, if the Board wants to have a TAC that is different than 216 in future years, you would have to come back and do a two-thirds majority vote, because you have set a TAC at 216, even if it is less than 216. Under Motion 12, you still have to come back and have a two-thirds majority vote, because you've set it at 216 in this motion. Under 13 you only have to do the two-thirds majority vote for '18 and '19, because you haven't set a TAC beyond that in Motion 13.

CHAIRMAN BALLOU: Does that answer your question, Robert?

MR. BOYLES: Yes sir, thank you.

CHAIRMAN BALLOU: We've ended debate. Are there any clarifying questions? Really, Loren, I'm hesitant to go to you only because we really have closed debate, caucused, and we're really ready to vote. I would take a question, but only on a point of order. Go ahead, Loren.

MR. LUSTIG: Pennsylvania requests a roll call vote.

CHAIRMAN BALLOU: That is an appropriate request. We will have a roll call vote; and I will ask Megan to call the roll moving from north to south.

MS. WARE: Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: No.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: New York.

MR. GILMORE: No.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. SHIELS: No.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

DR. DUVAL: Yes.

MS. WARE: South Carolina.

MR. BOYLES: No.

MS. WARE: Georgia.

MR. WOODWARD: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA Fisheries.

MR. BURNS: Yes.

MS. WARE: Fish and Wildlife.

MR. MILLARD: Yes.

CHAIRMAN BALLOU: The motion passes 11 to 7. The substitute becomes the main, and I would like to think that we might be ready to take final action on this particular issue; and

then perhaps have a break and take on the other issues. Unless anyone wanted to make any other motions to amend or substitute. I'm not encouraging that I'm just making the offer. Dennis Abbott.

MR. ABBOTT: I would make another motion to limit debate. I think we've had enough debate on this; it's time to vote.

CHAIRMAN BALLOU: Okay. Is there any objection to limiting debate and taking final action at this point? Seeing no objection; I appreciate the sentiment. I don't think we need to put that in the form of a motion. There is unanimous consent on the part of the Board to do that; so we will now do that. This will be the main motion. We will take a vote. Is there a request for a roll call? Oh, it has to be a roll call because this is final action on specifications. That said; we'll call the roll and we'll just stay with the flow on going north to south.

MS. WARE: Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MR. ABBOTT: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: Yes.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. SHIELS: No.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

DR. DUVAL: Yes.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA Fisheries.

MR. BURNS: Yes.

MS. WARE: U.S. Fish and Wildlife.

MR. MILLARD: Yes.

CHAIRMAN BALLOU: **The motion passes 15 to 3; and** we have dispensed with that agenda

item, and we are now going to take a ten minute break and reconvene at 10:04. Thank you.

(Whereupon a recess was taken.)

CHAIRMAN BALLOU: I'm going to call the meeting back to order. The next order of business is to continue forward with the other issues in the amendment. Moving in sequential order the next would be quota allocation and timeframes. As set forth in the amendment there are six options for allocation methods; and five options for allocation timeframes. The intent is to find a way to move on both; a sort of Tier 1 approach combined with a Tier 2 approach. With that is there anyone who would like to make a motion on the issue of quota allocation and timeframes? Pat Keliher.

MR. KELIHER: Last night I had indicated I had put together a bundled motion; and after thinking through it last night, and after going through this morning, I have broken it apart and I have sent Megan some language that needs to be tweaked just a little bit. She may have already tweaked it.

I would move to choose the following options in Draft Amendment 3: Section 4.3.2 Allocation Method Option C with a jurisdictional allocation with a Minimum Base Allocation of 0.75 percent fixed minimum for the Quota Timeframe of 2012 to 2016. Section 4.3.3 Quota Transfer Option A: Quota Transfer would be permitted. Section 4.3.4: Quota Rollover Option A: Unused Quota May Not Be Rolled Over. I will end there; Mr. Chairman.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Ritchie White? Moved by Pat Keliher; seconded by Ritchie White to do just what Pat read into the record, and is now up on the screen. Is there discussion on the motion? Emerson Hasbrouck.

MR. HASBROUCK: I would like to offer an amendment to that motion.

CHAIRMAN BALLOU: Go ahead.

MR. HASBROUCK: Such that Section 4.3.3 Allocation method Option C; jurisdictional allocation with a minimum base allocation of a 1.0 fixed minimum.

CHAIRMAN BALLOU: Is there a second to that motion to amend? There is, Nichola Meserve moves to second the motion to amend, so moved and seconded to amend the main motion by changing what I understand to be the first part, and that is in lieu of a 0.75 percent fixed minimum, a 1 percent fixed minimum. I'm sorry, I know Max is putting that up on the board, but Emerson did you want to maintain the quota timeframe of 2012 through 2016?

MR. HASBROUCK: Yes.

CHAIRMAN BALLOU: Maybe we don't need that. I guess we're just modifying that one portion therefore of the first bullet in the main motion; discussion on the motion to amend, Jim Gilmore.

MR. GILMORE: I actually can support both motions. But we're back in the same issue is that a 1 percent to me is cleaner; because we essentially cover I think everybody's fishery, in terms of both bait harvest and possibly episodic event. We go into a 0.75 then I would feel more comfortable, and I probably would argue later on that we go and have some episodic event, you know because we're kind of pushing up against maybe some of the actual harvest going on right now. It's another chicken and egg thing. I like 1 percent without episodic event. I like 0.75 with an episodic event.

CHAIRMAN BALLOU: David Borden.

MR. BORDEN: I would just like to follow up on Jim's point; and point out a nuance of the linkage here with other issues. The percentages can be used by any state; regardless of what the percent is. The percent can be used by any state for catches in both state and federal

waters episodic program can only be used for catches in state waters.

Now that sets up the dynamic where, and I'll use Rhode Island as an example of this so everybody understands it. The guy sitting immediately to my right had some of the vessels in Point Judith landing menhaden from federal waters. They were part of a herring catch. If you have one program you can land those, and if you have the other type of program you can't land those. This subtle distinction that a percent is, I think more desirable from a coastwide perspective as opposed to the episodic program.

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: I'm not opposed to the motion to amend. I think I would still argue for some sort of an episodic, because of the potential for fish die offs that we have within the state of Maine are real, and have big economic impacts. I was trying to not look like I was going for too much of a fish grab here; to be honest, trying to have some recognition to both New Jersey and Virginia and also to the other jurisdictions to the south. I can go either way; but I would want to see some sort of an episodic, and obviously I'll talk to that later.

CHAIRMAN BALLOU: Emerson Hasbrouck.

MR. HASBROUCK: My motion to amend does not preclude an episodic event. My motion does not relate to episodic events at all. That's another issue. But also, in terms of minimum allocation, states like New York and there are other states as well, did not have a very good data collection system in place for bait fisheries, which includes menhaden.

There were other species as well. In New York, we weren't able to get our reporting system in place until just over the past few years. Now that we've got that reporting system in place, we realize that the fishery is more extensive and more robust than what was originally recorded or not recorded. I think with again at least a 1 percent, it could even go for more.
But 1 percent brings us to a place where we can cover our current fishery with a slight expansion. Additionally, in terms of public comment, we've heard a lot yesterday and today about public comments. I know that in New York, and I don't recall from Megan's presentation yesterday public comment in other states. But there was significant public comment in support of states having at least a 1 percent fixed-minimum.

CHAIRMAN BALLOU: Ritchie White.

MR. WHITE: I struggle with this, but I'm going to oppose the amendment. When I originally talked about a 216,000 ton quota, I talked about compromise and I talked about trying to meet everybody in the middle. My concern with the 1 percent is that it will not keep Virginia and New Jersey whole in this process.

I say that we don't have to keep Virginia and New Jersey whole. This is allocation. But I think in a compromise situation, I think it will be wise to. I think the three-quarter percent; I believe we can make both those states whole, combination of the quota they would get and then added to that would be some chance at the unused allocation that would go into a pool from the states that would not be using their three-quarter percent. Based on that thinking I'm going to oppose 1 percent and stick with the original motion.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: I oppose the amendment, the 1 percent, also in opposition to the idea that having a combination, which was mentioned of Episodic Event, which is about 4.8 million pounds, and then tacking on this 0.75, which is pretty close to about 58 million pounds. They are definitely not linked in magnitude. I mean a 1 percent Episodic Event is relatively small; compared to providing a minimum, even at a half a percent to all the states.

The problem is the way things stand now. If you look at 2012 through 2016, the best performance by the states that would be receiving the minimal, in addition to the three states that are already above 1 percent is there would be a lot of unused quota. That might be okay for some states that wish to do that.

We talked about opt-in and opt-out; but clearly, I don't want to call this a precedent, because it's been around, but other than American eel, where certain states were provided 2,000 pounds that did not have previous landings. That was done in the quota-building process, and the quota hasn't come due yet. But that was in a process taken by the ASMFC. Here we already have a quota system; and part of the situation is going to be a minimum, which we're not sure what will happen. Clearly, I would rather substitute for this if you don't mind.

CHAIRMAN BALLOU: I prefer to vote first on the amendment; and then entertain a motion to substitute.

MR. O'REILLY: I think that's fine; but please know that Virginia is opposed.

CHAIRMAN BALLOU: Other comments on the motion to amend. Is the Board ready for the question? Is there a need to caucus; 30 second caucus? Robert.

MR. BOYLES: Maybe a question for staff. At the TAC at 216,000 metric tons, just for my purposes can you tell me what that equates to in pounds?

CHAIRMAN BALLOU: Megan is looking that up.

MR. BOYLES: And what 1 percent equals, if you would, please Megan.

MS. WARE: The total TAC in pounds is 476,198,486; and for 1 percent it is like 4.76 million, roughly.

CHAIRMAN BALLOU: Okay I'm going to call the question. All in favor for the motion to amend please raise your hand. Hands down; those opposed please raise your hand. Hands down; thank you, null votes, abstentions, we have two abstentions**. The motion fails 6 to 10 with 2 abstentions. We're back to the main motion. Rob O'Reilly, did you want to offer a substitute**?

MR. O'REILLY: Yes, and I'll have some brief remarks about it. **But I would move to substitute Option F under Section 4.3.2 as the allocation method.**

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Dave Bush. Moved by Rob O'Reilly and seconded by Dave Bush to substitute what I understand to be, is it your intent, Rob to substitute the entire main motion with your substitute motion?

MR. O'REILLY: My understanding, it would just be at the top of the main motion with the allocation method; not the transfers and not the rollover.

MS. WARE: Rob, there are two sub-options for Option F. Do you want to include which sub-option you are interested in?

MR. O'REILLY: I was hoping that would be discussed after this; because that has an importance of its own, in terms of the allocation. I think really what we're looking at in F is we have reached that situation with Sub-option 1, where it would be a 50/50 distribution between bait and reduction, and Sub-option 2 is 70 percent to bait, 30 percent reduction.

The reason I'm hesitant to declare one is I think, just like Robert Boyles just did. I think it's important that we know the outcome of Sub-option F; in terms of what's going to be available. I don't think anyone is working on their calculator fast enough to help me out on that. We're looking at when 212,500 are exceeded, which with 216,000 it is.

That's going to leave approximately another 212,500 is 468.4 million, and 216,000 metric tons is 476.1 million. We're looking at about 8 million pounds. I think in the sense of fairness, I think we ought to know that the Board can say, well that either does help my situation or it does not. That is a really long response, Megan.

CHAIRMAN BALLOU: It's okay, and it does sound like that if I understand how this would go that if the Board were to approve this amendment, there would then be a subsequent motion to clarify the particular sub-option associated with this.

MR. O'REILLY: That's correct.

CHAIRMAN BALLOU: Okay I'll take comments both in favor and opposed. If you wish to speak in favor of this motion, please raise your hand, question, John Clark.

MR. CLARK: Option F states that the timeframe is 2009 to 2011; whereas the motion states the timeframe is 2012 to 2016. Could Rob clarify which timeframe he wants to use for Option F?

CHAIRMAN BALLOU: I think Megan has a response.

MS. WARE: The part up to the 212,500 metric tons that is our current allocation method; so that is based on the 2009 to 2011. The part above, so the difference between 216 and 212,500 metric tons, I am assuming that is what that 2012 to 2016 timeframe is applying to. We can try and clarify that if you would like in the motion.

MR. CLARK: Well, that is kind of confusing, because under Option F the additional is just either divvied up between the bait and the reduction fishery. It doesn't say anything about a timeframe there. The base option F does specify a timeframe; and it's not the timeframe that is in the motion right now. That is where we need some clarification.

MS. WARE: Yes, so what the amendment says is for the sub-options; depending on if it's a 50/50 or a 70/30 split. That distribution is "based on landings during the timeframe chosen in Tier 2," which is the timeframe options. That difference, and if we need to I can pull up the picture that describes this option, because maybe that will help. But I'll look to Rob to see if he is looking to have that difference be based on the 2012 to 2016; and maybe if he is we can clarify that in the motion.

MR. CLARK: Well, Megan I'm just saying that it says at or below a TAC of 212,500, which is our base situation. The quota is allocated based on average landings from 2009; you know the current allocation method, whereas this motion up here would imply that no, we're not using that timeframe. It makes a big difference to states like ours which timeframe is used.

CHAIRMAN BALLOU: John, this is my take on where we are. Rob's motion to substitute would replace all of the first bullet in the main motion. That quota timeframe 2012 to 2016 would not apply; because it's not applicable to Option F. ***This is a motion, and make sure it's correctly worded***.

Substitute Option F under Section 4.3.2: fully replacing the way the current main motion is proposed with regard to Option C, and what Megan has been referring to is that if this motion were to pass, we would necessarily have to come back and address the timeframe issue associated with a delta between 212,500 and 216. Does that make sense?

MR. CLARK: Yes, I have that. Okay, it's just the way the motion is. I see, so the entire timeframe is gone then from the original motion.

CHAIRMAN BALLOU: That is my interpretation. Rob, do I have that correct?

MR. O'REILLY: You do, and Megan had it right as well. Another decision would have to be

made if this passes. Then we'll have to choose one of the sub-options and also the timeframe is under Tier 2.

CHAIRMAN BALLOU: Okay, we have a few hands up. I guess I'll just try and just alternate back and forth, without necessarily figuring out if it is pro or con. I'll go next to Adam Nowalsky.

MR. NOWALSKY: We have a motion to substitute; but if I'm clear on what you're saying, we're not substituting 18 for 16; we're only amending 16 to remove the first bullet point with the information contained in 18.

CHAIRMAN BALLOU: That's correct.

MR. NOWALSKY: Okay so that would probably best be clarified as an amendment to the original motion then.

CHAIRMAN BALLOU: I concur, so let's make it that; thank you for that clarification, so motion to amend the first bullet in lieu for substituting for the entire motion, thank you. It is now a motion to amend and it only refers to the first bullet under 16; with that further discussion on the motion to amend. Nichola Meserve.

MS. MESERVE: I can't support the substitute motion. I don't feel that this Option F meets one of the main objectives of this amendment document; which is to develop a management program which ensures fair and equitable access to the fishery for all regions and gear types. Given the TAC that we have selected, this is going to redistribute a very small amount of quota to the other states, and not meet the needs that we have identified.

There has been some discussion that while we can use the Episodic Event Program to address those needs still. But as pointed out that doesn't provide for the state flexibility to manage that episodic amount as best fits the needs of the states. I can't support the substitute and support the main motion.

CHAIRMAN BALLOU: David Bush.

MR. BUSH: One of the reasons why I supported this, and let me preface it with it's no front page news that North Carolina has long had a reduction fishery until of recent years when we decided that was the route we didn't want to pursue anymore. We would most certainly like to have more poundage than we have; at least enough to make it economically feasible to pursue a bait fishery. We most certainly would love to do anything we can to get that without damaging those who depend on it on a regular basis.

We won't pursue that bait fishery at the expense of communities that rely on it. We understand that different states have different fisheries that they are heavily reliant on. We all know that North Carolina has a big fishery that we're reliant on. While we would pursue a bait fishery at almost all cost, we would not do so at the expense of other communities, other infrastructures, other states that have grown to rely on it due to the actions of this Board.

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: I want to echo Nichole's comments. I'm having a real hard time with this being equitable. What I was trying to move forward in the original motion was some sort of balance between the jurisdictions. Maine caught over 4 million pounds alone; and if my rough last year and my rough estimates, this would split between jurisdictions just under 5 million, if our math is right. I've got very big problems with this motion; and I will be opposing it.

CHAIRMAN BALLOU: Emerson Hasbrouck.

MR. HASBROUCK: I'm also opposed to this amendment. I agree with Pat and Nichola that this does not meet the goals of equitable distribution to states that don't have much quota.

CHAIRMAN BALLOU: Any other comments on the motion to amend? Seeing none; is the Board ready for the question? If so, do you need time to caucus? Let's give it a 15 second caucus, just to make sure. Okay, it looks like the Board is ready**. All in favor of the motion to amend please raise your hand, thank you. Those opposed, please raise your hand, thank you. Any null votes, any abstentions? We have two. The motion fails 1 to 15 with 2 abstentions. We're back to the main motion.** Is there any further discussion regarding the main motion? Seeing none; is the Board ready to vote on the main motion, which has three parts? There it is up on the board. This would be a vote on all three parts; the allocation methodology, the timeframe, quota transfers and quota rollovers. It would address all three components.

If the Board is ready for the question I will call it**. All in favor of the motion please raise your hand, thank you. Opposed please raise your hand, thank you; any null votes, any abstentions? We have two. The motion passes 14 to 2 with 2 abstentions.** We are moving along. Now up to, let me pause. There is a motion that was tabled. Is there any interest in bringing that back now or at any point? I guess that's a decision for the Board. Adam Nowalsky.

MR. NOWALSKY: **I would move to bring that previous motion, take it from the table.**

CHAIRMAN BALLOU: Is there a second to that motion to bring the tabled motion back? There is; it is seconded by Emerson Hasbrouck. Moved by Adam Nowalsky and seconded by Emerson Hasbrouck, to bring back the tabled motion for consideration by the Board. I forget whether this is even debatable or not.

But let's just see if there is any objection to doing that. Seeing none; that motion is back before the Board and we'll wait for Max to try to catch up and see if we can get that back up on the screen. Okay, I think we have it up. Let's just make sure we've got it correct. I know there were a couple tweaks made to it. I assume this is the motion as it stood prior to when it was tabled earlier this morning; so it's back before the Board, discussion on this motion. Emerson Hasbrouck.

MR. HASBROUCK: I have a question about process here. I generally support this motion. However, is the decision on states opting in or opting out, is that going to be brought back to the Board for decision at our February meetings, or is this going to be a staff decision or an Administrative Committee decision? How is that going to work?

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: The way it is crafted is that any quota that is not received by state is then redistributed to the other jurisdictions. I see it this is a staff effort to say this is where we are, as far as what states have requested. It goes into a pot, and then that would be automatically redistributed.

CHAIRMAN BALLOU: Emerson Hasbrouck.

MR. HASBROUCK: Thank you, yes follow up on that. I'm referring to the part that says in terms of opting in: that the states which opt in much demonstrate that the state has the intent and ability to commercially harvest some or all of its menhaden quota, et cetera, et cetera, and how it could be demonstrated et cetera. I understand the part of it just going into a common pool; but who is going to make that determination as to whether or not the states have the ability to catch their allocation if they opt in?

CHAIRMAN BALLOU: Pat, do you want to speak to that?

MR. KELIHER: I'll try, Mr. Chairman. The way I've envisioned it, maybe wrongly here, is that states would submit with their request what they have for regulations on the books

associated with that fishery. If a jurisdiction didn't have regulations on the books associated with that fishery, then they wouldn't be able to request quota associated with it. In concept that is where I was trying to go.

CHAIRMAN BALLOU: Discussion on the motion; John Clark.

MR. CLARK: Just further clarification I guess; because you have the option to opt out of the program, so you can either opt out or opt in. You have to opt in, and if you do opt in you have to prove you can catch what you're – I'm sorry if I'm repeating some of the things here. It just seems a little contradictory here, these first two lines.

CHAIRMAN BALLOU: I'll leave that open unless somebody wants to grab onto it. Next I have Steve Train.

MR. TRAIN: I like this option. The last thing we just voted on prevents rollover; which I think is a good thing. But we're talking about a highly migratory species up and down the entire east coast. Sometimes they're in some places and sometimes they aren't. We're not allowing the rollover, yet the population might be healthy.

We have some jurisdictions that might not choose to prosecute this fishery; but we've determined that the resource is healthy, and some areas may be seeing a larger abundance. To allow this to happen and go back in a general pool, I think is perfectly reasonable and a very healthy thing to do as far as the fishery goes.
CHAIRMAN BALLOU: Jim Gilmore.

MR. GILMORE: Just to go back to Pat's comment, because it made me feel a lot more comfortable with this motion. The bar would be if you have regulations in place to harvest that would be the only requirement you would need; and if that's the case, I'm completely okay with this and support the motion.

CHAIRMAN BALLOU: Pat, do you want to say that on the record, please?

MR. KELIHER: That's the intent.

CHAIRMAN BALLOU: That could be clarified in the motion. It's up to the Board to decide whether they want to try to perfect this, clarify it. But we've just had a good exchange regarding intent. Next I have Rob O'Reilly.

MR. O'REILLY: I think roughly it looks like about 43 to 44 million pounds from the last motion on the 1 percent would be allocated; and clearly that exceeds the capacity that we think we know around the table. My question is, the last motion also talked about the transferability. I'm wondering how that coupling works with the opt-in situation opt out. For example, which comes first or are they coupled together? A state may choose to opt out, and then does the state have the ability to transfer right after that?

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: There are probably a hundred different "what ifs" here. Again, the intent, jurisdiction opts in; they don't have fish within their state waters. They are not harvesting those fish. They end up with a surplus at the end of the year. The ability is for another state could request a transfer to help with any overage that might have happened within their jurisdiction. I'm trying to create some certainty up front for states that will promulgate fisheries; and the flexibility on the back end, in case they go over what their targets are.

CHAIRMAN BALLOU: Russ Allen.

MR. ALLEN: I have a few problems with this motion. One of those hits really hard at New Jersey; because we already have two species where we have quota that we do not use. One is striped bass; where we have a commercial quota, and we have as everybody knows, a

recreational program that allows some of that harvest.

But we do not reach the total harvest. The other is horseshoe crabs; where we have a quota that we do not use. I would really have a hard time if this passed; trying to defend how we don't use that horseshoe crab quota. It's really hard for me to even think about this. I can feel for Pennsylvania on that one; where they are trying to be conservative, and this doesn't let them do that.

CHAIRMAN BALLOU: Senator Miner.

SENATOR MINER: I'm trying to get, I guess a feel for the sentence that says any quota that is not received by a state would then be redistributed. Is it the intent here that that redistribution could occur either at the front end or in the back end of that given year; so it either could be used to cover overages of another jurisdiction or it could be used in the pool on the front end, to theoretically increase the quota that states might get that are still in the fishery?

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: The intent is for it to be redistributed on the front end. The ability within the last motion spoke to the ability to transfer. That would be on the back end of the fisheries.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: A couple things I guess. I apologize that on the previous motion, I just wanted to clarify for the record that our vote was based on the timeframe, not necessarily the method that was used. That timeframe was not really good for North Carolina; but it is what it is. I'm still struggling with demonstrating intent and ability to commercially harvest some or all of that quota; and I guess I'm concerned about if there are years where due to whatever. I mean we're in a hurricane belt; you know that impacts a lot of our fisheries pretty significantly, and if folks don't have the opportunity to get out there that it would impact our ability to opt in to our full allocation. I'm still struggling a little bit with that part of the decision making process. I absolutely appreciate what Pat's trying to do here; just trying to wrap my head around it.

CHAIRMAN BALLOU: I'll just say, my understanding of the way this motion reads is that there are three ways that you could demonstrate your intent and ability. One would be the issuance of permits for applicable gear types or species. The other would be via historic landings. The other would be the abundance of menhaden in state and/or federal waters. As I read this motion literally, those are the three standards that would be applied to a state's request. Dr. Duval.

DR. DUVAL: Follow up. I mean right now the timeframes for harvest that we're using in this amendment did not allow states and jurisdictions that previously had reduction fisheries to be able to. Those landings were not included in those historic timeframes; so are we going to be allowed to use that as demonstration of availability of menhaden in our waters?

CHAIRMAN BALLOU: I guess I have my interpretation; but I would rather look to the maker of the motion as to what your intent is with regard to historic landings, and how that should be applied.

MR. KELIHER: To the literal sense, historic landings. I was trying to be inclusive; as we developed this in trying to give some flexibility. It is any one or combination of those three criteria. In my mind, Maine had a reduction fishery at one time. That would come into play here if we were in the situation to want to consider the use of this.

CHAIRMAN BALLOU: I'll just challenge you; if you don't mind. Does historic in your opinion mean any time prior to, or at some fixed time prior to or during some fixed timeframe prior to?

MR. KELIHER: In my mind it is any time prior to.

CHAIRMAN BALLOU: That clarifies the intent. Andy Shiels.

MR. SHIELS: We're in a unique position; and I really appreciate Russ Allen mentioning that. This really looks extremely complicated for something that could be very simple. The question I have as almost an objective observer is what is the need for all the language? We just said what the distribution is going to be; three-quarters of a percent.

You take the total amount; somebody already calculated it, what each state should have. You divide that up, and that's what the state's quota is and you're done. There doesn't seem to be a need for a state to determine now or at the beginning of the year whether they're going to be in or out of the fishery.

If they decide, if two or three states decide to hold their quota for whatever reason, maybe because the environmental activist and encouragers and the recreational fishermen say to that state, we really don't want you to catch that full quota. We know it's available; but we would like to meet with you, and we think maybe you should only take 50 percent of the quota that's due you, because it's affecting our local waters.

That option would exist if you don't have all this language. This seems to me that it's almost like a states' rights issue that the states now are going to give up their authority to make a decision how they want to spend their marbles. We were all given 200,000 marbles or 212,000 marbles; metric tons are marbles yesterday. Today we're given 216,000 metric tons of marbles. New Hampshire might decide to keep all their marbles; or they might decide to give some of their marbles away. That should be their right that I don't think should be predetermined at the beginning. Let the state's decide how they want to spend their marbles.

CHAIRMAN BALLOU: Robert Boyles.

MR. BOYLES: I'm struggling with this. You know we've just made, if this amendment passes, if the whole amendment passes, we have just allocated 3.5 million pounds. You all have given me 3.5 million pounds, the Palmetto state 3.5 million pounds of menhaden that we don't have those fisheries developed. I think that is clearly a policy call.

That is a motion that passed; and if the amendment passes that will be our operating stance. I appreciate the intent of the motion, you know as one of the states with really not a dog in this fight. I appreciate the intent of the motion to perhaps soften the blow or to ease the impact of the entire amendment, whatever we pass here today.

At the same time, I struggle with the whole idea. I should have prefaced this at the beginning. It is my full intent that we will have biological/ecological reference points; which will first determine how many fish we're going to leave in the water. This is I think I've described to a number of you, at its essence an allocation amendment.

The first order question is how much to leave in the water. I think we've committed to that through our actions yesterday and today and through the intent of the amendment. Once we've determined what that level of ecosystem services is, then the real question is how are we going to split this portion of the pie that we take out of the oven to eat?

I struggle. You know South Carolina just has no capacity for 3.5 million pounds of menhaden at three-quarters of a percent. I'm certainly willing to play ball for the good of the cause in

implementing this policy of managing these species for ecological services; as well as supporting a bait and a reduction fishery.

But I struggle with this. I don't know that the Commission, I would look to staff, is this precedent setting, in terms of giving a state a share of the pie that we have absolutely no intention of using? That is another policy call that I'm just struggling with. I've enjoyed the conversation. Let me rephrase that. I'm learning a lot through the conversation; and will continue to grapple with it.

CHAIRMAN BALLOU: I do know you asked a question. We'll see if we can get a staff response to that. But I'll next go to Ritchie White.

MR.WHITE: I support this and I'll give you the example of how this will affect New Hampshire; and how I see this working. Presently we have negligible landings. We also have a large purse seine vessel that lands millions of pounds of herring in New Hampshire annually. This year they talked about landing mixed loads of herring and menhaden.

It didn't happen this year. They also talked about additional availability of menhaden showing up; and they may want to land total loads of menhaden, and they come in at 400,000 pounds a trip. This would allow us to, we would opt in, and I'm just guessing, maybe a million and a half pounds. Put the balance right out of the gate into the pool; and see how it went for a few years. Maybe we would opt out of all of it in the future; if that vessel stopped landing in New Hampshire. But this gives the flexibility of us not being in a position where we would have to lock a fishery out; having no quota that we presently have. I think that is a fairness issue.

I also support this; because I think this is the compromise originally in the 216,000 metric tons that I was talking about. This gives each state a chance at a fishery; and this fishery is changing, so we need some ability for states that haven't been fishing in recent times to have a chance to fish now. But it also puts back into the pool the fish that aren't used.

That gives the ability to try to make some state whole that may not be whole; with the use of the three-quarters of a percent going to the new states. I think that is the compromise; this balances it. I understand the angst of Pennsylvania. New Hampshire doesn't use their small, commercial striped bass quota either.

But I think looking at this in its entirety; and thinking about it in a compromised situation, and how without doing it this way maybe the 220,000 metric tons was a fairer target. That was my thinking in this whole process; starting with the 216. I hope the states will consider that approach to this and support it.

CHAIRMAN BALLOU: Toni Kerns, could you take a crack at answering Robert Boyles' question; which as I understood it was whether there is any precedent for an approach like this with regard to any other FMP that involves state-by-state allocation? Robert is involved in a sidebar right now; so hold on that Toni. I'll come back to you; because I want to make sure Robert's focused. Adam Nowalsky, you're next.

MR. NOWALSKY: I see this motion as having two relevant parts that we're discussing; one is the element of opting out, and being able to redistribute that to states that may need or want it. The second element of this is this opt-in provision which forces states, in my opinion, to demonstrate the intent to use their quota and if not, a sense that it would be taken from them without their consent.

That gives me trouble; and I hear that concern from some other members around the Board here as well, both in terms of how it might impact other species, precedent setting et cetera. I'm going to make a motion to substitute, Mr. Chairman. I believe it's going to include a number of these terms, so maybe

staff just wants to start with cut and pasting. I'll go along here with it.

My motion to substitute is: at the start of each fishing year and no later than January 31st, states may declare if they want to opt-out of the fixed minimum program. States, do you want me to just read the whole thing or just let staff go along with me and read as it comes up on the board?

MS. KERNS: Adam, do you have it on a piece of paper or no?

MR. NOWALSKY: I can come up there and give it to you if you would like.

MS. KERNS: You can read it into the record; and then if you could just come up and help us get it up on the screen appropriately.

MR. NOWALSKY: That would be fine. At the start of each fishing year and no later than January 31st, states may declare if they want to opt out of the fixed minimum program. States may declare if they have the option, and decline their fixed minimum allocation or maintain 10,000 pounds for bycatch purposes, and to decline the remainder of the quota.

If a jurisdiction declines its full allocation, it must identify the amount they do not wish to receive. Any quota that is not received by a state is redistributed to the other jurisdictions based on historic landings from the time period selected. Essentially what I'm doing is removing the requirements for opting in; and focusing on opt out entirely.

CHAIRMAN BALLOU: Let's do this. The Board will be at ease for five minutes as we get that motion up on the board.

MR. NOWALSKY: I think a lot of people want to take the break; but it's pretty darn close with what's up there.

CHAIRMAN BALLOU: We'll take a five minute break; just to get this motion up, and then we'll pick up right where we left off, starting with is there a second to the motion.

(Whereupon a recess was taken.)

CHAIRMAN BALLOU: I would like to resume; and I would like to go back to Adam to first ensure that the motion he has up is accurate, in terms of what he intends. Then I am going to see if there is a second. Then I'm going to allow Adam to speak to it, and then I'm going to allow. I'm sorry; I'm getting ahead of myself. Let's just stop right there. Adam, is this the motion you would like to make with regard to the wording that's up on the board right now?

MR. NOWALSKY: With a nod of great thanks to staff, yes it is. Would you like me to reread it at this point?

CHAIRMAN BALLOU: Please do.

MR. NOWALSKY: Move to substitute that "at the start of each fishing year and no later than January 31st, states may declare if they want to opt out of the fixed-minimum program. States may declare to opt out of the program and decline their fixed-minimum allocation, or maintain 10,000 pounds for bycatch purposes and decline the remainder of their quota.

If a jurisdiction declines its full allocation, it must specifically identify the amount they do not wish to receive. Any quota that is not received by a state is redistributed to the other jurisdictions; based on historic landings from the time period selected by the Board in this Amendment."

CHAIRMAN BALLOU: Is there a second to that motion? Dr. Duval seconds the motion; so the motion has been made and seconded, and Adam I'll go to you first to have you speak to it. Then I have some thoughts about some public input on this.

MR. NOWALSKY: First let me identify what is different about this with regards to what already exists in the draft amendment; the specific language with Option C. This includes more specificity in two areas. One, it provides the specificity of the date by which this declaration needs to occur; and two, it provides the specificity of what would happen to that quota that is not utilized by individual states. The draft amendment is silent on what occurs right now. This specifically lays that out through the last sentence.

This issue of fixed minimum is a bit of a difficult one; because essentially what we're doing is taking fish that states have had historical allocations of, historical use, and saying we're making a unilateral decision to hand it out, essentially. That is a tough pill. If it is the intent of the Board; as the original motion did, to force states to prove that they can use those fish.

Then I would say that that whole fixed-minimum approach is flawed, and that we as a Board should go back and reconsider it. But if that is in fact the decision that we're making that we're going to go down that road; then to go ahead and put the requirement on those states to say and oh by the way. Even though we decided to give it to you, if you can't show we're going to use it we're going to take it back; that is even more flawed, and I can't support that. That is my justification for this motion to substitute.

CHAIRMAN BALLOU: Because both this substitute motion and the main motion, which addressed the issue of we'll call it opt-in versus opt-out lend a lot of specificity with regard to the provision that was only set forth in the amendment in general terms. I'm going to allow some public input on this.

But it really needs to be specific to the issue before the Board right now on opt-in versus opt-out. Is there anyone from the public who would like to address the Board on either the main or substitute motion? I see two hands; and I'll go first to the gentleman approaching the microphone. Thank you. Could you please introduce yourself?

MR. MONTY DEIHL: Thank you, Mr. Chairman, Monty Diehl from Omega Protein. If my math is correct, did it on my phone in the back. I just witnessed the Board vote for about an 8 percent increase in the overall TAC because of the health of the stock and how well it's doing; and in fact some argued that it could have been raised much more.

But based on this motion, again we could probably ask staff for clarification. It essentially means about an 8 to 10 percent reduction for Virginia; in Virginia's harvest from this year. For me that's laying off a lot of people from work. It even means now I have assets that I no longer need. Should I go to a state who I've heard around the table saying they want to grow an industry, they want to build an industry?

Do I now need to go and try to sell vessels, sell equipment, and even maybe barter labor to those states to grow something on the backs of people who have been doing this, like mine, for five generations? I can't even believe what I hear; I honestly can't. It also completely changes the mix, the supply and demand mix.

I'm not in the bait market. But it completely changes the supply and demand mix for bait; because you're now taking fish that had been used for reduction and not on the bait market, and you're moving millions and millions of pounds of those into the bait market, and you have industries, bait industries who have built again for many, many generations to build up a business. Now they're going to compete in a flooded bait market. I don't know if that's even being considered here. But I just wanted to point that out. From a Virginia standpoint, from a taxpayer in Virginia standpoint, and from a very large employer who represents an awful lot of people, this is not going in a very good direction. Thank you, Mr. Chairman.

CHAIRMAN BALLOU: Thank you, is there anyone else who would like to address the Board? Yes, sir.

MR. JEFF REICHLE: Thank you, Mr. Chairman, Jeff Reichle from Lunds Fisheries. Yes, I would like to echo a lot of what Monty just said; and just say that what I've seen happen today has totally destroyed what I understand fishery management to be. For the most part, fisheries have always been managed and allocated based on history and recency; and that was completely thrown out the window today.

You know there are a couple states that have history; recent history and history going way back. What you've basically done today is done a total reallocation to other states. If that stands, then I do not agree with this amendment. I think I agree with the original motion, so that we have the opportunity to get some of the quota that has been taken from us for no good reason back. Thank you.

CHAIRMAN BALLOU: Yes sir, in the back. If there is anyone else would like to speak, please come forward and be ready to take the microphone. I don't see any other hands up; but I just want to move on after this. Thank you.

MR. JIMMY KELLUM: Jimmy Kellum; from Virginia. My company is Kellum Maritime; we fish for bait and for reduction, and sell to Omega. I appreciate what Adam is trying to do here; but this doesn't fix the fact that we just transferred 301,000 bushels from reduction to bait. Do you have any idea what that is going to do to the bait industry?

The bait industry will collapse; based on what we've done in the last hour. This doesn't fix what we've done. We need to go backwards and say, we made a serious mistake here, because we have made a mistake. We have pillaged New Jersey and Virginia; on the theory that some other states may establish a bait business. I'm on the AP Committee, and they'll tell you I was all in favor of the four states getting more quota, but not to this degree. We need to rethink this. Thank you.

CHAIRMAN BALLOU: Thank you very much for those comments; one last comment, thank you.

MR. A. J. ERSKINE: My name is A.J. Erskine; I'm with Mid-Atlantic Bait in Virginia. I agree with the previous comments. I disagree with this amendment. I think we did make a mistake with the fixed minimum. We are talking about economically changing the bait market drastically; so we're opposed.

CHAIRMAN BALLOU: Thank you, so now I would like to go back to the Board for comments on this motion to substitute. I had four names that were already in queue; and I'm just going to go right through those to see if they would like to speak on the substitute motion, starting with Cheri Patterson.

MS. PATTERSON: Ritchie covered what I was going to say, thank you.

CHAIRMAN BALLOU: Colleen Giannini.

MS. GIANNINI: I was looking for just some confirmation on Pat's original motion; that a state's decision to opt in and then subsequent declaration for the amount of quota it would like in that year, wouldn't be affected in subsequent years.

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: Correct, it would be an annual decision by the state.

MS. GIANNINI: Okay, and then just a quick follow up, I guess just a comment in this. I think that this motion here that Adam has up, I think it could be maybe a lot simpler, and I don't know if it would work better just to simply end that states may declare to opt out of the program and decline their fixed minimum

allocation, and not necessarily have to have a 10,000 pound for bycatch purpose in there.

CHAIRMAN BALLOU: Duly noted. Next I have Rob O'Reilly.

MR. O'REILLY: Certainly the speakers from the public, I certainly echo what they have to say from Virginia. I do think that there was a mistake earlier on; and you know it's too late in one way. The 220,000 metric tons would have solved some of these problems, and we could have gotten away from the fixed minimum that I've talked about a couple of times, as to what the ramifications and repercussions will be from that.

I don't really think that making a situation like this more palatable is something that we should avoid. I think we should try and do that. I've been hearing making certain states whole; although, and I don't take any offense at all. I did hear Ritchie White say, but maybe we don't have to make them whole.

But clearly, we need to be a little more careful about what we're doing. I see what's up on the board, and no disrespect to Pat or to Adam, I see it as a contrivance. I see it as an outfall of having not thought through some of the decisions that we made. I can't support it; and I regret that we didn't make some earlier decisions that maybe wouldn't get us in this place.

If I look across the table at New Jersey, I see their workforce diminishing; if I think of Virginia, our workforce diminishing. I mean how many things can we add on to our lives in the states that we have to monitor and keep sacred; when we don't need to start doing that and we shouldn't have started doing this on this situation. It was fixable earlier on.

CHAIRMAN BALLOU: Nichola Meserve.

MS. MESERVE: I prefer the initial motion to this substitute. The purpose of the reallocation option that we selected was to meet the needs of more states for their commercial fisheries; and allocating 3.5 million pounds to a state without a fishery runs counter to that objective. For consistency purposes, I think we need to look at that objective when it comes to this motion as well. ASMFC does have a long-held practice; I guess I would call it, of allowing states to be more conservative than the requirements. But I don't think that that has normally come at the disadvantage to other states, and that is what the initial motion was trying to address in some part. I don't support the substitute.

CHAIRMAN BALLOU: Toni Kerns, did you have something you wanted to add?

MS. KERNS: Just for clarification. The first two sentences are sort of in opposition of each other here in the motion; because the first one says you can declare to opt out and decline all of your allocation or maintain just the 10,000 pounds. But then the second sentence says if a jurisdiction declines its full amount it must specify the amount that they don't wish to receive.

I think if a state wanted to keep part of the allocation, you could just say states may declare to opt out of the program and decline all or part of their fixed minimum, instead of restricting it to just being able to keep 10,000 pounds. Does that make sense, Adam? Do you see where I'm thinking the two sentences may go against each other?

CHAIRMAN BALLOU: I do believe I see your point. Adam, do you want to speak to that?

MR. NOWALSKY: Your suggestion would be to remove the "or maintain 10,000 pounds through the period?"

MS. KERNS: Yes, if that is the intention yes; but also say decline all or part of your fixed minimum, so it allows the state to determine what is being declined. If they want to keep

half, then they can still keep half. If that is what your intention was here.

MR. NOWALSKY: My intention is definitely to allow states to choose the portion they wish to decline; so I'll leave it up to the discretion of staff and the Chair whether having that information on the record is sufficient, or if they have word smithing they would like to offer.

CHAIRMAN BALLOU: I believe staff is undertaking word smithing. Let's see if we can get it to a point that would comport with your intent, Adam.

MR. NOWALSKY: I have no objection to how it's being modified pending the final result.

CHAIRMAN BALLOU: Let's read back into the record where this motion now stands as amended. Move to substitute that at the start of each fishing year and no later than January 31st; states may declare if they want to opt-out of the fixed minimum program. States may declare to opt-out of the program and decline all or part of their fixed minimum allocation.

If a jurisdiction declines part of their allocation it must specifically identify the amount they do not wish to receive. Any quota that is not received by a state is redistributed to the other jurisdictions based on historic landings from the time-period selected by the Board in this Amendment. Adam, does that meet with your intent?

MR. NOWALSKY: Yes, thank you.

CHAIRMAN BALLOU: Is there any objection from the Board to modifying the motion as now written? Seeing no objection that change has been accepted and the motion stands as it does; further discussion on the motion, Doug Brady.

MR. BRADY: I'm trying to get my arms around this motion versus the prior motion; and I guess I'll direct the question to maybe Robert Boyles in the case of maybe South Carolina. The language in the prior motion dealing with the intent and the ability to demonstrate that you can harvest your quota that's allocated, if that one passed South Carolina has no, I mean there are states that have nothing in the regulations that allow them to do that. Obviously they could pass things.

Would by default South Carolina automatically give up their quota; because they don't have anything in place to show intent or ability to harvest? Under this motion, all the states can for whatever reasons just say we're not going to opt out; we're just not going to opt out, and therefore we'll keep out quota to do whatever we want to with it.

Under the prior motion, some states that don't have a fishery at the present, by default would not get their quota. Do you understand what I'm trying to? I think from what was said at the public comment, the concern may be that under this provision it's just so easy to take quota that is not going to be utilized, or negotiated in other ways.

But it penalizes potentially severely the states that are getting less of a quota by what we're doing by the 75 or the three-quarter percent. But Robert, I would just ask you that. Did you read the first motion to say by default that if that one passed that South Carolina would not get any quota? Do you follow my question?

CHAIRMAN BALLOU: Robert, it's your call as to whether you feel like you want to respond to that or not.

MR. BOYLES: I think what our particular situation is, to answer Doug's question, is the gear that would process menhaden is unlawful in South Carolina, outlawed by the Legislature years ago, nothing to say that a processor couldn't fish federal waters, if the fish were there. For instance, we don't have the processing capacity necessarily. Not to say that it couldn't develop. Doug, I'm not sure if that

answers your question; but that is kind of where we are in South Carolina.

CHAIRMAN BALLOU: Let's leave that one there for now and circle back if need be. Loren Lustig.

MR. LUSTIG: I will be brief. With my new found skills for word smithing, I would like to thank Ritchie White for reminding us of the benefits of compromise. If we dig in our heels there is going to be plenty of blood on the floor all around the table. I'm in favor of compromise. The gentleman who just spoke from Lund Fisheries reminded us of the importance of history. I was a history major in college. I understand history. If I was to choose a historic date to hearken back to, it would be the famous voyage of Captain John Smith in the Chesapeake. All right that is the date I would like to use as a baseline.

CHAIRMAN BALLOU: Senator Miner.

SENATOR MINER: The word "may" says to me that we may not need any of this language at all; either in the original motion, which would be 18 or 19. What this does in my view is changes an allocation from currency, which it is under the original what's been passed so far, 216,000 metric tons to a non-currency, because it automatically goes back to the Board for reallocation.

From a state's rights perspective, it seems to me that I would want Connecticut to have this allocation as a currency. It may very well be that we could choose to transfer it. But my read of this is that by making the declaration to opt out of the program, we devalue that currency. It automatically goes back into the pool.

I don't know what state would actually do that; and therefore that goes to my question of why do we even need either one of these? I understand the original intent of the original motion; which was try to set that base number as low as possible, and create a feeling that for those states that were harmed in this redistribution process, there was some mechanism to get it back.

But I would suggest that the state of Connecticut could still enter into an agreement with the state of Virginia or the state of New Jersey to redistribute our allocation in the form of currency back to one of those states, should we choose to do it, without either of these motions. I'm probably inclined not to support either one of them.

CHAIRMAN BALLOU: I think it is a very good time to remind the Board that the amendment right now has a specific provision addressing this issue; which would be changed by either of these motions. Let's just say for the sake of discussion, neither of these motions passed. The default would be the following.

Should a jurisdiction desire to forego the fixed-minimum quota it has been allocated, it may on an annual basis choose to decline its quota completely, or maintain 10,000 pounds for bycatch purposes, and decline the remainder of the quota. Quota which is relinquished by the states will be redistributed to the other jurisdictions.

Should a state choose to relinquish its annual quota, the Commission must be notified through the Annual Compliance Report process. I just want to make it clear that that is what the amendment currently says with regard to the allocation method that's already been adopted. These motions seek to tweak that, change that, and modify it. Eric Reid.

MR. REID: I just want some clarification. Mr. Keliher's original motion had two other portions in it. Are those two other portions still in play in this?

CHAIRMAN BALLOU: I'm going to have Megan answer it.

MS. WARE: I don't believe so. But I would look to the maker of the motion to clarify that.

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: Because this is a motion to substitute, I don't believe that would be the case. I think this would completely replace my motion.

CHAIRMAN BALLOU: We have that now on the record. David Borden.

MR. BORDEN: I would just like to go back to the point that you made about the language in the document; and just remind everybody of what Ritchie White pointed out, and I thought it was a good example of how the mechanism would work. If the state of New Hampshire has a herring fishery that's taking place, and they need for the sake of argument 400,000 pounds of menhaden, in order to eliminate the bycatch and regulatory discards.

They would have the option of selecting 400,000 pounds. I don't think the state of New Hampshire wants to have a directed fishery. I don't think it may necessarily, and this is my read, but they would like the opportunity to select a number above 10,000 pounds so that they could eliminate bycatch. I just remind everybody of that. This system doesn't work very well when we promote regulatory discards. But I think there is a lot of merit in what Ritchie said before.

CHAIRMAN BALLOU: Any further discussion on the motion to substitute; David Bush and then Dr. Duval?

MR. BUSH: I'm glad you let me go first; because I can never follow her. She's a tough act, right? I'm still wading through this and there are a lot of different things that could happen from this. Now in my mind, and it may be different for some folks, but we've achieved our conservatory effect by the overall TAC that we put into place.

What the original motion in my mind would do, although the dates is something that I would question, would be to make states actively pursue their catch, and if they are not going to or can't demonstrate that they can, then that puts it back into play for everybody else. That doesn't mean that say North Carolina is going to come up the Potomac River and start fishing for menhaden.

But the overall quota itself has already accounted for the conservatory hopes that we want to achieve here. Again, I'm sort of trying to walk my way through this. In my mind I would think that maybe the first motion would be something to maybe take a little bit of the sting out of the initial cut that we already had. Again, I'm sure I'll learn more before we get done here.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: I seconded the motion for purposes of discussion. I think it's been very robust; and I really appreciate the public comment, and I appreciate what Adam was trying to do, in terms of I guess providing some assurance to states. But I also hear that the previous motion would actually provide more assurance of making certain that the quota that is available is available to those areas that actually need it. I appreciate what Adam was going to try to do, but I think I'm actually not going to support the substitute motion based on the public comments.

CHAIRMAN BALLOU: I echo the comment just made that we've had a robust discussion; and I'm going to take that as a queue to call the question. With that 30 second caucus and then we'll vote on the motion to substitute. Okay, I'm going to call the question. All in favor of the motion to substitute please raise your hand.

Hands down, all opposed please raise your hand; thank you, any null votes, any abstention? There are two. The motion fails 2 to 14 with two abstentions. We're back to the

main motion and after Max catches up, we'll put that back up on the board. Is there any further discussion on this main motion? John Clark.

MR. CLARK: I'm sorry to keep coming back, but the intent of this is to put it on the states that this fixed minimum is much more than most states will use. A state would have to actually state early in the year that they are going to use what they get; and if not, it automatically goes back into the pool to be redistributed.

Obviously from the concerns that were brought up by the public, this would have to be done in a very timely manner. Do we need to have more details in this motion, or do we need to further specify how we are going to reallocate unused, fixed minimum quota from these states?

CHAIRMAN BALLOU: I think the motion is quite detailed and quite clear on that; but I'll look to other Board members to see if they feel a need for additional clarity. David Borden.

MR. BORDEN: To John's question. My read is slightly different here, and I think it's pretty explicit in the motion. If Delaware didn't need their full allocation, they could request any amount up to the full allocation. But that is up to the state of Delaware.

MR. CLARK: I get that Dave. I'm just saying, the fact is I could for whatever reason say I want the full 0.75 percent of the quota, and not get anywhere near that. Then it doesn't get reallocated; to me that is a real problem. Because we have enough quota that is being taken from Virginia and New Jersey; that if enough states did what I just said that reallocation wouldn't happen in a timely enough manner to help those fisheries catch. As with many states, we're dependent on those states to provide bait for our crab fishery and for other fisheries. This is a big question is how this is going to work.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: I think to John's point. You know the motion that we passed previously included the transfer provision. I think I would look to that to ensure that quota is available to be used. I mean I know that North Carolina this past year was approached by several states earlier, actually pretty early in the year to see if we might be able to transfer some of our quota to them, to alleviate the issue of an abundance of menhaden that they were encountering off their waters. I would hope that that transfer provision would be utilized in that situation.

MR. CLARK: Well transfers are voluntary. All I'm saying is I'm just giving a worse-case scenario here is that a state could take the minimum, not transfer it, and we would have problems in the fishery. That is the only reason I wanted to see more specific language.

CHAIRMAN BALLOU: Good exchange; any further discussion on the motion? Seeing none; is the Board ready. Does the Board need time to caucus? David Borden, one minute caucus. Yes, one minute caucus and then we'll vote on this main motion. Okay, is the Board ready for the question? I see some caucusing still going on. Now it looks like it is ending.

Okay, all in favor of the motion please raise your hand; thank you. Those opposed please raise your hand; thank you, null votes, abstentions, two. Robert.

MR. BOYLES: Mr. Chairman, a motion to recess please.

CHAIRMAN BALLOU: First we need to clarify the vote; because I think we may have missed one, so I am going to ask for a recount, because I think our math came our wrong here, so let's make sure we get this right**. Those in favor of the motion please raise your hand and keep them up; thank you. Those opposed please raise your hand; thank you. The motion fails 7 to 9 with two abstentions.** The request to

recess could be coupled with a lunch break. Are we at that point, Robert, or were you looking for something shorter term?

MR. BOYLES: That was my intent, yes sir.

CHAIRMAN BALLOU: Let's break for lunch, and Toni, what time do we want to reconvene, or Bob?

MS. KERNS: Let's reconvene at 1:00 p.m. please.

CHAIRMAN BALLOU: We will reconvene at 1:00 p.m.; enjoy your lunch, thank you.

(Whereupon a recess was taken.)

PROCEEDINGS OF THE FIRST FEW MINUTES OF THE BOARD RECONVENING ARE UNAVAILABLE. IT IS CLEAR FROM THE MOTIONS THAT MR. BOYLES MADE THE FOLLOWING MOTION WHICH WAS SECONDED BY MR. MILLER.

Move to reconsider the allocation method.

MR. BORDEN: I would just ask Robert if he could provide us with a little bit of insight on where he wants to go with this.

CHAIRMAN BALLOU: Well, I think that's the second part. First is whether the Board feels comfortable bringing this motion back before the Board. Then I think Robert will have the opportunity to speak of how he may wish to subject it to reconsideration. I believe it's a two-part process, but I look to the Board for input on that. I see two hands. Adam Nowalsky.

MR. NOWALSKY: I believe because the original motion also included the two bullet points, and they were packaged together. I don't think we can just reconsider part of it. I understand that's the element we're looking to change. But I think we would be looking to reconsider that entirety of the motion.

Then once that's on the floor again, we would decide what else we were going to do. But I believe that's what we would be looking at; including the rollover and transfer provision we would be reconsidering as part of one reconsideration.

CHAIRMAN BALLOU: I totally concur with that. It would be the full motion back before the Board; which can then be addressed in however way the Board would like to. Is there any further discussion on the motion to reconsider? Emerson Hasbrouck.

MR. HASBROUCK: We had quite an extensive debate and discussion around that issue this morning; that went on for an extended period of time. I don't know why we need to revisit it; but maybe that will come out in the debate about, if it is brought back to the floor. I'm just concerned. We had a significant discussion this morning. I think we beat it to death pretty well.

CHAIRMAN BALLOU: Understood. Ray Kane.

MR. KANE: To reconsider, are we going to need two-thirds? No.

CHAIRMAN BALLOU: Majority vote. Is there any further discussion on the motion; Dennis Abbott?

MR. ABBOTT: Going along with what Emerson said. Surely we had plenty of discussion; and we reached some decisions. Like anything else, I think that when you do something and it advantages someone, there is probably someone else that is going to be disadvantaged. Apparently, not apparently that is what the feeling is with a number of people here.

Well at some point we have to make decisions and live by them. It just seems unseemly to have made a decision an hour and a half ago, and already we can't live with it. With due respect to Mr. Boyles, who I know is trying to do the right thing as Robert does a lot, he tries to make sure that everybody leaves the table

happy. Again, it's not going to happen. There is always displeasure with our decisions. We surely spent enough time this morning making a tough decision. I think that we should not reconsider and move along with our agenda.

CHAIRMAN BALLOU: Dave Bush.

MR. BUSH: Very briefly. I sat here while I watched quite a bit of folks skip lunch; folks that were on both the winning and losing sides working towards the middle, which I believe was the ultimate goal, not necessarily just the process for the sake of the process but an outcome we can all live with. I would certainly be in favor of hearing further discussion, if we can make this something that works for everyone.

CHAIRMAN BALLOU: Any further discussion on the motion to reconsider? Loren Lustig.

MR. LUSTIG: Just before you reconvened the meeting, I was speaking to my wife, Louise, and she said well when is the meeting supposed to be over? I said Louise, it's supposed to be over at 6:00 p.m. but it would not surprise me, since we're talking about the bottom line that I might be here until 9:00 or whenever. I agree with what I've heard around the table here. Sometimes long discussions sort of just overwhelm me. This is too important to sort of give it short shrift.

CHAIRMAN BALLOU: Any further discussion on the motion. Seeing none; is the Board ready for the question? Is there any need to caucus; a 30 second caucus? Okay, I'm going to call the question**. All in favor of the move to reconsider the allocation method please raise your hand, thank you. Those opposed please raise your hand, thank you. Are there any null votes, any abstentions? The motion passes 11 to 7; which means the motion is now back before the Board for consideration.** Robert Boyles.

MR. BOYLES: Thank you, good discussion and I agree; we'll try not to belabor this. My quote from Dr. Franklin, please, "For having lived long, I have experienced many instances of being obliged by better information or fuller consideration, to change opinions even on important subjects, which I once thought right but found to be otherwise. It is therefore that the older I grow, the more apt I am to doubt my own judgment, and to pay more respect to the judgment of others." Having said that Mr. Chairman, I'm reminded that being a guy from South Carolina; we know something about state's rights. We know something about public trust resource management; and it is very much my intention that we have a durable outcome as a result of our deliberations here today, and as we move forward with the implementation of the Amendment.

Let me be blunt. I think it's important that we all have something that we can live with; that we can go home with and say we've done our level best to be good stewards of our resources, good stewards of the trust that is given to us by our constituents, and in fact good stewards of the authority under which we are operating.

I'm concerned with my seatmate here Dr. Rhodes' comment referencing the Hippocratic Oath earlier that we might have jumped a little too quickly earlier today. Clearly there are allocations; very, very difficult issues associated with allocation. I have a new motion I would like to make that is up on the board.

If the Board will indulge me in it I will read it; and I think you will find that this is – fairness and equity are in the eye of the beholder – I think it's important that we do our level best to bring everyone along that we don't lose sight of the prize here. I think, Mr. Chairman, when I was sitting in your seat I suggested to the Board that this was a great big allocation amendment.

The first order question is how much do we leave in the water. I spoke to that issue yesterday. I won't revisit that in terms of

reference points. But I think it's important for the good of the cause. I think it's important for the commitment that the states made in 1942, when we were a little distracted with global events that there is more to be gained by cooperating and remaining committed to one another than by going it alone.

It is within that spirit that I offer this motion. **I would move to select Allocation Method Option C, a jurisdictional allocation with a fixed minimum with a 0.5 percent fixed minimum and the allocation timeframe 2009-2011. I would also move that we include incidental catch and small-scale fisheries Option B, modified to include purse seine smaller than 150 fathoms long by 8 fathom deep would be considered small scale gear, and episodic events Option A, with the 1 percent set aside. If I get a second, I'll explain further.**

CHAIRMAN BALLOU: Is there a second to the motion; seconded by Dave Bush? Moved and seconded to move this sort of three-part motion. Before I go to the Board for questions, Robert I would ask you. With regard to the motion that this is intended to replace, the motion that it would replace addressed transfers and rollovers, I believe. What is your intent with regard to those issues with this new motion?

MR. BOYLES: With the intent of transfers. My intent quite frankly, Mr. Chairman, as a state with no landings history, with no fishery that we would be prepared to contribute our share to be able to transfer that perhaps to the episodic events set aside, to bump up that number, to take into account the interest of those brethren along the northern coast. Also that would be available for transfer to other jurisdictions that may have overages.

CHAIRMAN BALLOU: If I might; just to make it clear. Is your intent to modify at all the prior decision made by the Board; with regard to allowing for transfers but not allowing for rollover? I believe those were the two key aspects of the prior motion.

MR. BOYLES: Yes sir, Mr. Chairman. Thank you for clarifying that. That is my intent.

CHAIRMAN BALLOU: I guess we might want to think about whether we need to wrap those into this motion or not. I'll just sort of leave that hanging for a moment; to make sure that we've got the full mix before us. If this is to substitute in full, it looks like staff is already doing that as I speak, so how about that.

I think what Max has just done, if I'm not mistaken, I'm doing this on the fly here is added back in the two provisions from the original motion addressing transfers and rollovers. This sort of augments this motion now by incorporating those in. Robert is this consistent with your intent.

MR. BOYLES: Yes sir, Mr. Chairman. I would give a shout out to staff over lunch. They did provide a table that reflects what the current allocation is on the far right hand side of the page; and what is contemplated in this motion is in the far left hand column with the 2009-2011 TAC. I believe that has been distributed. I believe.

CHAIRMAN BALLOU: I believe you're right; and with that I will open the floor to questions or comments on the motion, starting with Adam Nowalsky.

MR. NOWALSKY: I appreciate the comment about a willingness to redistribute some of that unused quota. We had the conversation earlier this morning about the language that is currently in the Draft Amendment not being explicit in how that redistribution would occur. With this motion, how do you propose to move forward with that redistribution? How would it actually occur?

CHAIRMAN BALLOU: I think staff is prepared to address it; unless Robert, you want to jump in. All right, Megan.

MS. WARE: There are kind of two ways we could do that. We could do a separate motion to provide clarity on that; and maybe use some of the language from your motion before, if you would like to do that or if you would like to make an amendment or a friendly amendment, I would ask Robert Boyles to add in that sentence that said it is redistributed based on the timeframe selected by the Board. Then that's up to you guys.

CHAIRMAN BALLOU: As Adam mulls over that and other Board members as well, I'll go to Andy Shiels.

MR. SHIELS: This may surprise everybody, including myself in the room. But I support this motion. The reason I do is because I was under the understanding, mistakenly on my part that when we were talking about this earlier today. At the three-quarter percent fixed minimum that the states that did not have quota were getting quota, and Maryland and Virginia were unchanged. I was incorrect. When I found out that it was a half percent that's what I intended, sitting around the table.

I did not want to bring harm to Virginia or North Carolina, when the most important thing was a very modest increase of the total allowable catch.

Within that modest increase, the other states get an opportunity to fish. We argued back and forth whether Pennsylvania does or South Carolina will or will not prosecute that.

But I did not feel good about that as we left the room. I'm glad that somebody else brought it up. I do not prefer an alternative approach where we raise the TAC to provide this room. I think this is the right approach. I think Maryland and Virginia roughly stay the same. The other states get the benefit, a fishery that they didn't have in the recent past, and so I support this motion.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: Thank you, Robert for bringing this forward, and I know several of you have been diligently trying to think of a little improvement. Sometimes when we do get involved in something that has so many layers, it is difficult to keep everything in mind. Andy, I think you're right. I think that it was quite a difference earlier with the way things were with the 0.75 fixed minimum compared to this, which is like about a 0.5 percent increase for Virginia.

I still don't know how all of this settles out. I mean you've heard this before, but the agency I work for really has very little to do with management of menhaden. It's the General Assembly that manages menhaden; and Senator Richard Stuart, who is a member of this Commission, and is also an attorney, sent a letter to the Commission and he really was somewhat critical, but on the fixed minimum especially.

He really questioned that if it was not illegal it certainly was inequitable and unjust, where there could possibly be horse trading of quotas. I think we've addressed that a lot before lunch; and wanting a method that that cannot happen. This is a big improvement. I do appreciate it; and so thank you for the time.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: Yes, I am supportive of what Robert is trying to do and reconsider, and do no harm here, and try to find the most equitable approach for everyone sitting around the table. I guess the concern that I have is with the Section 4.3.5 Option B, the incidental catch and small scale fisheries. Those harvests would not be counted towards the TAC under that option. Is that the intent?

CHAIRMAN BALLOU: I was having a sidebar, I'm sorry. If you could restate the question or maybe if somebody is ready to answer it. I missed it, I'm sorry.

DR. DUVAL: The motion on the board under Section 4.3.5, Incidental Catch and Small Scale Fisheries, Option B; under that option incidental catch does not count towards the TAC. I just wanted it clarified if that was the intent, to not have that catch count against the TAC.

MS. WARE: It is correct that that option does not count incidental catch towards the TAC.

CHAIRMAN BALLOU: Thank you, and my apologies for not following along. Additional comments on the motion. Emerson Hasbrouck.

MR. HASBROUCK: I'm a little confused here; in terms of proceeding under episodic events. I thought I heard the maker of the motion say something about discussing episodic events under that separate category. Is that not true, or does this motion take care of whatever we need to do under episodic events?

CHAIRMAN BALLOU: Well, I'll certainly let the speaker address that issue; but my take is this is addressing episodic events. I see the maker nodding in the affirmative; so that is the intent of the motion, to address episodic events among other things, additional discussion, Russ Allen.

MR. ALLEN: I'm not totally enthralled with this motion; but I see that there is a lot of work behind it to get it to where it needs to be. I'm having a hard time supporting it; but I'm as Rob said, real pleased that we're all working together on this to try to make it work for everyone. We already made half our constituents ticked off when we were doing certain things on this; and this will probably tick off the rest of them. I think this may end up being a best way forward; because I don't have a solution after this.

CHAIRMAN BALLOU: Yes, John Clark.

MR. CLARK: I'm just a little concerned about the allocation method here again. Once again we're allocating a large amount of quota to states that have not fished it, will not fish it. It just seems very inefficient. I think there has got to be better ways; and I thought I heard some discussed earlier that we could use, rather than going with this fixed minimum.

CHAIRMAN BALLOU: Nichola Meserve.

MS. MESERVE: I have the same concern as Dr. Duval with the Option B for the incidental catch and small scale fisheries; and it not counting towards the TAC, and also including small purse seines in that category now. It was also my hope with our initial selection of the 0.75 percent fixed minimums that we would be able to do away with the episodic event program; and the bycatch, what many people have referred to as a loophole, over the years. We're moving away from that direction here; so I can't support this motion.

CHAIRMAN BALLOU: Just for the Board's edification. My understanding is Option B as proposed under incidental catch and small scale fisheries, would not only now include purse seines as characterized, but would also include trawls, which was an issue brought up by the Advisory Panel. I just want to make sure the Board is clear that those would be gear types that would be allowed to fish; and that those landings in total would not be counted against the TAC, just to make sure we're all on the same page on this. I have Robert Boyles next.

MR. BOYLES: Again, thank you to the Board for indulging the discussion. I think the number of you I've talked to over the previous several months. Let me blunt and honest. There are a lot of things in the motion I just made that I don't like. I just don't like it. I won't be specific. I've talked to a number of you. I think you know what those things are.

I'm going to go back and tell you again; as a guy with no commodity in this fight. My interest is in the integrity and this body and this process. This body and this process that was tested this summer; and this body and this process that I think we're on notice, will be tested as a result of the actions that we take today.

I'm asking the Board's indulgence. There are things in here I don't like; make no mistake. But I think in the spirit and the interest of moving us forward, and not losing sight of the big prize; in my mind ecosystem reference points. That I think it's worth some give and take. It's perhaps a little bit of Frankenstein; in terms of a motion.

But I think if you look at the table, most jurisdictions end up better off than they are under the current allocation. I think we have sent a strong message with setting the TAC at 216,000 metric tons, to those folks who were gravely disappointed with our actions yesterday, with respect to our commitment to ecosystem reference points.

I think this is something; I would hope that this is something that the Board, perhaps more importantly the member states of our Commission, could live with as we move forward the development of ecosystem reference points. I would urge your consideration and urge your passage.

CHAIRMAN BALLOU: Eric Reid.

MR. REID: I'm a little bit concerned about Option B not accounting for small-scale fisheries. I have a question about the size of the purse seines that are in this fishery. We don't have a lot of purse seining in Rhode Island; but I know you do in Maine, and there is in Massachusetts as well.

Would a purse seine of this size fall – how many purse seiners do you have that use a net smaller than 150 by 8? I'm also concerned about episodic event being only 1 percent; if we go to a half a percent fixed minimum. I guess my real question is about how much purse seine gear would fit into this category of not being considered or accounted for? Maybe somebody else could answer that.

CHAIRMAN BALLOU: I was just going to say, who might be best able to address that and I see Pat Keliher's hand up. Pat.

MR. KELIHER: The purse seines that are used in our fisheries right now are vastly larger than what is here. This would put a cap on the upper end size of a purse seine that would be able to be used. The fishery, we had a lot of people who are harvesting 6,000 pounds a day with purse seines that are twice this size.

They were doing that without a lot of spillage that was going over dead. We only one incidence of mortality associated with our fishery; with much larger seines. But the intent of that was to try to get the overall size under control; with the understanding that this is the language within Option B, which isn't here. This is for the 6,000 pound daily allocation. There is about 20-ish, could be more, and could be as many as 30 that will participate.

CHAIRMAN BALLOU: Ritchie White.

MR. WHITE: Pat just answered my question; and that is that this would be limited to 6,000 pounds a day.

CHAIRMAN BALLOU: Yes that's correct. Jim Gilmore.

MR. GILMORE: I'm just going to throw in, echo what Robert was speaking about. There are a lot of things I don't like in this reconsideration. But I think what we all need to keep in mind is as we move forward; I mean allocations is going to be our challenge for several species as we move forward over the next couple years.

We're getting into maybe even I walked in the room this morning, and what I want versus what I need. In terms of the Commission and

our guiding principles, we really need to look at cooperating, in terms of what our needs are, so that we can be functional as we move forward. It's easy to dig your heels in and maybe try to get what you can get out of the pie. But right now we really need to keep in the back of our minds is that we need to stick with those principles of the Commission, and really find a solution that keeps everyone's fishery viable.

That's probably the best term I can use. Other species that I won't mention right now, which we'll be talking about in a few months. It's really to have viable fisheries for all the states; and to cooperate the best we can to make that happen. As Robert said and I agree, there are things in here I don't like, but I support the motion, because I think it is what moves us forward in a cooperative fashion.

CHAIRMAN BALLOU: Steve Train.

MR. TRAIN: Like many that spoke already. If I had to pick this apart individually, I could probably find each item I don't like individually. But the quota allotment is obviously not enough to keep the Maine fishermen happy; if that was what we were working on. But when you tie all of these together, I think we can live with it and I can support the motion. But if we pull things out of it, I can't.

CHAIRMAN BALLOU: Emerson Hasbrouck.

MR. HASBROUCK: I pass, Mr. Chairman.

CHAIRMAN BALLOU: Pat Keliher. Is there anyone else on the Board who would like to address the motion; David Borden?

MR. BORDEN: Although I appreciate Robert's attempt here; I have problems with any portion of the landings not counting towards the quota. I think that sends the wrong message. I would have no problems if that were characterized as the soft cap. But I think there has to be a cap. The other thing that I've been personally struggling here; and I think the Board has been struggling with.

I mean if you look at just fishery performance, and you can pick almost any timeline here recently. We have a whole group of states that really haven't had any performance in their jurisdictions. This is one of the flaws with the state minimum. In other words, we're allocating fish to states that have not had any type of performance.

Now much to his credit, Robert has been talking about foregoing his share of the allocation, I don't know how we get there. But I think we need to have a dialogue with the states that don't have any performance, history of performance in the fishery. Somehow, if we can get more jurisdictions to do exactly what Robert offered up, I think that's kind of the way forward. That would free up allocation to fix some of these issues. As I said, I don't know how to do that. If we had more time to do it, we could have a focused discussion individually or collectively on how to get there. We've done that on other species; black sea bass a long time ago, we had that type of discussion, and it was a negotiation.

To the extent that states that have not landed a pound for the last couple years, they're going to be allocated 2 plus million pounds. If they could say oh, well we'll take 500,000 instead of 2 million. That would solve a lot of the problems we're trying to deal with. I don't know how to generate that dialogue; or whether we have the time to generate that dialogue. But that I think is the way out of this box.

CHAIRMAN BALLOU: Allison Colden.

DR. COLDEN: I'll pass Mr. Chair, thank you.

CHAIRMAN BALLOU: Tom Fote.

MR. FOTE: Since Dave brought up black sea bass and how we got around that is because New Jersey gave up 20 percent of its quota.

Now when Bruce Freeman got back to New Jersey, there were not a lot of happy people there, because it was an arbitrary decision he made at the time. But that made the deal work then.

I don't see anybody sitting around this table wanting to give up 20 percent of their quota to help out, and try to make everybody happy. But that's how we got the black sea bass; by New Jersey stepping up to the table and giving up 20 percent of its quota.

CHAIRMAN BALLOU: Spud Woodward.

MR. WOODWARD: Just to get it on the record; in response to what Dave Borden said. The state of Georgia has no interest in prosecuting fisheries on its share of whatever we end up getting through these deliberations. I think if it will help the deliberations, you can certainly consider that our 2.6 million pounds is going to go wherever it can do the most good to help this situation. Since I'm going to be retiring at the end of December, I can make those kinds of promises, Tom.

CHAIRMAN BALLOU: Before I go back to David, anyone else who has not yet spoken. Cheri Patterson.

MS. PATTERSON: I could support everything here with the exception of Section 4.3.5. I think at least from our constituency and how most of us, some of us feel I should say, is that a lot of these ancillary numbers should be included in the TAC.

CHAIRMAN BALLOU: Roy Miller.

MR. MILLER: I would like to first express my appreciation to Robert; and all of the folks who worked on this issue since our lunch break. I'm very appreciative of the effort. Do I like all the details of this? I could quibble, like many others with individual points. I agree with Cheri, all catch including incidental catch in small scale fisheries I feel should go towards the quota. But in general, I'm in favor of this and am appreciative of the effort.

CHAIRMAN BALLOU: Marty Gary.

MR. GARY: I appreciate all the discussion and hard work that everybody put into coming to this motion on the table now. Just a quick comment about Section 4.3.5, I won't speak for Maryland, but they probably have similar sentiment. It's essential for PRFC. We have a small-scale fishery. We typically hit our quota late summer into early autumn; and we're very reliant on that bycatch to continue us through the season.

We worked really hard on our accountability. We have trip level daily reporting submitted weekly, not monthly. When we hit 70 percent we have a mandatory call in for our 20 pound netters, and then when we hit the 90 percent threshold, we then switch over to bycatch. We really put in a lot of hard work with our harvesters and our staff; and make sure the accountability is there. I just want to make sure that you all know that that is really, really important to us. We need that there.

CHAIRMAN BALLOU: David Borden.

MR. BORDEN: I would just like to go back again and complement Spud and Robert for their willingness to try to strike a bargain here by enhancing it. I guess my suggestion would be to kind of break the mold here, is to take like a two or three minute caucus, ask the states that basically do not have significant fisheries talk among themselves, and see whether or not there are other jurisdictions that would be willing to give up some portion of their allocation. My suggestion would be anything that's given up would either be redistributed or go into Section 4.3.6.

CHAIRMAN BALLOU: We'll take that into consideration after I get Dave Blazer; who's next up. Then we'll try to figure out where we want to go from here.

MR. BLAZER: Really, what Marty said about the incidental catch. That is extremely important to our fishermen in the state of Maryland. I do want to remind everybody that in the management plan there is language in there. I won't read it verbatim, but basically that it's tracked.

If it becomes too much of a problem, it's too impactful that either that gear or trip reductions or other management measures can be taken as we follow that and learn that. There is some safety built in to that incidental catch for the small-scale fisheries. By the way, I'm supportive of this motion, even though it's not perfect for our situation. But again, I applaud the folks that helped put this together, and I'll be supporting it.

CHAIRMAN BALLOU: Dave Blazer. It's getting late, Dave Bush.

MR. BUSH: Although Mr. Blazer probably would like the opportunity to go again I guess. I don't know if it would be appropriate or not. We offered the opportunity, or you did, Mr. Chairman earlier for the public, one or two to weigh in on it, the original motion. Now this is a whole new grab bag, and those are the folks that we're trying to take care of. I don't know if maybe at your discretion, maybe a comment or two to see if this might be more livable.

CHAIRMAN BALLOU: It's a tough call. But I do feel that by and large this motion reflects provisions that are in the Amendment; and have already been subject to public comment. I am reluctant to open the door to additional comment; because I don't see this as being significantly different from what the options were as set forth in the Amendment.

That said; there is clearly interest. I think Adam Nowalsky expressed it, certainly David Borden did, and this issue of what happens under the fixed minimum program, which certainly the first part of this motion would enact. What happens when states relinquish their quota? It's to be redistributed, it says that.

But it does not say how it's to be redistributed. It's really up to the Board whether you want to try to work through that issue question now, or potentially after a vote on this and coming back to it, or whether you just want to let it lay. It is what it is. I'll just sort of say that I sense that we're getting close to a vote.

But I'm aware that there have been a couple of points made regarding the implementation of the fixed minimum approach, particularly with regard to states that opt not to utilize their quota. I think there are two ways we could go; one would be to try to add on to this motion, the other would be to vote on this motion and then potentially circle back to that as a supplemental issue. I guess I'll take thoughts on that sort of piece; as well any other general comments.

I do sense we are approaching voting time, so I see three hands up. Let me go to the three hands that I see up; Nichola, Colleen, well we have four hands up. It sounds like there will be more discussion; as well there should be. This really is going to kind of be a big wrap, depending on the vote goes. Let's take the time we need to; to make sure we get it right. Nichola Meserve.

MS. MESERVE: I have now heard a number of Board members have concerns with the incidental catch and small-scale fishery Option B. There is also Option D in the document; which does provide the same 6,000 pound trip limit per day, or 12,000 pounds for the two permitted individuals on a vessel for the small-scale gears and the non-directed gears.

But those landings count towards the TAC and there is the 2 percent set aside. My question is actually for the maker of the motion; as to why, if there was a rationale for selecting Option B over Option D for the incidental catch, which

would count the bycatch landings towards the TAC.

CHAIRMAN BALLOU: Robert.

MR. BOYLES: It was offered in the form of an effort to build consensus.

CHAIRMAN BALLOU: Colleen Giannini.

MS. GIANNINI: Hi, I'm generally in support of the motion. I have the same concerns about Section 4.3.5; and because the incidental catch in the small scale comes in after a jurisdiction's quota is met. I'm just trying to wrap my head around what that magnitude is, given the increase in allocations with a fixed 5 percent, minimum?

MS. WARE: I mean obviously we can't necessarily predict what those will be. But I can say that especially last year, as there have been increases in the TAC, the magnitude of those incidental catch landings does seem to be declining. I will say that. I'm not sure if that will apply for this year. But that was a trend that we've seen to date.

CHAIRMAN BALLOU: Rachel Dean.

MS. DEAN: I just wanted to say that 4.3.5 is where we get behind this motion. The timeframe, 2009 to 2011 makes us uncomfortable, makes me uncomfortable. I won't speak for everyone. The half percent fixed minimum does not by any means get us to where we need to be. I just want to echo what Mary Gary said about how essential this is. I understand that there is the concern that some states would be allocated something that they don't intend to use. But the incidental catch and small-scale fisheries would mitigate that and essentially give that back to the states that are intending to use it.

CHAIRMAN BALLOU: Pat Keliher.

MR. KELIHER: We started today with the setting of a quota, or the TAC, which I supported in the end, hoping we could find a way to cut up this pie. It's obviously proving very difficult. I did not think I would be in a position where my fixed minimum was going to be half of what I was hoping it was going to get.

That being said, I am a reluctant supporter of this motion; assuming 4.3.5 remains in place, and I would urge the Board per David Borden's suggestion to take a pause and see where that exercise might get us regarding what jurisdictions, what state's might be willing to give up may help give us a clearer picture.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: We in Virginia also have a pound net fishery with quite a history; and of the seven gears that are involved in a quota, away from anything else, pound net is the one that is the largest. But it closes sort of without a pattern. It has been closed a couple of times since 2013; it has remained open.

You know there is a problem when it closes. I think we know with a fixed gear like that that discards are really not what we're aiming to do. I support the 4.3.5 provision. I also wanted to just ask Megan quickly on that magnitude question. Was it somewhere around 6 million pounds or something like that in one of those years for the bycatch? Does that ring a bell?

MS. WARE: Yes. I mean it sounds about right for the highest year; I believe was around 6 million. Then I can look it up, but I think last year was between 3 and 4 million.

MR. O'REILLY: Thank you, and if I may Mr. Chairman, based on last year that would be about 1.3 percent. Of course it's added on so it would be a little bit less; since it's not counting toward the TAC or towards the quota.

CHAIRMAN BALLOU: Steve Train.

MR. TRAIN: I wonder sometimes if everyone around the room remembers we've been working under what essentially is 4.3.5 from the beginning of this recent realm of management of menhaden. We've seen the stock continue to build; and it hasn't seemed to be an issue. I don't know why it's a sticking point now. Almost every state I look at has used it. It kind of makes this work. Without it, Maine can't support this.

CHAIRMAN BALLOU: Let's do this; well first let me go to Adam, and then I have a suggestion for a pause. Adam.

MR. NOWALSKY: If I could wait until after that pause; I had an idea I was going to toss out. But I'll be happy to do it offline, and then decide whether it warrants online discussion.

CHAIRMAN BALLOU: Let's pause for the purpose of essentially caucusing on whether the Board is ready to vote when we return; or whether there is any interest in doing any further modifications to the motion. We'll be paused for five minutes; and I'll call the meeting back to order.

(Whereupon a recess was taken.)

CHAIRMAN BALLOU: Okay that was a long recess; but hopefully a productive one. There certainly was plenty of engagement around the table. I see a couple hands up. I know David Borden has something he would like to say; as well Dr. Duval. I'll go to Dr. Duval first.

DR. DUVAL: Again, this is in regards to Section 4.3.5, the incidental catch and small-scale fisheries. You know we support counting all catch against the TAC. I recognize that moving to Option D would give a lot of people discomfort due to the 2 percent that will come off the top, and the impacts that might have to different jurisdictions allocations. I did want to ask Megan.

You know we do have a table in the Draft Amendment that indicates that on average the incidental catch has come out to 4.7 million pounds. Now, I was hoping if Megan could clarify for us that when you take the incidental catch that has occurred under this existing provision, and then add it to the total landings under the TAC. Have we exceeded the TAC in recent years?

MS. WARE: I've been doing a little research. Last year when we combined the directed landings and bycatch, we did not exceed the TAC. For the 2015 fishing year we did exceed it by 2 million pounds.

DR. DUVAL: Follow up, Mr. Chairman?

CHAIRMAN BALLOU: Sure.

DR. DUVAL: In 2015 the TAC was what?

MS. WARE: Approximately 414 million pounds.

DR. DUVAL: Okay. Thank you, I might have one more question.

CHAIRMAN BALLOU: Let me go to David Borden next.

MR. BORDEN: I will make this quick; and I kind of circled the table quickly. I mean we're trying to deal with two different problems here. One is in Section 4.3.6 the 1 percent. I had people say to me that they thought that percent was too low; and then this issue of 4.3.5 with the quota not counting.

I go back and reiterate, I'm not going to ask or put anybody on the spot, but if there are jurisdictions that would voluntarily contribute some portion of their minimum to those two activities; I think we could probably fix at least some of the issues we're trying to deal with.

CHAIRMAN BALLOU: Okay, additional comments if any; or is the Board ready for the question? It looks like the Board is ready for

the question; and I'm going to take the long recess we just had as the caucus opportunity. Without further ado; I will call the question, and ask all in favor of this motion please raise your hand.

MR. NOWALSKY: Mr. Chairman.
CHAIRMAN BALLOU: Yes.

MR. NOWALSKY: I would like to request a roll call vote.

CHAIRMAN BALLOU: We shall do that; and I'll look to Megan, and we'll go south to north.

MS. WARE: U.S. Fish and Wildlife.

MR. MILLARD: Abstain.

MS. WARE: NOAA Fisheries.

MR. BURNS: Abstain.

MS. WARE: Florida.

MR. ESTES: Yes.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: South Carolina.

DR. RHODES: Yes.

MS. WARE: North Carolina.

DR. DUVAL: Yes.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: Potomac River Fisheries Commission.

MR. GARY: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Delaware.

MR. CLARK: Yes.
MS. WARE: Pennsylvania.

MR. SHIELS: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Massachusetts.

MS. MESERVE: No.

MS. WARE: New Hampshire.

MR. WHITE: Yes.

MS. WARE: Maine.

MR. KELIHER: Yes.

CHAIRMAN BALLOU: **The motion passes 12 to 4 with 2 abstentions.** I believe we have perhaps just one issue left; Chesapeake Bay Reduction Cap if I'm not mistaken, because I believe this issue will essentially dispense with all of the other issues that were pending. Before I go to the Chesapeake Bay cap issue, I just want to make sure that the Board is comfortable with where we are.

I should just say I assume the Board is comfortable with where we are; because otherwise we could get back into it. Seeing no hands; I will now seek a motion on the issue of the Chesapeake Bay cap. Maybe to fill this awkward gap, I'll ask Megan to review the option. We'll see if that might help spur some interest.

MS. WARE: For the Chesapeake Bay cap there are three options. The Board can maintain the cap at the 87,216 metric tons, reduce the cap to 51,000 metric tons, or remove the cap, which means that there are no restrictions on the reduction fishery in the Chesapeake Bay. Then there are also sub-options which ask whether a portion of unused cap can be rolled over to the next year. Right now we do have a rollover provision; it's about 10,000 metric tons. I'll look that up for you guys; but right now we do allow a portion of that to roll over.

CHAIRMAN BALLOU: With that is there anyone on the Board who would like to make a motion? Rob O'Reilly.

MR. O'REILLY: I'll make the motion for status quo for the Chesapeake Bay reduction fishery cap to be maintained at 87,216 metric tons. I'll have some explanation if I get a second.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Adam Nowalsky? Moved and seconded, Rob the floor is yours.

MR. O'REILLY: I understand those who have talked to me over the last few weeks, and talked about support for lowering this cap to 51,000 metric tons. I'm not sure they have all the information; but there are a few pieces of pertinent information. The first is that everyone knows that the reduction fishery has not been achieving the cap by quite a bit over the last, I would say five years.

The other pertinent piece of information is while we lowered everything; in terms of the fishery opportunities and quotas for 2013, starting in that season. We also lowered the cap from 109,000 plus metric tons are where it was starting in 2006. When there were increases, both in February of 2015 and also in 2017, almost a 10 percent and then a 6.4 percent increase in 2017.

The Bay cap remained unchanged. There were no calls to increase that Bay cap. I think probably we talked a lot about fair. I'm not going to say the equitable in this case; I'm just going to say fair. But a lot went into this cap. In 2006, it was set at the average of 2001 to 2005. I was at that meeting.

Every organization, whether NGO or not, was quite pleased that the cap of 109,000 plus metric tons was established. Given that type of information, I would not find it fair that we want to reduce; and some of the reasons behind wanting to reduce it really may serve as a bad situation for the idea that the reduction fishery has not been in the Bay, does not wish to be in the Bay when possible. But there is going to be a rainy day. When is the rainy day? Is the rainy day going to occur five years from now? It's sort of a penalty to lower this cap. Thank you for the time; and I hope for those who weren't involved back in 2006, and didn't watch the progression of this cap, because there was no progression after 2012 – it stayed the same – that they will appreciate my comments.

CHAIRMAN BALLOU: Just to clarify. You certainly implied this with your reference to status quo. Status quo would also involve Sub-option A under Option A; limited rollover of unused cap permitted up to 10,976 metric tons. Is that your intent?

MR. O'REILLY: That is correct; and again that was something that was worked out 11 years ago, and has worked very well. I think the main point here is that that is status quo.

CHAIRMAN BALLOU: Allison Colden.

DR. COLDEN: Obviously, as a person who lives in the Chesapeake Bay watershed and region, I think this is a very important discussion that warrants a lot more discussion**. I would like to offer as a substitute amendment to adopt Option B, Sub-option B to reduce the Bay cap to 51,000 metric tons with no rollover.** I would like to comment on that if I may.

CHAIRMAN BALLOU: Is there a second to that. There is a seconder, John McMurray seconds the motion to substitute so it's been moved and substituted, and Allison, the floor is yours.

DR. COLDEN: I think that many people around this table already know that the Chesapeake Bay is an extremely important nursery habitat; not only for Atlantic menhaden, but a number of the other species that these Boards manage, that this Commission manages. Even though there have been increased contributions of other places up and down the coast, in terms of menhaden recruitment. The Chesapeake Bay remains the largest contributor of menhaden to the coastwide stock.

It's because of this contribution, as well as the contribution of other organisms like particularly striped bass, from the Chesapeake Bay that this issue concerns not just the Bay states, but obviously every state that is sitting around this table. I would also like to point out that we haven't been seeing the same types of recovery that's been seen in New England.

That's not entirely shocking for anyone who has followed the work of Andre Buchheister and his colleagues, who noted that there are some climatic patterns that seem to correlate well with the recruitment of menhaden, and particularly that those patterns are negatively impact Chesapeake Bay, when they positively impact New England.

As long as we're continuing to see menhaden growing in New England that would imply that we would continue to see this low level of recruitment and low levels of menhaden within Chesapeake Bay. I would encourage this body at this point in time to really err on the side of the ecosystem; as we all said that we are committed to. Remember all of the other species coming out of the Bay, and that the Chesapeake Bay menhaden populations are supporting, when we are considering this issue.

CHAIRMAN BALLOU: Thank you. John McMurray.

MR. McMURRAY: Setting a cap at 51,000 metric tons is essentially the status quo; as that's what they're catching now. Industry has consistently underperformed the cap. I would also note that if the entire cap were landed where it's set now that is about 100 million additional pounds, taken out of what I consider to be a very small area. That would most certainly have an impact on menhaden in that region and certainly the predators that eat them.

CHAIRMAN BALLOU: Ritchie White.

MR. WHITE: I have a question for Rob. I've heard that a lot of the concern on not lowering the cap is that the new owners of Omega have other uses for menhaden than are presently being used; which might prompt the harvesting of smaller fish. Can you comment on this? Can you, if you know, is there any commitment that the company will continue to harvest the fish size that they have been harvesting? My understanding is that that is why they're not catching their cap; because that size fish is not available in the Bay.

CHAIRMAN BALLOU: Rob.

MR. O'REILLY: Thank you for the question, Ritchie. No, I really can't comment; because I do not know the aspects of the future plans there at all. But I think the one thing is that the smaller fish are not desirable. I think I can say that; as much so for oil, which is a pretty good product from Omega.

The other thing, while I have the ability to say something, is that it's not really fair to say that because someone has harvested a certain amount by volition for the last five years that they should be held to that. That's sort of making a decision on a fishery that the fishery should make a decision on.

Clearly, if there was 109,000 metric ton cap in 2006 and that was the average of 2001 to 2005. It tells you that at times when the stock was available, but not as robust as it is today, there was more harvest then. Now the stock is healthier, and for business reasons is all that I could say. You know the reduction fishery has not taken place to the same extent in the Bay. But I don't think that is a signal to anyone to decide that's where you're going to stay, that's your line.

CHAIRMAN BALLOU: Dennis Abbott.

MR. ABBOTT: Rob just; clarify something for me, Rob. In this instance you don't want to go by history. In the last five years you haven't come near your quota, and you're saying you can't go by the fact that we didn't catch it. But yet when we were dealing with all the other matters, then history seems to mean everything. There is in my mind a bit of contradiction.

But as a comment, on the one hand I could believe that it doesn't matter whether the quota is at 87,216 or 51,000, because you're not catching it. What that number is really doesn't need to be changed on the one hand, because you're not getting up to the 51,000 anyways. I don't know, but I think it sends the wrong message of catching too many fish out of the Chesapeake. I know the recreational people don't want that. I could go either way, but I think that lowering that number probably does no harm to anyone.

CHAIRMAN BALLOU: Additional comments on the motion, before I go back to Allison who has spoken already, I would like to get others in. Nichola Meserve.

MS. MESERVE: Just very quickly, I support the substitute and the comments from Allison and John. It seems like one example, one place where we could follow the overwhelming public comment on this issue, and not have an economic harm imposed by it.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: I think just this cap is based on average harvest over a number of years; and I know that there was previously a research program that was focused on trying to determine whether or not localized depletion was occurring. You know that research was inconclusive. I guess I would just put out there that I would hope that in the future that this might be something that the Board would revisit, should there be conclusive science that indicates one way or another how a cap should be set.

CHAIRMAN BALLOU: Back to, who I now realize should be addressed as Dr. Colden, my apologies. I now see that I've been off for only the past ten hours, on improperly addressing you, so Dr. Colden, back to you.

DR. COLDEN: That's no problem. I just wanted to make one comment in response to Rob's comment about fairness and equity. At the current, under status quo, there is the possibility; there is the capacity to harvest 97,000 metric tons from Chesapeake Bay, almost half of the entire coastwide TAC that we've been discussing all afternoon.

I don't know whether the recreational anglers of Virginia and Maryland would consider that equitable; but I think I know the answer to that question. In terms of a business decision, it's obvious that if the business decision has been made to harvest at a specific level within the Bay over the past five years. That this is not a business decision that is negatively impacting

the bottom line; or else that decision would not have been made.

You know I think this reflects the past five-year's landings from the Bay. It's simply updating the window; the way that the cap was originally put in place. We're simply updating to the last five years; and making it similar to the way the cap was first implemented when it was first put in place. I hope folks will consider those comments when they are considering this.

CHAIRMAN BALLOU: Any additional comments on the motion? Rob O'Reilly.

MR. O'REILLY: Very briefly. I think the main issue is that this is a coastwide stock; and there is no scientific basis to indicate that the Chesapeake Bay has suffered from any localized depletion. I certainly understand those who hold to that concept; only because they think of the Chesapeake Bay as differently than the coastal area, but it's not.

It's a unit stock, a coastwide stock. Science has not shown anything else. I think that is important, and I think for that reason there was an option here to remove the cap as well, which hasn't been talked about. I think that is where maybe some would get some comfort by knowing a cap is there; but once you have that comfort, I don't think you need to go any further.

CHAIRMAN BALLOU: Any further comments on the motion to substitute? Seeing none; is the Board ready for the question? Is so does the Board need time to caucus? I'll assume there might be at least some time needed, so let's make it a 30 second caucus. There has been a request for a roll call; so I'll have Megan call the roll moving north to south.

MS. WARE: Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: Pennsylvania.

MR. SHIELS: Yes.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: North Carolina.

MR. BRADY: Yes.

MS. WARE: South Carolina.

DR. RHODES: Yes.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: Florida.

MR. ESTES: Yes.

MS. WARE: NOAA Fisheries.

MR. BURNS: Abstain.

MS. WARE: Fish and Wildlife.

MR. MILLARD: Abstain.

CHAIRMAN BALLOU**: The motion passes 14 to 2 with 2 abstentions.** It now becomes the main motion; is there any further discussion on the main motion? Is there any further discussion on the main motion? Seeing none; is the Board ready to vote? If so do we need a roll call vote? Hearing no request, all in favor, yes there is a roll call vote on this now as the main motion. We'll call the vote again; same order.

MS. WARE: Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MR. ABBOTT: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: Pennsylvania.

MR. SHIELS: Yes.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: North Carolina.

MR. BRADY: Yes.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: Florida.

MR. ESTES: Yes.

MS. WARE: NOAA Fisheries.

MR. BURNS: Abstain.

MS. WARE: Fish and Wildlife.

MR. MILLARD: Abstain.

CHAIRMAN BALLOU: **The motion passes 14 to 2 with 2 abstentions.** We're almost at the end, and I am not a glutton for punishment. But I have been advised by staff that left hanging is the issue of what will happen in terms of the administration of any quota allocated to a state under our fixed minimum program that a state opts not to utilize.

It's left vague in the document; and there are I think two ways to handle this. One is to get into it right now; and decide how best to administer that reallocation of unused quota, the other is to push it to an addendum process. What is the will of the Board? Does anyone not get the point; or understand why we're bringing this up? I think I'm bringing it up because staff has advised; but Bob.

EXECUTIVE DIRECTOR BEAL: I guess some concern about timing with the addendum process or potential addendum process. You know, the states are going to have to decide very soon if they're going to harvest some or all their quota in 2018. The earlier we know that the earlier the receiving states, if you want to call it that, can make their plans.

The assumption is Virginia may be one of the receiving states. Keep in mind that menhaden is managed through the Virginia State Legislature; rather than through VMRC, and legislative session begins at the beginning of the calendar year. The more Virginia knows, I think at the beginning of the year, the more information they have to work with going into the legislative sessions.

If there is an easy way to do it right now it would be a lot better. Easy and now is probably an oxymoron. But I think anything we can do to help staff understand how we're supposed to divvy up the relinquished fish would help a lot of folks out, I think.

CHAIRMAN BALLOU: Thank you for that advice. With that advice, are there any suggestions from the Board? Pat Keliher.

MR. KELIHER: I move we have a caffeine break. No, Mr. Chairman I think we need some language. Do you have some language there, Megan? **Mr. Chairman, I would move that states must declare any relinquished quota by December 31st of the previous year. Any quota that is foregone by a state is redistributed to the other jurisdictions based on historic landings from the time period selected by the Board in this Amendment.**

CHAIRMAN BALLOU: Is there a second to that motion? Seconded by David Borden, Pat Keliher, do you want to speak more to it?

MR. KELIHER: I don't think this is perfect; by any stretch of the imagination. I think there were other comments during the last deliberation; in regards to have it going to very specific areas, whether it be the small-scale fishery or whether it be episodic. I don't think that is precluded from this motion. But it may need to be more specific. But I think the intent is to ensure that we have a clear understanding up front, and that clear understanding would be prior to December 31st.

CHAIRMAN BALLOU: Thank you. David Borden.

MR. BORDEN: I seconded it for discussion purposes. But I guess my question to Bob is, is December 31st adequate; in order to do what you want to do here, or should we back it up to like November 1st, or some date in November?

EXECUTIVE DIRECTOR BEAL: Mr. Chairman.

CHAIRMAN BALLOU: Please, I'm sorry.

EXECUTIVE DIRECTOR BEAL: It might be a better question for Rob O'Reilly. I don't know exactly when they have to have their legislative packages squared away to go into their

legislative process. The end of the year may be really tight for them; you're right, David. I don't know if mid-December is right or what it may be. But Rob may have a better sense of their legislative timing.

CHAIRMAN BALLOU: Rob, did you want to, yes I'm sorry.

MR. O'REILLY: I think December 1 would be better. I think that's a good suggestion. I think December 1 would be. It's going to be a little bit difficult the first time around to go through this. I understand that. But that would give time for the General Assembly Session in Virginia.

CHAIRMAN BALLOU: This is two weeks from today, more or less. Pat Keliher.

MR. KELIHER: I would accept that as a friendly if my seconder would.

CHAIRMAN BALLOU**: Is there any objection to amending the motion to change December 31 to December 1? Seeing none; the motion is amended,** and we're continuing our discussion on it. Dr. Rhodes.

DR. RHODES: Well, I had one other friendly amendment; because I've been hearing concerns about the 1 percent episodic event set aside. Would it be appropriate to put in here, any quota that is foregone by a state covers the 1 percent episodic event set aside, and the remainder is redistributed. That way no one has to worry about losing any of their 100 percent quotas.

CHAIRMAN BALLOU: My take is those are two very different approaches. One goes right down the list of allocations, allocation percentages for the 2009-2011 period, and redistributes accordingly. The other would do something different. Your approach would do something different; I don't see how that could be a friendly. It would have to be in the form of a substitute. Adam Nowalsky.

MR. NOWALSKY: Would there be any merit to specifying that the receiving states be states that did not relinquish quota; because I don't think it would make sense to donate back to states that are already giving something up. I might suggest consideration here that any quota that is foregone by a state is redistributed to the other jurisdictions that are not relinquishing quota. I'll put that out there for consideration.

CHAIRMAN BALLOU: That could be in the form of a friendly, I think. But first Bob Beal has a point.

EXECUTIVE DIRECTOR BEAL: I guess the way I was reading it, Adam, the notion that any foregone quota will be redistributed to other jurisdictions meant exactly what you said, which is jurisdictions other than the ones that relinquish quota. That is the way I was reading it; but maybe I was assuming too much.

CHAIRMAN BALLOU: Let me just ask Pat Keliher as the maker of the motion. Is that your intent?

MR. KELIHER: Our Executive Director did not assume too much, for once.

CHAIRMAN BALLOU: We have that clear on the record now that that is the intent. Nichola Meserve.

MS. MESERVE: Question to the maker of the motion whether this was intended to provide the flexibility to states to relinquish any amount of the fixed amount; as opposed to what the document currently says about 10,000 pounds for bycatch, or forego entirely.

MR. KELIHER: That's a great question. The intent would be to relinquish quota; with the understanding the document allows for that bycatch allocation.

CHAIRMAN BALLOU: Nichola, does that address your question?

MS. MESERVE: I think it's been answered. I guess I would have hoped that the states had more flexibility to give up any amount that they wanted to, as was part of the earlier motion today.

MR. KELIHER: I'm not opposed to that. It meets the intent of my original motion earlier in the day.

CHAIRMAN BALLOU: Again that is on the record as the intent. States have the flexibility to relinquish all or part of their quota. John Clark.

MR. CLARK: Just kind of a follow up. There could be a situation where, I'm just thinking of in our state. We would relinquish some of our quota; but it might turn out that in the fishing year of 2018, as we get to the end there would be more quota we could relinquish under this. It's only for the previous year. Would there be a way to relinquish quota during the fishing year also?

CHAIRMAN BALLOU: I think the answer to that is via transfer, yes, further discussion on the motion, Spud Woodward.

MR. WOODWARD: Just a question. If this motion were to pass, foregone means anything that is not transferred or used, is that correct?

CHAIRMAN BALLOU: I'm sorry, there is typing going on. I'm trying to follow, but let me see if Megan has a response.

MS. WARE: I'll just use a hypothetical. If Georgia wanted to forego half of their fixed minimum, half of your marbles would go through this process, and the other half you would still have. If you want to transfer those, you can do that.

MR. WOODWARD: Or I could transfer the entire quota to someone by declaring to do that on December 1st, which would leave nothing foregone. Is that correct?

MS. WARE: Correct. You would not opt out of the fixed minimum, so you would have all your marbles and you can do with them what you would like.

MR. WOODWARD: Well I would sure like to have all my marbles; it would be the first time in my life. I think I understand this, all right thank you.

CHAIRMAN BALLOU: As we were just having that good exchange, the motion has been perfected and it now reads**:** ***Move that states must declare any relinquished quota by December 1st of the previous year. States have the ability to declare how much of their quota to relinquish. Any quota that is foregone by a state is redistributed to the other jurisdictions based on historic landings from the time period selected by the Board in this Amendment. Is there any objection to that perfected language?*** I see no objection from the Board. Toni Kerns.

MS. KERNS: Just a perfection, perhaps instead of saying foregone, we should be consistent and say relinquished, quota that is relinquished by a state, just to be consistent.

CHAIRMAN BALLOU: That makes very good sense to me**.** ***Is there any objection to substituting the word foregone with the word relinquished? Seeing none; we have an even more perfected motion.*** Is there any more perfection that needs to be done, or any more discussion that needs to take place on this motion?

Seeing none; is the Board ready to vote on it? If so; do you need time to caucus? Let's just do a 15 second caucus. All right, I'm going to call the question**. All in favor of the motion please raise your hand, thank you. Those opposed please raise your hand. Are there any null votes, I see none. Are there any abstentions, and there are two. The motion passes 16 to 0 with 2 abstentions.** I now believe, if I'm not

mistaken but I may be, because I just see a hand go up. Robert Boyles.

MR. BOYLES: Mr. Chairman, I was going to offer a motion to approve the Amendment and they're not, okay, sorry.

CHAIRMAN BALLOU: We have one issue before that motion; which is moments away, I believe, and that is an implementation date. We do need an implementation date. Megan, if you could just speak to the options if you will that the Board has for an implementation date.

MS. WARE: It's really at the discretion of the Board; if there are certain timeframe constraints, states should probably come up with those now. My sense from the Board is that the intent is to have this implemented for the 2018 fishery.

CHAIRMAN BALLOU: We do need a motion on this. Would anyone like to make a motion regarding the implementation date for this Amendment? Tom Fote.

MR. FOTE: I make an implementation date of 2018.

CHAIRMAN BALLOU: Tom, would you want to make that January 1, 2018?

MR. FOTE: Yes.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Loren Lustig? The motion is to move that states implement the provisions of Amendment 3 by January 1, 2018; discussion on the motion. John Clark.

MR. CLARK: As far as the Amendment won't be implemented until January 1, but Rob needs quota transfer to him by December 1. Do we have the quota as of the end of this meeting or as of January 1?

MS. WARE: I mean I can certainly work to get out the numbers as soon as I can as to what your guys quota will be with the different set asides. Then you guys can make decisions as to whether you would like to relinquish quota or not; if that helps.

MR. CLARK: Right, I just wanted to make sure. Okay, so all the factors are going into effect as of today. We'll be transferring before the plan actually goes into effect.

MS. WARE: I think that's, I guess the intent of what the Board is deciding.

CHAIRMAN BALLOU: Just to clarify. We just agreed on some provisions that really are Amendment provisions that will actually kick in prior to January 1, 2018. John, to your point, I think it's a very fair point. But I think the record will reflect that those preliminary steps will be undertaken prior to implementation. You could argue they are part of implementation; but I think we're probably splitting hairs at this point, unless there is a feeling that we need to be more clear. Rob O'Reilly.

MR. O'REILLY: The Commissioner reminds me that the startup date is a little after January 1 for the General Assembly. But clearly that would be the implementation authority. It's not going to help the situation with the December 1 declarations. But January 1 might be a little bit too early to say that's the implementation.

I'm a little surprised. I think there probably are some other states that are going to need a little bit of time to do this as well. I remember in the past we've had to adopt even a May 1, which we don't want to do here. But I guess I'm asking the other states about this January 1 date. Maybe it might be better to put it into February.

CHAIRMAN BALLOU: Are there any thoughts by other Board members on whether January 1, 2018 is a date that they're comfortable with, or whether they wish to adjust? Cheri Patterson.

MS. PATTERSON: Question please. Megan, what is the harvest in the month of January?
MS. WARE: I don't know off the top of my head; but low.

CHAIRMAN BALLOU: Robert Boyles.

MR. BOYLES: Mr. Chairman, I would, I'm sorry you've got a motion. I'm sorry, never mind.

CHAIRMAN BALLOU: Any further discussion on the motion? Nichola Meserve.

MS. MESERVE: Just to clarify. Our state implementation plan is also due January 1, 2008, because Page 82 of the document has the option for two different dates for implementation plans being due, and then programs implemented.

CHAIRMAN BALLOU: Megan.

MS. WARE: Yes that's a good point. One option, taking into consideration what Rob O'Reilly said is we could do implementation plans due January 1, and then implementation date January 15, or February 1, whatever works. But that's just one suggestion.

CHAIRMAN BALLOU: There has been a suggestion. Is there an interest in modifying this motion? Robert Boyles.

MR. BOYLES: Move to amend.

CHAIRMAN BALLOU: Thank goodness, because we need this kind of excitement. Go ahead.

MR. BOYLES: I would move to amend that states submit implantation plans for Amendment 3 by January 1, 2018, and implement by January 15, 2018.

CHAIRMAN BALLOU: Is there a second to that motion; seconded by Jim Gilmore? Discussion on the motion to amend, is there any objection to the motion to amend? Seeing none; I'm sorry, Roy Miller.

MR. MILLER: Mr. Chairman, do we have to vote on those implementation plans?

MS. WARE: There is no voting. What has happened before is the Plan Review Team will review those; to make sure everyone has kind of checked the boxes on the various parts of the plan that the Board has voted on today. If there are any concerns then the PRT will notify the Board; potentially electronically or at the February meeting. We'll figure out the timing there. But that's how we have done it in the past.

CHAIRMAN BALLOU: I'll ask again, is there any objection to the motion to amend? Roy Miller.

MR. MILLER: I'm sorry, Mr. Chairman, I hate to be a nitpicker. But if the Board will be reading over these implementation plans, why not push back the actual implementation until the February meeting?

CHAIRMAN BALLOU: Toni Kerns.

MS. KERNS: Oftentimes we have a more complicated plan that will need information from the states. The states will have a lot more things to change. In this document for the most part, the only thing that you're going to be implementing is a quota. If a state can't implement the quota by January 15, then that is what we would need to know right now. Otherwise, I'm not sure there is going to be a lot of Plan Review Team review of the state implementation plans, because you're just going to come back and tell us yes, we're implementing our quota. I'll leave that with the Board to discuss.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: I know Robert Boyles has been trying to help me out here. I guess the situation is this isn't anticipated to be an emergency action at the General Assembly. The General Assembly goes into March, I think this year. I'm

looking to the back of the room and getting a head nod.

At the least, it would not be voted on and finalized through the House and the Senate, and be in the Governor's packet for him to either veto or sign, until March. I'm looking to the back of the room, or early April. Again, I'm a little surprised. First of all please know that this is a rare occasion; because usually VMRC is able to promulgate regulations fairly quickly, you know within a two month period.

It does put us in a bind that way, in that we really wouldn't have the quota ratified until early April. I don't know what to say other than that. I suppose we could be fishing not with reduction or with the snapper rig fisheries up until May, starting in May. But there is a bycatch situation, and the pound nets may start in late February some years. It depends. You know it's sort of a mess, I guess. But I think we can work around this better if it's not January 15, and again I know this is sort of a unique situation, just looking for some guidance.

CHAIRMAN BALLOU: Bob Beal.

EXECUTIVE DIRECTOR BEAL: A number of instances at the Commission, the Boards have set implementation dates, knowing that certain states or Commonwealths may take longer to implement. The compliance and other things have been really evaluated, based on whether a state is or is not moving toward implementation.

January 15 may not be the right date, but if it's March 1, or whatever it may be. The Commission is aware that states are working through their rule making or legislative processes to implement this Amendment. I think that is the most important thing. The other important thing is all states are working up the same sheet of music that know that the quotas that are approved through this Amendment and the spec setting process, are fully applicable to 2018.

We're not starting the year with a different quota, and then on the implementation date we're switching gears to a new quota. The Board today has approved the 2018 quotas that the states are going to be evaluated by. I think the implementation date may not be that critical. It's the state's working toward implementation of this that is the most important.

With that you guys can consider pushing back January 15 a little bit. But I don't know if we need to set the implementation date at sort of the least common denominator of the slowest legislative process; because some of the other states may need a shorter timeframe to sort of motivate them to implement the provisions earlier.

CHAIRMAN BALLOU: Eric Reid, did you have a comment?

MR. REID: I have a question. I think maybe Bob answered it; but I just want to be clear. What happens on January 1, as far as going fishing? What are we working off of? Are we working off of no quota? Are we working off of some quota? Do we have a bycatch? What do we have to work with?

CHAIRMAN BALLOU: Bob Beal

EXECUTIVE DIRECTOR BEAL: My understanding is you'll start with the allocations that are included in Amendment 3; based on the 216,000 metric ton quota that was approved earlier.

CHAIRMAN BALLOU: Yes, Andy Shiels.

MR. SHIELS: Would it make more sense to substitute the word implement and say no later than and pick a date; based on what Bob Beal said that you don't want to go for the fastest or the slowest state, but if it's no later than then everybody can work up to that date?

CHAIRMAN BALLOU: It's a suggestion. The Board can take that to heart, or we can just vote as proposed. I see two hands. Dr. Rhodes.

DR. RHODES: This hearkens back to an issue that we often have before the Board when we change rules or limits; because South Carolina, all processes are done by the legislature, so Robert frequently is telling the Board that we will get this done as quickly as we can. However, it goes through the legislature. Virginia is in the same boat as us. We've never asked to change implementation dates, and I think the Board recognizes that if you're handcuffed by the legislature in certain areas you are, but you're working towards that goal.

This would be fine if other states require a little fire to get everything implemented by an earlier date, we would do that. We just stay aware of the fact that Virginia is moving as rapidly as their legislature allows. We've been in that boat 100 times, and you all have all forborne us during those times.

CHAIRMAN BALLOU: Robert Boyles.

MR. BOYLES: Mr. Chairman, I'm sorry. I meant to say April 15 for implementation date.

CHAIRMAN BALLOU: Is that serious?

MR. BOYLES: Yes sir, I did. I'm tired, I'm sorry, distracted.

CHAIRMAN BALLOU: That's okay. Now we have a modified motion to amend that states submit implementation plans for Amendment 3 by January 1, 2018, and implement by April 15, 2018. Is there any objection to that modification to the amended motion? Seeing none; the motion stands amended, but we still haven't voted on it yet.

Is the Board ready to vote? **Are there any further questions or discussions on this issue? Seeing none; is there any objection to adopting the motion to amend? Seeing no objections; the motion to amend is adopted by consent, and it becomes the main motion.** Is there any further discussion on this now as the main motion? Seeing non hands; is there any objection to adopting this now as the final motion on implementation? Seeing no objections; the motion stands approved by consent, and now Robert, I do believe we're ready for one final motion. Right, yes we are.

MR. BOYLES: I would recommend to the Commission the approval of Amendment 3 to the Menhaden Interstate Fishery Management Plan as amended today.

CHAIRMAN BALLOU: Is there a second? Seconded by Jim Estes, moved by Robert Boyles and seconded by Jim Estes, is there discussion on this motion? This will be a final action by the Board; the final action on Amendment 3. It will be a roll call vote by necessity, and it will end the process of considering Amendment 3. Loren Lustig.

MR. LUSTIG: I certainly appreciate what we've had today; which has certainly been a very insightful discussion. I apologize to those of you might wish that I had forgotten, but I did not forget Rachel, my pal over here in Maryland using the word "unless." Here's my response. The Lorax said, "Unless someone like you cares a whole awful lot, it's not going to get better, it's not." I think what we proved to our critics and our supporters are that the people in this room care a whole awful lot. Thank you.

CHAIRMAN BALLOU: Any further discussion on this motion? Seeing none; I'll have Megan call the roll. We'll go north to south.

MS. WARE: Maine.

MR. KELIHER: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

MS. MESERVE: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Connecticut.

MS. GIANNINI: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. SHIELS: Yes.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MR. BLAZER: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: North Carolina.

DR. DUVAL: Yes.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: Georgia.

MR. WOODWARD: Yes.

MS. WARE: Florida.

MR. ESTES: Yes.

MS. WARE: NOAA Fisheries.

MR. BURNS: Yes.

MS. WARE: U.S. Fish and Wildlife.

MR. MILLARD: Yes.

CHAIRMAN BALLOU**: The motion passes 17 to 1 and the Amendment stands adopted**. Thank you, and before we move on to what I believe is our last agenda item, and it's a brief one, relatively brief. Indulge me for one minute, just one minute for some closing remarks. I would appreciate your time.

I really feel like I've learned two things through this process. One is that I was advised early on that amendments are a big deal; and I found that to be true. Then I've really learned that amendments pertaining to menhaden are really big deals. It has been quite a journey; but the second lesson that I've learned is that the journey is made possible thanks to the team effort of so many people.

I'm sure I'm missing some key folks here, or key entities. But I think back to the Allocation Workgroup Process that Robert Boyles began prior to my Chairmanship, while he was still Chair, which really carried forward and was very much a part of the provisions that ended up in this Amendment.

I think of the Plan Development Team and listening into their many hours of meetings, and working through these issues. I think of the Technical Committee and the BERP Working Group, and of course the Advisory Panel; for all

of their hard work over the course of really, the past two years. This has been a long process.

Of course I recognize prior, and recognize again the enormous amount of public input that was provided for this process; and how well received and appreciated it was. Of course there is this Board, and I've never been so privileged to work with such a fine group of people. It has been an honor and really a great experience to work with you through this process and get to where we've gotten.

Last but not least this person to my right, Megan Ware, our FMP Coordinator (Applause), what a champion and what a dear friend and colleague. Thank you so much, Megan for all of your work. Boy, I'm sure it's going to feel good tomorrow to know that this is actually behind you. I believe Max might be stepping in, if I've got that right, so welcome, Max.

It's a cake walk, I assure you. Before we do turn to our last item, I just have to note how skilled and talented Russ Allen is, agreeing to serve as Vice Chair, and then also leaving us just at the point where he would have assumed the Chairmanship. Well played, Russ. But in all seriousness, thank you.

I know we acknowledged and thank you for your contributions to this Commission at the last meeting. But certainly, let's take this opportunity to thank Russ for all of his contributions to the Menhaden Board. Thank you. (Applause) With that we turn to our last agenda item, which is, I'm sorry, Dennis Abbott.

MR. ABBOTT: Excuse me, Mr. Chairman. You thanked an awful lot of people; but you didn't thank yourself, which is not appropriate to do. But on behalf of the Board, I would like to thank you for the work that you've put into this, and also like to thank you for the way that you have conducted all the meetings with the utmost consideration to every person in the room. I think you ought to be congratulated; and we surely appreciate the work that you've done over the past two years. Thank you! (Applause)

CHAIRMAN BALLOU: Thank you very much and you're going to want to stand again; because I was just reminded that this is Spud Woodward's last meeting. Let's please stand and give a round of applause to our colleague, Spud Woodward. (Applause)

ELECTION OF VICE-CHAIR

CHAIRMAN BALLOU: With that we are indeed onto our last item of business; which is the election of a Vice-Chair. Does anyone have any recommendations or motions to make? Robert Boyles.

MR. BOYLES: **I would move that we nominate, select, and elect, and sentence Nichola Meserve as Vice-Chair of the Atlantic Menhaden Board, and if I could just to expedite things and the nominations be closed.**

CHAIRMAN BALLOU: I guess we need a second. Loren Lustig seconds that. Nominations are therefore closed. There is no chance Nichola that you're getting out of this one**. Is there any objection to the motion? Seeing none;** congratulations, Nichola and we look forward to your leadership as a follow to all that's been done by all of the prior Board Chairs and welcome and congrats.

MS. MESERVE: Big shoes to fill, but I expect nothing but smooth sailing for the next two years.

ADJOURNMENT

CHAIRMAN BALLOU: With that I believe the next order of business would be to adjourn; and then there might be a reconvening of the Business Section. Do I have that correct? Jim will be doing that; and Jim is already poised and ready to go, so this is going to be a quick transition. I will hereby adjourn this meeting of the Menhaden Board and turn it over to Jim Gilmore for the Business Section.

(Whereupon the meeting was adjourned around 3:00 o'clock p.m. on November 14, 2017)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

April 16, 2018

To: **Atlantic Menhaden Management Board**

From: **Atlantic Menhaden Technical Committee (TC) and Ecological Reference Point (ERP) Work Group**

RE: **Draft Terms of Reference (TORs) for the 2019 Atlantic Menhaden Single-Species and Ecosystem-Based Benchmark Stock Assessments and Peer-Reviews**

The following terms of reference were drafted in preparation for the Atlantic Menhaden Single-Species and Ecosystem-Based Benchmark Stock Assessment Data Workshops, scheduled for April 23-27, 2018, in Arlington, Virginia. As such, the TORs should be considered preliminary and may change slightly following TC and ERP Work Group Review.

TERMS OF REFERENCE

For the 2019 ASMFC Atlantic Menhaden Single-Species Benchmark Stock Assessment

Terms of Reference for the Single-Species Atlantic Menhaden Assessment

1. Define population structure based on available data. If alternative population structures are used in the models (e.g., coast-wide or regional), justify use of each population structure.
2. Characterize precision and accuracy of fishery-dependent and fishery-independent data used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data)
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors)
    d. Justify inclusion or elimination of available data sources.
    e. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, ageing accuracy, sample size) on model inputs and outputs.
3. Develop models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, and analyze model performance.
    a. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature. If using a new model, test using simulated data.
    b. Clearly and thoroughly explain model strengths and limitations.
    c. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    d. Describe stability of model (e.g., ability to find a stable solution, invert Hessian)
    e. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    f. Clearly and thoroughly explain model strengths and limitations.
    g. If multiple models were considered, justify the choice of preferred model and the explanation of any differences in results among models.

4. State assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs. Examples of assumptions may include (but are not limited to):
    a. Choice of stock-recruitment function.
    b. No error in the catch-at-age or catch-at-length matrix.
    c. Calculation of M. Choice to use (or estimate) constant or time-varying M and catchability.
    d. Choice of equilibrium reference points or proxies for MSY-based reference points.
    e. Choice of a plus group for age-structured species.
    f. Constant ecosystem (abiotic and trophic) conditions.
5. Characterize uncertainty of model estimates and biological or empirical reference points.
6. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective pattern for uncertainty in population parameters (e.g., F, SSB), reference points, and/or management measures.
7. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?
8. Other potential scientific issues:
    a. Compare trends in population parameters and reference points with current and proposed modeling approaches, including the results of the ecological-based benchmark stock assessment. If outcomes differ, discuss potential causes of observed discrepancies.
    b. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.
9. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.

10. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.
11. Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species.

Terms of Reference for the Atlantic Menhaden Single-Species Assessment External Peer Review

1. Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:
    a. Presentation of data source variance (e.g., standard errors).
    b. Justification for inclusion or elimination of available data sources,
    c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, aging accuracy, sample size),
    d. Calculation and/or standardization of abundance indices.
2. Evaluate the methods and models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, including but not limited to:
    a. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).
3. Evaluate the diagnostic analyses performed, including but not limited to:
    a. Sensitivity analyses to determine model stability and potential consequences of major model assumptions
    b. Retrospective analysis
4. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

5. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.
6. Recommend best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative estimation methods.
7. Evaluate the choice of reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.
8. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.
9. Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.
10. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

TERMS OF REFERENCE

For the 2019 ASMFC Atlantic Menhaden Ecosystem-Based Benchmark Stock Assessment

Terms of Reference for the Atlantic Menhaden Ecosystem-Based Assessment

1. Review and evaluate the fishery-dependent and fishery-independent data used in the Atlantic menhaden single-species assessment, and justify inclusion, elimination, or modification of those data sets.

2. Characterize precision and accuracy of additional fishery-dependent and fishery-independent data sets, including diet data, used in the ecological reference point models,
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data)
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors)
    d. Justify inclusion or elimination of available data sources.
    e. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, ageing accuracy, sample size) on model inputs and outputs.

3. Develop models used to estimate population parameters (e.g., F, biomass, abundance) of Atlantic menhaden that take into account ecosystem drivers of Atlantic menhaden population dynamics and analyze model performance.
    a. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature. If using a new model, test using simulated data.
    b. Justify choice of ecosystem drivers included (e.g., predator species, environmental effects)
    c. Describe stability of model (e.g., ability to find a stable solution, invert Hessian)
    d. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    e. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    f. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective pattern for uncertainty in population parameters (e.g., F, SSB), reference points, and/or management measures.
    g. Clearly and thoroughly explain model strengths and limitations.
    h. If multiple models were considered, justify the choice of preferred model and the explanation of any differences in results among models.

4. Develop reference points and methods to determine total allowable catch for Atlantic menhaden that account for Atlantic menhaden's role as a forage fish.

5. State assumptions made for all population and reference point models and explain the likely effects of assumption violations on synthesis of input data and model outputs.

6. Characterize uncertainty of model estimates and reference points.

7. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?

8. Other potential scientific issues:
    a. Compare trends in population parameters and reference points with current and proposed modeling approaches, including the results of the single-species benchmark assessment. If outcomes differ, discuss potential causes of observed discrepancies.
    b. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.

9. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.

10. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.

11. Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species.

Terms of Reference for the Atlantic Menhaden Ecosystem-Based Assessment External Peer Review

1. Evaluate the justification for the inclusion, elimination, or modification of data from the Atlantic menhaden single-species benchmark assessment.

2. Evaluate the thoroughness of data collection and the presentation and treatment of additional fishery-dependent and fishery-independent data sets in the assessment, including but not limited to:
    a. Presentation of data source variance (e.g., standard errors).
    b. Justification for inclusion or elimination of available data sources,
    c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, aging accuracy, sample size),
    d. Calculation and/or standardization of abundance indices.

3. Evaluate the methods and models used to estimate Atlantic menhaden population parameters (e.g., F, biomass, abundance), including but not limited to:
    a. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample

sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, choice of ecosystem drivers).

4. Evaluate the choice of reference points and the methods used to estimate them. Evaluate the methods to estimate total allowable catch.

5. Evaluate the diagnostic analyses performed, including but not limited to:
    a. Sensitivity analyses to determine model stability and potential consequences of major model assumptions
    b. Retrospective analysis

6. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

7. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.

8. Recommend best estimates of stock biomass, abundance, exploitation, and stock status of Atlantic menhaden from the assessment for use in management, if possible, or specify alternative estimation methods.

9. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

10. Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.

11. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

2018 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN AND STATE COMPLIANCE FOR ATLANTIC MENHADEN *(Brevoortia tyrannus)*

2017 Fishery

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Draft April 2018

REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN AND STATE COMPLIANCE FOR ATLANTIC MENHADEN *(Brevoortia tyrannus)* FOR THE 2017 FISHERY

Management Summary

Date of FMP:	Original FMP: August 1981
Amendments:	Plan Revision: September 1992 Amendment 1: July 2001 Amendment 2: December 2012 Amendment 3: November 2017
Management Unit:	The range of Atlantic menhaden within U.S. waters of the Northwest Atlantic Ocean, from the estuaries eastward to the offshore boundary of the Exclusive Economic Zone (EEZ).
States With Declared Interest:	Maine – Florida, including Pennsylvania
Additional Jurisdictions:	Potomac River Fisheries Commission, National Marine Fisheries Service, United States Fish and Wildlife Service
Active Boards/Committees:	Atlantic Menhaden Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Plan Review Team, Plan Development Team, Biological Ecological Reference Point Work Group
Stock Status:	Not overfished, and overfishing is not occurring (2017 stock assessment update)

I. Status of the Fishery Management Plan

Atlantic menhaden management authority is vested in the states because the vast majority of landings come from state waters. All Atlantic coast states and jurisdictions, with the exception of the District of Columbia, have declared an interest in the Atlantic menhaden management program.

The first coastwide fishery management plan (FMP) for Atlantic menhaden was passed in 1981 (ASMFC 1981). The 1981 FMP did not recommend or require specific management actions, but provided a suite of options should they be needed. In 1992, the plan was revised to include a suite of objectives intended to improve data collection and promote awareness of the fishery and its research needs (ASMFC 1992).

Amendment 1, passed in 2001, provided specific biological, ecological and socioeconomic management objectives for Atlantic menhaden. No recreational or commercial management measures were implemented as a result of Amendment 1; however, subsequent addenda instituted a harvest cap on the reduction fishery in the Chesapeake Bay, based on average landings from 2001-2005. Two addenda (Addendum I and V) revised the biological reference points for menhaden and specified that stock assessments are to occur every three years.

Amendment 2, approved in December 2012, established a 170,800 metric ton (metric tons) total allowable catch (TAC) for the commercial fishery beginning in 2013. This TAC represented a 20% reduction from average landings between 2009 and 2011. The 2009-2011 time period was also used to allocate the TAC among the jurisdictions. In addition, the Amendment established requirements for timely reporting of commercial landings and required states to be accountable for their respective quotas by paying back any overages the following year. Amendment 2 also included provisions that allowed for the transfer of quota between jurisdictions and a bycatch allowance of 6,000 pounds per day for non-directed fisheries that operate after a jurisdiction's quota has been landed. Further, it reduced the Chesapeake Bay reduction fishery harvest cap by 20% to 87,216 metric tons.

In May 2013, the Board approved Technical Addendum I which established an episodic events set aside program. This program set aside 1% of the coastwide TAC for the New England states (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) to harvest Atlantic menhaden when they occur in higher abundance than normal. In order to participate in the program, a state must reach its individual quota prior to September 1, implement daily trip level harvester reporting, restrict harvest to state waters, and implement a daily trip limit no greater than 120,000 pounds/vessel. At its October 2013 meeting, the Board extended the episodic event set aside program through 2015, adding a provision that re-allocated unused set aside as of October 31 to the coastwide states based on the same allocation percentages included in Amendment 2. At its May 2016 meeting, the Board again extended the episodic events program until final action on Amendment 3 and added New York as an eligible state to harvest under the program.

At its May 2015 meeting, the Board established a TAC of 187,880 metric tons for the 2015 and 2016 fishing years. This represented a 10% increase from the 2013 and 2014 TAC. In October 2016, the Board approved a TAC of 200,000 metric tons for the 2017 fishing year, representing a 6.45% increase from the 2015 and 2016 TAC.

In August 2016, the Board approved Addendum I which added flexibility to the bycatch provision by allowing two licensed individuals to harvest up to 12,000 pounds of menhaden bycatch when working together from the same vessel using stationary multi-species gear. The intent of this Addendum was to accommodate cooperative fishing practices that traditionally take place in the Chesapeake Bay.

At its February 2014 meeting, the Board passed a motion to manage cast net fisheries for Atlantic menhaden under the bycatch allowance for 2014 and 2015, with the states bearing responsibility for reporting. At its November 2015 meeting, the Board approved a motion to continue the management of cast net fisheries under the bycatch allowance for 2016. In February 2017, the Board extended management of the cast net fishery under the bycatch provision until implementation of Amendment 3.

Amendment 3 to the Atlantic Menhaden Fishery Management Plan:

The Board approved Amendment 3 in November 2017. First, Amendment 3 maintains the management program's current single-species biological reference points until the review and adoption of menhaden-specific ERPs as part of the 2019 benchmark stock assessment process. In doing so, the Board placed the development of menhaden-specific ERPs as its highest priority and supports the efforts of the Ecological Reference Point Work Group (ERP WG) to reach that goal (see *Section III*). The intent of menhaden-specific ERPs is to provide a method to assess the status of menhaden not only in regard to their own sustainability, but also in regard to their interactions with predators and the status of other prey species. The benefit of this approach is that it allows fishery managers to consider the harvest of menhaden within a broad ecosystem context, which includes other fish, birds, mammals, and humans who utilize and depend on marine resources.

Amendment 3 also changes commercial quota allocations in order to strike an improved balance between gear types and jurisdictions, and to facilitate future growth opportunities. The Amendment allocates a baseline quota of 0.5% to each jurisdiction, and then allocates the rest of the TAC based on historic landings between 2009 and 2011. This measure provides fishing opportunities to states which had little quota under Amendment 2, while still recognizing historic landings in the fishery. Furthermore, states have the option to relinquish all or part of their quota by December 1st of the preceding fishing year. Any relinquished quota is then redistributed to the other jurisdictions based on the historic landings period (2009-2011). The Amendment also prohibits the rollover of unused quota; maintains the quota transfer process; maintains the 6,000 pound trip limit for non-directed and small-scale gears following the closure of a directed fishery; and sets aside 1% of the TAC for episodic events in the states of Maine through New York.

Finally, the Amendment reduces the Chesapeake Bay cap, which was first implemented in 2006 to limit the amount of reduction harvest within the Bay, to 51,000 metric tons. This recognizes the importance of the Chesapeake Bay as nursery grounds for many species by capping recent reduction landings from the Bay to current levels.

In addition to its Amendment 3 deliberations, the Board set the TAC for the 2018 and 2019 fishing seasons at 216,000 metric tons. This represents an 8% increase from the 2016 and 2017 TAC.

II. Status of the Stock

Threshold reference points are the basis for determining stock status. When the fishing mortality rate (*F*) exceeds the *F*-threshold, overfishing is occurring. When the reproductive output measure, in this case population fecundity (*FEC*), falls below its threshold, then the stock is overfished, meaning there is insufficient egg production to replenish the stock.

Amendment 2 (2013) implemented maximum spawning potential (MSP) based reference points that relate current stock conditions as a percent of unfished conditions. Considering the modeling and data input changes that occurred in the 2015 Benchmark Stock Assessment, the TC and Peer Review Panel recommended new MSP based reference points that are applicable to the results of the assessment (SEDAR 2015). These new reference points were accepted by the Board in 2015 and continue to be used under Amendment 3 (2017).

As recommended by the Peer Review Panel, and accepted by the TC, the values of the threshold and target fishing mortality reference points are calculated as the maximum and median geometric mean fishing mortality rate for ages-2 to -4 during the reference period of 1960-2012. These ages represent the fully selected fishing mortality rates depending upon the year and fishery (i.e., bait and reduction). The fecundity (FEC) reference points match the F reference points meaning they are equal to the fecundity estimated when F reaches equilibrium at its target and threshold MSP levels, respectively.

According to the 2017 stock assessment update (ASMFC 2017), the fishing mortality reference points are *F*-target ($F_{36\%\ MSP}$) = 0.80 and *F*-threshold ($F_{21\%\ MSP}$) = 1.85. Associated reference points for population fecundity are *FEC*-target ($FEC_{36\%MSP}$) = 99,467 (billions of eggs), and *FEC*-threshold ($FEC_{21\%MSP}$) = 57,295 (billions of eggs). Based on the 2017 stock assessment, overfishing is not occurring because fishing mortality for the terminal year (2016) is estimated to be $F = 0.51$ ($F_{48\%MSP}$), below both the target and the threshold. Additionally, the stock is not overfished because fecundity for 2016 is estimated to be *FEC* = 83,486 billion eggs, above the threshold but below the target.

A benchmark assessment is expected to be completed and peer-reviewed at the end of 2019.

III. Progress of the Ecological Reference Point Work Group

The Ecological Reference Point Work Group (ERP Work Group; formerly known as the BERP Work Group) has been tasked with developing menhaden-specific ecosystem reference points that account for the abundance of menhaden and the species role as a forage fish. In 2017, the ERP Work Group held three workshops to review candidate ERP models. The candidate models include a Bayesian surplus production model with a time-varying population growth rate, a Steele-Henderson model which permits non-fisheries effects (predation and environment) to be quantified and incorporated into the single species stock assessments, and a multispecies statistical catch-at-age model in which single species models are linked to provide a predator-prey feedback between the population models. An Ecopath with Ecosim model is also being evaluated for strategic planning purposes and exploring tradeoffs.

The ERP Work Group decided to continue to pursue the development of each modeling approach until available data has been full vetted. A Data Workshop is scheduled for April 2018. It is expected that a peer-review of the menhaden-specific ERP model(s) will coincide with the peer-review of the singles-species benchmark assessment at the end of 2019.

V. Status of the Fishery

Recreational

Menhaden are important bait in many recreational fisheries; some recreational fishermen employ cast nets to capture menhaden or snag them with hook and line for use as bait, both dead and live. Recreational harvest is not well captured by the Marine Recreational Information Program (MRIP) because there is not a known identified direct harvest for menhaden, other than for bait. MRIP intercepts typically capture the landed fish from recreational trips as fishermen come to the dock or on the beach. However, since menhaden caught by recreational fishermen are used as bait during their trip, they are typically not a part of the catch that is seen by the surveyor completing the intercept.

The preliminary MRIP estimate of Atlantic menhaden harvest in 2017 is 1,067,309 pounds. This is a 36% decrease from the 2016 recreational harvest estimate (1,674,912 pounds), but only 5% below the previous 5-year average (1,118,214 pounds).

Commercial

Total commercial Atlantic menhaden landings in 2017, including reduction, bait, bycatch, and episodic event set aside (EESA) landings, was 380.85 million pounds. The bycatch landings[1] of 2.60 million pounds do not count toward the coastwide commercial TAC of 440.9 million pounds. The non-bycatch landings[2] total was 378.12 million pounds, representing a 14% underage of the coastwide TAC in 2017, and a 4.7% decrease from the 396.8 million pounds landed in 2016[3].

Reduction Fishery

The 2017 harvest for reduction purposes was 284.2 million pounds. This represents a 6.2% decrease from 2016 reduction landings, and is 8% below the previous 5-year average of 310.2 million pounds (Figure 1). Omega Protein's plant in Reedville, Virginia, is the only active Atlantic menhaden reduction factory on the Atlantic coast.

Bait Fishery

The preliminary estimate of the coastwide bait harvest for 2017, including directed, bycatch and EESA landings, is 96.62 million pounds; this is a 1.8% increase from the 2016 bait harvest, and is 5.2% less than the previous 5-year average of 101.9 million pounds (Figure 1). New Jersey

[1] Landed under the 6,000 pound bycatch allowance
[2] Directed landings and episodic events set aside landings, combined
[3] Based on 2018 state compliance reports

(49%), Virginia (33%), Maine (4.2%), Massachusetts (3.8%), and Maryland (3.0%) landed the five largest shares.

Bycatch Landings
In 2017, the states of Maine, New Hampshire, Rhode Island, Connecticut, New York, Delaware, PRFC and Florida reported bycatch landings (Table 1). Preliminary bycatch landings in 2017 totaled 2.73 million pounds, which represents a 6% increase from 2016 bycatch landings[4]. The 2017 bycatch landings accounted for approximately 0.72% of the coastwide landings, but do not count towards the coastwide TAC. Although bycatch increased in 2017, this may not be an issue considering the large increase in state-specific quotas in 2018. It should also be noted that due to unusual computer programing errors, PRFC closed its 2017 directed fishery earlier than is typical. As a result, PRFC's combined directed landings and bycatch landings in 2017 were less than its 2017 quota.

A total of 3,387 trips landed bycatch of Atlantic menhaden in 2017, which is a 78% increase relative to 2016 (1,908 trips) but 6% below average from 2013-2017. A majority of the bycatch trips (73%) landed less than 1,000 pounds in 2017 (70% on average from 2013 through 2017; Table 2). The predominant gears used from 2013-2017 include pound nets (56%) and anchored/staked gill nets (24%). Refer to Table 3 for average landings under the bycatch allowance from 2013-2017 by gear type and jurisdiction.

Episodic Events Set Aside Program
One percent of the TAC is set aside for episodic events. Episodic events are defined as any instance when a qualified state has reached its individual state quota prior to September 1, and has information indicating the presence of unusually large amounts of menhaden in its state waters. In 2017, Maine, Rhode Island, and New York[5] declared participation in the set aside. In total, 4.69 million pounds were harvested under the set aside which represents a 6% overage of the 4.41 million pound set aside quota and a 23% increase from 2016. The overage (285,398 pounds) will be deducted from the 2018 set aside quota. The resulting quota for 2018 is 4.48 million pounds.

VI. Status of Research and Monitoring

Commercial fisheries monitoring
Reduction fishery - The NMFS Southeast Fisheries Science Center Beaufort Laboratory in Beaufort, North Carolina, continues to monitor and process landings and biological sample data collected from the Atlantic menhaden purse-seine reduction fishery. The Beaufort Laboratory processes and ages all reduction samples collected on the East Coast. In addition, the purse-seine reduction fishery continues to provide Captains Daily Fishing Reports (CDFRs) to the

[4] Based on the 2018 state compliance reports, estimated bycatch landings for 2016 totaled 2,581,534 pounds
[5] While not a New England state, New York was approved by the Board in May 2016 to harvest under the set aside program. This exemption is codified in Amendment 3.

Beaufort Laboratory where NMFS personnel enter data into a database for storage and analysis.

Bait fishery - Per Amendment 2 (and Amendment 3), states are required to implement a timely quota monitoring system in order to maintain menhaden harvest within the TAC and minimize the potential for overages. The SAFIS daily electronic dealer reporting system allows near real time data acquisition for federally permitted bait dealers in the Mid-Atlantic and Northeast. Landings by Virginia's purse-seine for-bait vessels (snapper rigs) in Chesapeake Bay are tabulated (at season's end) using CDFRs maintained on each vessel during the fishing season. A bait-fishery sampling program for size and age composition has been conducted since 1994. The Beaufort Laboratory, and some states, age the bait samples collected. See *Section VII: Implementation for FMP Compliance Requirements for 2017* for further information on age and length sampling requirements.

Atlantic menhaden research

The following studies relevant to menhaden assessment and management have been published within the last year:

- Whitehead, J.C., and Harrison, J. 2017. Socioeconomic Analysis of the Atlantic Menhaden Commercial Bait and Reduction Fishery. A report to the Atlantic States Marine Fisheries Commission: http://www.asmfc.org/files/Atlantic%20Menhaden/ASMFC_MenhadenSocioeconomicReport_June2017.pdf
- Able, K.W., Valenti J.L., and Grothues, T.M. 2017. Fish Larval Supply to and within a Lagoonal Estuary: Multiple Sources for Barnegat Bay, New Jersey." Environmental Biology of Fishes 100.6: 663-83
- Aguilar et al. 2017. Gutsy Genetics: Identification of Digested Piscine Prey Items in the Stomach Contents of Sympatric Native and Introduced Warmwater Catfishes Via DNA Barcoding. Environmental Biology of Fishes 100.4: 325-36
- Allen, D.M., Virginia, O.M., and Kenny, P.D. 2017. Nekton use of Flooded Salt Marsh and an Assessment of Intertidal Creek Pools as Low-Tide Refuges." Estuaries and Coasts 40.5: 1450-63
- Anstead, K.A., Schaffler, J.J., and Jones, C.M. 2017. Contribution of Nursery Areas to the Adult Population of Atlantic Menhaden. Transactions of the American Fisheries Society 146.1 (2017): 36-46
- Güt, J.A., and Curran, M.C. 2017. Assessment of Fish Assemblages before Dredging of the Shipping Channel Near the Mouth of the Savannah River in Coastal Georgia. Estuaries and Coasts 40.1: 251-67
- Kornis et al. 2017. Linking the Abundance of Estuarine Fish and Crustaceans in Nearshore Waters to Shoreline Hardening and Land Cover." Estuaries and Coasts 40.5: 1464-86

- Korsman, B.M., Kimball M.E., and Hernandez, F.J. 2017. Spatial and Temporal Variability in Ichthyoplankton Communities Ingressing through Two Adjacent Inlets Along the Southeastern US Atlantic Coast. Hydrobiologia 795.1: 219-37
- Schueller, A.M., and Williams, E.H. 2017. Density-Dependent Growth in Atlantic Menhaden: Impacts on Current Management. North American Journal of Fisheries Management 37.2: 294-301
- Valenti, J.L., Grothues, T.M., and Able, K.W. 2017. Estuarine Fish Communities Along a Spatial Urbanization Gradient. Journal of Coastal Research SI.78: 254-68
- Vasslides, J.M., and Jensen, O.P. 2017. Quantitative Vs. Semiquantitative Ecosystem Models: Comparing Alternate Representations of an Estuarine Ecosystem. Journal of Coastal Research SI.78: 287-96
- Vasslides, J.M., et al. 2017. Modeling the Effects of a Power Plant Decommissioning on an Estuarine Food Web. Estuaries and Coasts 40.2: 604-16

Theses and Dissertations of Potential Interest:

- Liljestrand, Emily Morgan. 2017. Mortality and Movement of Adult Atlantic Menhaden during 1966-1969. Order No. 10618597 University of Maryland, College Park
- Siple, Margaret Clark. 2017. Implications of Demographic Diversity for Forage Fish, their Fisheries, and Ecosystems. Order No. 10680836 University of Washington

VII. Implementation of FMP Compliance Requirements for 2017

All states are required to submit annual compliance reports by April 1.

Quota Monitoring and Results

Menhaden purse seine and bait seine vessels (or snapper rigs) are required to submit Captain's Daily Fishing Reports (CDFRs). Maine, New York and Virginia fulfilled this requirement in 2017. New Jersey did not require purse seine vessels to fill out the specific CDFR but did require monthly trip level reporting on state forms that include complementary data elements to the CDFR. Rhode Island purse seine vessels must call in daily reports to RI DFW and fill out daily trip level logbooks. Massachusetts requires trip level reporting for all commercial fishermen.

Through Amendment 2, the Board approved timely quota monitoring programs for each state that were intended to minimize the potential for quota overages. Table 5 contains a summary of each state's approved quota monitoring system.

Table 4 contains state specific quotas and harvest that occurred in 2017. Table 5 displays the breakdown in directed versus bycatch landings by jurisdiction. The final state quotas for 2017 include an adjustment from two inter-state quota transfers; North Carolina transferred 195,180 pounds to Maine, and 300,000 pounds to New York. These quota transfers were pursued to ameliorate overages. Quota overages resulted from the fact that there was a high and/or variable volume of landings over a short period of time relative to the size of the quota.

At their November 2017 meeting, the Board set the 2018 TAC at 216,000 metric tons (476.2 million pounds), an 8% increase from the 2017 TAC. State-specific quotas for the 2018 fishing year are displayed in Table 4. The 2018 quota for Massachusetts, Rhode Island, and Delaware will be reduced by the amount of their overage in 2017. Furthermore, Massachusetts indicated that its quota overage was due to a single transaction being inadvertently categorized as "Research Set-Aside" and thus omitted from totals during quota monitoring. Rhode Island indicated that it went from being under its quota to over its quota in one day. However, this should not be a problem considering both states quotas increased significantly under the Amendment 3 allocations.

Biological Monitoring Requirements
Amendment 2 implemented monitoring requirements for non *de minimis* states as follows:

- One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for ME, NH, MA, RI, CT, NY, NJ, and DE; and
- One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for MD, PRFC, VA, and NC.

Table 6 provides the number of 10-fish samples required for 2017. These are based on the best available 2017 total bait landings data (including bycatch and episodic events) provided to the Commission by the states. Table 6 also provides the number of ages and lengths collected by the states in 2016, and an indication of the gear type sampled during collections. All states met the biological monitoring requirements of Amendment 2 in 2017. Connecticut continued to collect age and length samples from fishery-independent sources to fulfill this requirement. Although Maine collected five of six required samples, the PRT determined that Maine made a strong effort to fulfill the sampling requirement, and likely would have succeeded if the fishery were open another week (Maine DMR collects samples from the menhaden bait fishery once per week while the directed fishery is open, and Maine's directed fisheries were only open for 5-weeks in 2017).

The PRT discussed whether a sufficient number of samples are being collected from different gear types and regions, and whether additional sampling should be conducted from bycatch fisheries. The 2019 benchmark provides an opportunity for the Technical Committee to evaluate age and length data from commercial bait fishery catches and respond to the PRT's comments.

Adult CPUE Index Requirement
Amendment 2 required that, at a minimum, each state with a pound net fishery must collect catch and effort data elements for Atlantic menhaden as follows; total pounds landed per day, number of pound nets fished per day. These are harvester trip level ACCSP data requirements. In May of 2013, the Board approved North Carolina's request to omit this information on the basis that it does not have the current reporting structure to require a quantity of gear field by

harvesters or dealers[6]. All other states with a pound net fishery met this requirement. New Jersey did note, however, that there appeared to be some confusion in the reporting of effort. New Jersey Staff is working with industry to clarify the reporting requirement.

Chesapeake Bay Reduction Fishery Cap

In 2017, and under the provisions of Amendment 2, the Chesapeake Bay Cap for the reduction fishery was set at 98,192 metric tons (87,216 metric tons plus an eligible rollover of 10,976 metric tons from the 2016 fishing year). Reported reduction landings from the Chesapeake Bay for 2017 was about 20,000 metric tons, which is below the Cap.

Amendment 3 implemented a change to the Chesapeake Bay Harvest Cap for the reduction fishery, starting in 2018. The Cap is set at 51,000 metric tons which is roughly the average harvest from the Chesapeake Bay reduction fishery over the 5-year time period from 2012-2016. Harvest for reduction purposes shall be prohibited within the Chesapeake Bay when 100% of the cap is harvested from the Chesapeake Bay. Harvest above the Cap in any given year will be deducted from the next year's allowable harvest. Transfer of quota to the Cap to reduce an overage is not permitted. Furthermore, any amount of un-landed fish under the cap cannot be rolled over into the subsequent year. As a result, the cap in a given year cannot exceed 51,000 metric tons.

De Minimis Status

To be eligible for *de minimis* status, a state's bait landings must be less than 1% of the total coastwide bait landings for the most recent two years. State(s) with a reduction fishery are not eligible for *de minimis* consideration. If granted *de minimis* status by the Board, states are exempt from implementing biological sampling as well as pound net catch and effort data reporting. The Board also approved a *de minimis* exemption for New Hampshire, South Carolina and Georgia from implementation of timely reporting

The states of New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida requested and qualify for *de minimis* status for the 2017 fishing season. As a result, the Plan Review Team (PRT) recommends that New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida be granted *de minimis* status.

VIII. State Implementation of Amendment 3

2018 is the first year of Amendment 3 implementation. State implementation plans were due January 1 with regulations to be implemented by April 15. Implementation plans were to include proposed, or already implemented regulatory language which fulfils each of the requirements of Amendment 3. Following review, the PRT determined that each state has fulfilled the requirements of Amendment 3, with one exception; Virginia's 2018 harvest cap for the reduction fishery in the Chesapeake Bay is higher than that permitted under Amendment 3

[6] North Carolina indicated that it may be able to provide a proxy for this information on an annual basis from existing information collected on permits. The state will consider this for the 2018 compliance report.

(Virginia's 2018 quota is more conservative than that permitted under Amendment 3). South Carolina's and Georgia's implementation plan indicated that if a directed fishery develops in its jurisdiction, it would submit an updated implementation plan outlining all mechanisms to fulfill the requirements of Amendment 3 for Board review and approval.

IX. Plan Review Team Recommendations

Management Recommendations

- That the Board approve the *de minimis* requests from New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida.

IX. Literature Cited

Atlantic States Marine Fisheries Commission (ASMFC). 1981. Fishery Management Plan for Atlantic Menhaden. 146 pp.

ASMFC. 1992. Fishery Management Plan for Atlantic Menhaden 1992 Revision. 170 pp.

ASMFC. 2001. Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. 146 pp.

ASMFC. 2004. Addendum I to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. 52 pp.

ASMFC. 2011. Addendum V to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. 17 pp.

ASMFC. 2012. Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden. 114 pp.

ASMFC. 2013. Technical Addendum I to Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden. 4 pp.

ASMFC. 2016. Addendum I to Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden. 12 pp.

ASMFC. 2017. Atlantic Menhaden Stock Assessment Update. Prepared by the ASMFC Atlantic Menhaden Stock Assessment Subcommittee. 180 pp.

Southeast Data, Assessment, and Review (SEDAR). 2015. SEDAR 40 – Atlantic Menhaden Stock Assessment Report. SEDAR, North Charleston SC. 643 pp.

Table 1. Directed, bycatch, and episodic landings (pounds) for 2017 by jurisdiction. NA = not applicable.

	Directed	Bycatch	Episodic
ME	344,130	699,874	C
NH	-	C	-
MA	3,697,744	-	-
RI	153,408	135,748	C
CT	76,152	123,666	-
NY	509,430	807,392	C
NJ	46,881,174	-	NA
DE	58,174	26,625	NA
MD	2,912,256	-	NA
PRFC	1,444,316	670,447	NA
VA	316,592,852	-	NA
NC	755,136	-	NA
SC	-	-	NA
GA	-	-	NA
FL	4,475	263,643	NA

Table 2. Total number of bycatch trips by year from 2013-2017 separated into 1,000 pound landings bins.

Bins (LBS)	2013 Trips	2014 Trips	2015 Trips	2016 Trips	2017 Trips	Total Trips	% of Total Trips 2013-2017
1-1000	1,875	3,673	3,146	1,450	2,458	12,602	70%
1001-2000	252	517	584	148	399	1,900	11%
2001-3000	148	318	316	73	135	990	5%
3001-4000	110	190	139	48	82	569	3%
4001-5000	131	206	132	48	94	611	3%
5001-6000	158	265	196	108	197	924	5%
6000+	130	109	140	33	22	434	2%
Total	2,804	5,278	4,653	1,908	3,387	18,030	

Table 3. Average landings under the bycatch allowance from 2013–2017 by gear type (stationary and mobile) and jurisdiction. Highlighted cells represent the gear type with the highest landings within a jurisdiction. (C) = confidential landings, and (-) = no landings. Total confidential landings are 121,906 pounds (i.e., the sum of all C's in the table below). Note that 'sum of pounds' and 'percent of total' columns do not include confidential data.

State/Jurisdiction	ME	NH	RI	CT	NY	NJ	DE	MD	PRFC	VA	FL	Sum lbs (NonConf)	% of Total
Stationary Gears While Fishing													
Pound net	-	-	64,545	-	183,813	C	-	1,579,981	682,950	90,087	-	2,601,376	56.37%
Anchored/stake gill net	39,860	-	C	C	25,100	79,850	30,622	15,777	3,213	892,409	C	1,086,831	23.55%
Pots	-	-	-	-	3,425	-	C	C	-	-	C	3,425	0.07%
Fyke nets	-	-	-	-	-	C	-	C	52	62	-	114	0.00%
Mobile Gears While Fishing													
Cast Net	-	-	C	563	183,813	C	-	C	-	-	173,150	357,526	7.75%
Drift Gill net	-	-	-	-	-	66,958	35,988	-	-	-	-	102,946	2.23%
Purse Seine	201,344	-	-	-	-	-	-	-	-	-	-	201,344	4.36%
Seines Haul/Beach	-	-	-	-	250,433	-	-	C	28	3,072	-	253,533	5.49%
Trawl	-	C	C	C	7,836	C	-	-	-	-	-	7,836	0.17%
Hook & Line	-	-	C	C	-	-	-	C	-	-	C	-	0.00%
Sum lbs (NonConf)	241,204	0	64,545	563	654,420	146,807	66,610	1,595,758	686,243	985,630	173,150	4,614,930	
% of Total	5.23%	0.00%	1.40%	0.01%	14.18%	3.18%	1.44%	34.58%	14.87%	21.36%	3.75%		

Table 4: State quota reporting timeframes in 2017. The **bold** text indicates which reporting program (dealer or harvesters) the states use to monitor its quotas.

State	Dealer Reporting	Harvester Reporting	Notes
ME	monthly	**monthly/daily**	Harvesters landing greater than 6,000 lbs must report daily during episodic event
NH	**weekly**	monthly	Exempt from timely reporting. Implemented weekly, trip level reporting for state dealers.
MA	**weekly**	monthly/daily	Harvesters landing greater than 6,000 lbs must report daily
RI	**twice weekly**	quarterly/daily	Harvesters using purse seines must report daily
CT	**weekly/monthly**	monthly	No directed fisheries for Atlantic menhaden
NY	**Weekly**	monthly	Capability to require weekly harvester reporting if needed
NJ	**weekly**	monthly	All menhaden sold or bartered must be done through a licensed dealer
DE	—	**monthly/daily**	Harvesters landing menhaden report daily using IVR
MD	monthly	**monthly/daily**	PN harvest is reported daily, while other harvest is reported monthly.
PRFC	—	**weekly**	Trip level harvester reports submitted weekly. When 70% of quota is estimated to be reached, then pound netters must call in weekly report of daily catch.
VA	—	**monthly/weekly/daily**	Purse seines submit weekly reports until 97% of quota, then daily reports. Monthly for all other gears until 90% of quota, then reporting every 10 days.
NC	**monthly (combined reports)**		Single trip ticket with dealer and harvester information submitted monthly. Larger dealers (>50,000 lbs of landings annually) can report electronically, updated daily.
SC	**monthly (combined reports)**		Exempt from timely reporting. Single trip ticket with dealer and harvester information.
GA	**monthly (combined reports)**		Exempt from timely reporting. Single trip ticket with dealer and harvester information.
FL	**monthly/weekly (combined reports)**		Monthly until 50% fill of quota triggers implementation of weekly.

Table 5. Results of 2017 quota accounting in pounds. The 2017 landings do not include bycatch landings because they do not count towards the TAC. The episodic events set aside quota was exceeded by 285,398 pounds in 2017. The 2018 quotas account for overages which occurred in the 2017 fishery and the redistribution of 6,704,365 pounds of quota relinquished by Delaware (2 million pounds), South Carolina (2,347,183 pounds) and Georgia (2,357,183 pounds).

State	2017 quota	Returned Set Aside	Transfers	Total 2017 Quota	2017 Landings	Overage	2018 Quota (Amendment 3)
ME	171,882	Set Aside Exceeded by 285,398 pounds	195,180	367,062	344,130	-	2,439,114
NH	131			131	-	-	2,357,315
MA	3,660,454			3,660,454	3,697,744	37,290	6,027,724
RI	78,195			78,195	153,408	75,213	2,366,618
CT	76,152			76,152	76,152	-	2,432,640
NY	242,032		300,000	542,032	509,430	-	3,270,675
NJ	48,853,880			48,853,880	46,881,174	-	52,013,736
PA	-			-	-	-	2,357,183
DE	57,646			57,646	58,174	528	415,939
MD	5,991,662			5,991,662	2,912,256	-	9,002,733
PRFC	2,709,809			2,709,809	1,444,316	-	5,102,086
VA	372,443,990			372,443,990	316,592,852	-	376,543,327
NC	2,150,995		(495,180)	1,655,815	755,136	-	4,540,560
SC	-			-	-	-	10,000
GA	-			-	-	-	-
FL	74,279			74,279	4,475	-	2,443,819
TOTAL	436,511,109			436,511,109	373,429,247	113,031	471,323,470

Table 6. Biological monitoring results in 2017. Note that total bait landings include bycatch landings.

State	Total Bait Landings (pounds)	#10-fish samples required	#10-fish samples collected	Age samples collected	Length samples collected	Gear/Comments
ME	4,015,309	6	5[1]	50	50	purse seine
MA	3,697,744	5.6	5	50	50	purse seine (4), midwater trawl (1)
RI	1,752,756	3	9	107	107	floating fish trap[2]
CT[3]	199,818	1	0	0	0	gill nets
NY	1,576,560	2	6	60	60	gill net, seine
NJ	46,881,174	71	140	1400	1400	purse seine (135), and other gears (5)
DE	84,799	1	1	225	225	drift gill net
MD	2,912,256	7	21	300	1058	pound net
PRFC	2,114,763	5	13	130	130	pound net
VA	32,360,092	74	92	920	920	pound net (35), gill net (44), haul seine (13)
NC	755,136	2	10	138	138	gillnet, pound net
Total	96,350,407	**177**	**302**	**3380**	**4138**	

[1] Sample schedule was once weekly for the duration of the directed and episodic fisheries; these fisheries were open for only 5 weeks and therefore the last required sample was not collected. However, the PRT determined that Maine made a strong effort to fulfill the biological monitoring requirement, and would have succeeded if the fishery were open another week.
[2] Thirteen lengths and ages were collected in addition to the table
[3] Ages (228) and lengths (239) collected from menhaden encountered during the Long Island Sound Trawl Survey

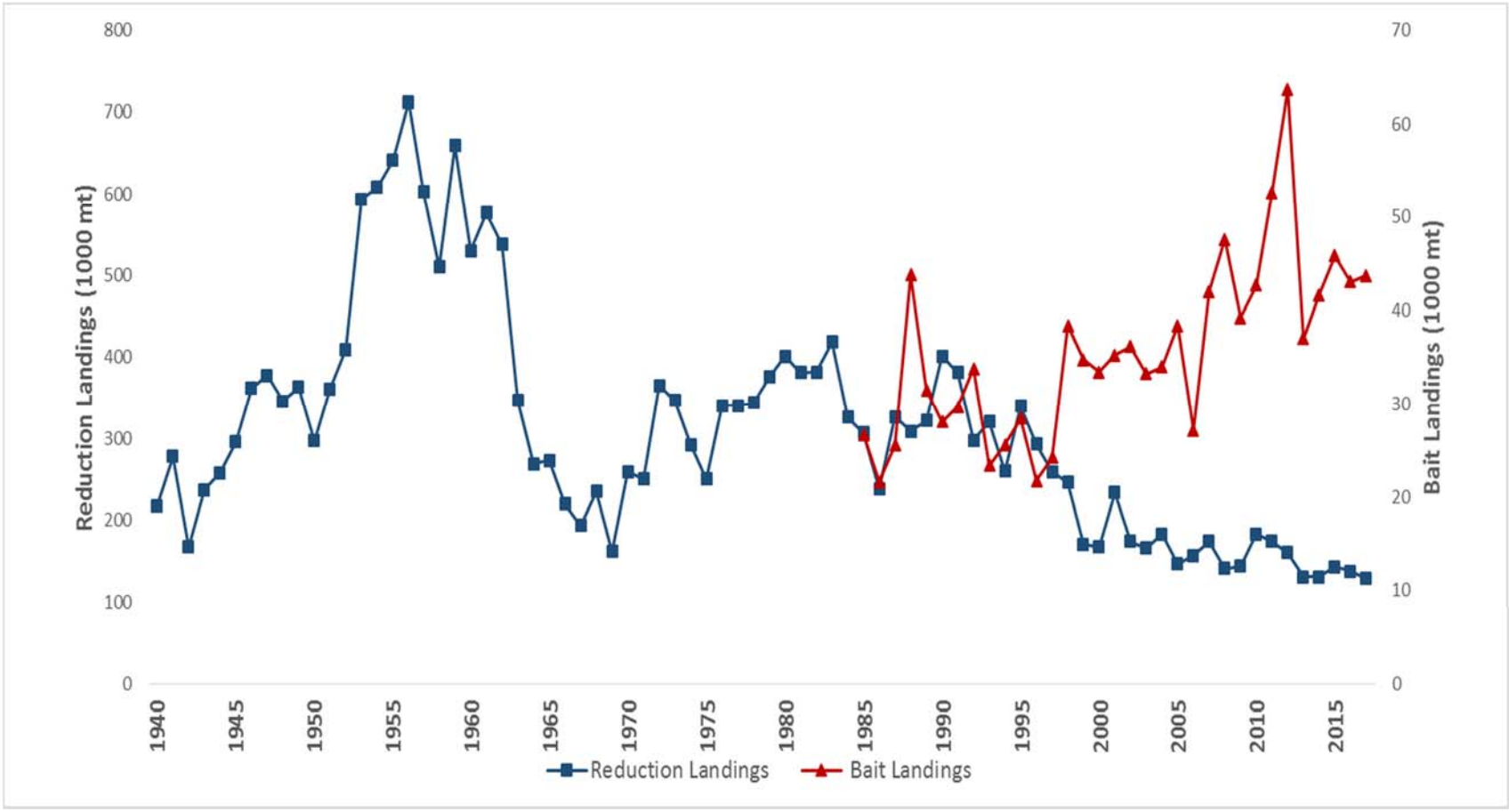

Figure 1. Landings from the reduction purse seine fishery (1940–2017) and bait fishery (1985–2017) for Atlantic menhaden. Note: there are two different scales on the y-axes.

t nt c St te r ne F er e omm on

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TO: Atlantic Menhaden Management Board

FROM: Max Appelman, FMP Coordinator

DATE: December 6, 2017

SUBJECT: Amendment 3 Implementation Plan Template

At the November meeting, the Atlantic Menhaden Management Board (Board) took final action on Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. Based on Board action, implementation plans for the Amendment are due January 1, 2018, and jurisdictions must implement regulations by April 15, 2018.

Below is a template that jurisdictions can use when crafting Amendment 3 implementation plans. The implementation plans should include proposed, or already implemented, regulatory language which fulfills each of the requirements below. Given many of the requirements are similar to those in Amendment 2, jurisdictions can attach current regulatory language to this template and note in the spaces below that the regulation is already in place. Underlined regulations note where there is change from Amendment 2 to 3.

Amendment 3 Implementation Template

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

c) A mechanism to enable the transfer of unused quota been states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines,

trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

III. Prohibit a vessel from making multiple trips in one day.

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting
ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction
iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

i. Prohibit harvest for reduction purposes within the Chesapeake Bay when 100% of the 51,000 metric tons is harvested from the Bay.
ii. A repayment mechanism to reduce the subsequent year's harvest cap to account for an over-harvest of the cap on a pound-for-pound basis.
iii. No rollover of unused cap into the subsequent year.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.
ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day
ii. number of pound nets fished per day

Amendment 3 Atlantic Menhaden Interstate Fisheries Management Plan

Implementation Plan for Atlantic Menhaden Fishery per State of Maine's Regulatory Process

1. **Coastal Fishery Management Measures**
   a. See attached for language on closing mechanism [41.30(2)(A)]
   b. State of Maine does not specify quota allocation in regulation.
   c. The mechanism to enable the transfer of unused quota is done so at the administration level, not at the regulatory level. A letter from the Commissioner initiates this action.
   d. The mechanism to rectify quota overages is done so at the administration level, not at the regulatory level. A letter from the Commissioner initiates this action.
   e. See attached language on regulatory specifications on the incidental catch and small-scale fishery [41.30(4)(A)]
   f. See attached language on regulatory specifications for the episodic events program fishery [41.30(3)(A)]
      i. Maine DMR may seek a conservation equivalency to better execute the episodic events program in such a way that reduces the risk of discards.
   g. N/A

2. **Monitoring Requirements**
   a. See attached language on reporting specifications specific to the fishery programs (41.30(2)(B) & (3)(C))
      i. State of Maine has monthly harvester and dealer reporting currently in place, but will implement daily reporting through regulation for the state allocated and episodic events fisheries.
   b. Reporting during the incidental and small-scale fishery will be required monthly per Chapter 8; 8.20(Q)
      - Pelagic and Anadromous Fishing Harvest

      Any person who holds a Commercial Pelagic and Anadromous Fishing License issued under 12 M.R.S. §6502-A must report trip level fishing activity on forms supplied by the Department. The following data elements must be reported to the DMR on approved paper forms or through approved electronic reporting mechanisms:
      1. Harvester name (as it appears on the harvesting license) and landings number
      2. Boat name and state vessel registration number or Coast Guard number (if a boat was used)
      3. Designate negative report period if no harvesting activity occurred
      4. Date fished & landed
      5. Number of crew (including captain)
      6. Gear type and quantity
      7. Number of sets/tows
      8. Set time (the average time your gear fished)
      9. Average depth
      10. Latitude and longitude
      11. Sea time (including travel)
      12. Pounds by species of all species caught (including discards)
      13. Landings number of dealer sold to, or if not sold to a licensed dealer, disposition of catch and whether catch was carried
      14. Port landed
      15. Signature written or electronic

c. Maine will be required to capture three 10-fish samples for their contribution towards the fishery-dependent biological sampling. This will occur during the state allocated fishery by science staff at known landing stations.
    i. In the past two years, Maine has acquired 10-12 complete samples of 10 ct. We do not anticipate any issues with maintaining that level of participation.
d. Also following under reporting as mentioned above in section b.

MAPA-3 revised 11-2017

Notice of Agency Rule-making Proposal

AGENCY: 13-188-Department of Marine Resources

CHAPTER NUMBER AND TITLE: Chapter 41 Menhaden

PROPOSED RULE NUMBER (*leave blank; to be assigned by Secretary of State*):

BRIEF SUMMARY: Atlantic menhaden fishery in territorial waters may be executed in three distinct fishery programs: state allocated fishery, episodic events fishery and an incidental catch/small scale fishery. The state allocated fishery will operate under the quota assigned to Maine by the Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission (ASMFC) until such time that the quota is near to or is consumed. Notification will be then given that this fishery program is closed. An episodic events fishery may be executed provided there is sufficient evidence of substantial resource remaining in territorial waters. Daily reporting of Atlantic menhaden landings will be required for both the state allocated and the episodic events fishery programs. An incidental catch and small scale fishery will commence after the closure the state allocated fishery, or a subsequent episodic events fishery, with a daily landings limit of 6,000 lbs under gear restrictions.

Date, time and location of PUBLIC HEARING *(if any)*: January 31, 2018 at 1:00 p.m.: DMR Conference Room, Marquardt Building, 32 Blossom Lane, Augusta.

COMMENT DEADLINE: February 14, 2018

CONTACT PERSON FOR THIS FILING *(include name, mailing address, telephone, fax, TTY, e-mail)*:

NAME: Amanda Ellis

MAILING ADDRESS: 21 State House Station, Augusta, Maine 04333-0021

E-MAIL: dmr.rulemaking@maine.gov

TELEPHONE: 207-624-6573

FAX: 207-624-6024

TTY: 207-624-6500 (Deaf/Hard of Hearing)

Hearing facilities: If you require accommodations due to disability, please contact Meredith Mendelson at 207-624-6553.

CONTACT PERSON FOR SMALL BUSINESS IMPACT STATEMENT *(if different)*: Same

FINANCIAL IMPACT ON MUNICIPALITIES OR COUNTIES *(if any)*: None

STATUTORY AUTHORITY FOR THIS RULE: 12 M.R.S. § 6171

SUBSTANTIVE STATE OR FEDERAL LAW BEING IMPLEMENTED *(if different)*: Same

AGENCY WEBSITE: http://www.maine.gov/dmr/rulemaking/

E-MAIL FOR OVERALL AGENCY RULE-MAKING LIAISON: dmr.rulemaking@maine.gov

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** Check one of the following two boxes.*

X The summary provided above is for publication in both the newspaper and website notices.

□ *The summary provided above is for the newspaper notice only. Title 5 §8053, sub-§5 & sub-§7, ¶D. A more detailed summary is attached for inclusion in the rule-making notice posted on the Secretary of State's website. Title 5 §8053, sub-§3, ¶D & sub-§6.*

Please approve bottom portion of this form and assign appropriate AdvantageME number.

APPROVED FOR PAYMENT_____ DATE:_____

(*authorized signature)*

FUND	AGENCY	ORG	APP	OBJ	PROGRAM	FUNDING Profile JVC	FUND Pri JVC	FUND Line JVC
010	13A	1120	10	4946				

DEPARTMENT OF MARINE RESOURCES

Chapter 41 Menhaden Regulations

41.05 Territorial Waters Trawl Prohibition

It shall be unlawful to fish for or take Atlantic menhaden by vessels rigged with a mid-water, otter or beam trawl net in Maine's territorial waters.

41.30 Menhaden Fishery Management Program

~~2~~ 1. Definitions

~~A. "Daily catch limit or Daily limit" For purposes of this section (Chapter 41.30) means a maximum of 120,000 lbs of menhaden possessed or loaded aboard from areas A and B between 00:01 AM to 11:59 PM. There is no daily catch limit or daily limit in Area C for harvester vessels.~~

~~B. "Carrier vessel 120,000 lbs capacity" For purposes of measuring 120,000 lbs or capacity in a vessel hold the volumetric measure (in hogshead) of 120,000 lbs of menhaden is equivalent to ~98 hogshead. One hogshead equals 17.5 lb bushels. For consistency with 12 M.R.S. §6543 and §6544(3), multiplying 70 pounds (lb) per bushel by 17.5 bushels per hogshead equals 1225 lb. Therefore 120,000 lb divided by 1225 lb (or 17.5 hogshead) equals ~98 hogshead, which is within the 5 hogshead tolerance used in §6544(3).~~

A. "Hogshead": one hogshead equals 17.5 lb bushels.
B. "Bushel": one bushel equals 70 lbs of menhaden.
C. "Barrel": one barrel equals 5 bushel of menhaden.
D. "Truck": one truck equals 40,000 lbs of menhaden.

2. State Allocation Fishery

A. Notice
Commercial Pelagic and Anadromous license holders shall be informed by public notice in a newspaper circulated in the area affected of any closing dates for the state allocation fishery.

B. Reporting
All harvesters must report landings daily to the Department via email to menhaden.dmr@maine.gov with the information no later than noon the day after landing:
- Name of harvester
- Name/Vessel ID
- Permit ID
- Landings number of license holder
- Total catch retained (including all catch transferred to any vessel who will not report it as their own catch)
- Name/Permit ID of Carrier, if transfer at-sea occurs
- Total amount of menhaden on board
- Date, time and location (dealer, city, state) of offload
- Estimated catch transfered, by weight, to each dealer (by dealer name and landings number)
- VTR number

3. Episodic Event Fishery
An episodic event fishery may be opened following the full utilization of the state allocation of menhaden.

A. Notice
Commercial Pelagic and Anadromous license holders shall be informed by public notice in a newspaper circulated in the area affected of any openings or closing dates for an episodic event fishery.

B. Effort restrictions

Following the opening of an episodic event fishery, and prior to the closure of the episodic event fishery, all vessels shall fish for, take, possess, or land menhaden from territorial waters only. Daily landing limit shall not exceed 120,000 lbs per vessel.

C. Reporting

Any harvester landing menhaden during an episodic event fishery must declare into the fishery by notifying the Department of their intent to harvest menhaden during the episodic event fishery prior to landing any menhaden. All harvesters must report landings daily to the Department via email to menhaden.dmr@maine.gov with the information no later than noon the day after landing:

- Name of harvester
- Name/Vessel ID
- Permit ID
- Landings number of license holder
- Total catch retained (including all catch transferred to any vessel who will not report it as their own catch)
- Name/Permit ID of Carrier, if transfer at-sea occurs
- Total amount of menhaden on board
- Date, time and location (dealer, city, state) of offload
- Estimated catch to be received, by weight, to each dealer (by dealer name and landings number)
- VTR number

4. Incidental Catches and Small Scale Fishery

An incidental catch and small scale fishery for menhaden may occur following the full utilization of the state allocation of menhaden or following the full utilization of both the state allocation and an episodic event fishery.

A. Notice

Commercial Pelagic and Anadromous license holders shall be informed by public notice in a newspaper circulated in the area affected of any openings or closing dates for an episodic event fishery.

B. Effort restrictions

Following the opening of an incidental catch and small scale fishery, all vessels shall fish for, take, possess, or land menhaden from territorial waters only. Daily landing limit shall not exceed 6,000 lbs per vessel. All vessels landing menhaden in any Maine port are limited to one landing per 24 hour period (12 am to 12 pm).

C. Gear Restrictions

Only small scale gears may be utilized for the small scale fishery, including cast nets, traps, pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets and purse seines which are smaller than 150 fathom long and 8 fathom deep.

Incidental catch may occur in a non-directed fishery using the following gear types: pound nets, drift gill nets, trawls, fishing weirs, fyke nets and floating fish traps.

~~1~~ 5. Areas

A. Bald Head Cliff to Cape Arundel

Shoreward and westerly of a straight line starting at the easternmost point of Bald Head Cliff, Ogunquit to the southernmost point of Cape Arundel, Kennebunkport.

B. Biddeford Pool to Cape Elizabeth

Shoreward and westerly of the territorial sea line, as identified on National Oceanic and Atmospheric Administration nautical chart 13286, starting at the easternmost point of Biddeford Pool, Biddeford following the territorial sea line to where the line intersects the southernmost point of land in Cape Elizabeth.

C. All Maine territorial waters outside the areas defined in Chapter 41.30(A) & (B)

Shoreward of the territorial sea line, as identified on National Oceanic and Atmospheric Administration nautical charts, except for those areas defined in Chapter 41.30(A) & (B).

~~3~~ 6. Area Limitations

The areas in Chapter 41.30(1)(A, B & C) are restricted to the take, possession and transport of the Atlantic menhaden in accordance with the following regulations:

A. Limitations in Areas A & B

(1) Harvester and Carrier Vessel Daily Catch Limit - It shall be unlawful for harvester vessels and carrier vessels to catch and possess greater than 120,000 lbs of menhaden per day.

B. Limitations in Area C

(1) Carrier Vessel Daily Limit - It shall be unlawful for carrier vessels to possess greater than 120,000 pounds (lbs) of menhaden per day.

For purposes of this section (Chapter 55.90) “daily catch” means a maximum of 120,000 lbs of menhaden possessed or loaded aboard from these areas between 00:01 AM to 11:59 PM.

C. Limitations in all Areas A, B & C

(1) It shall be unlawful for any harvester vessel that exceeds 50 feet in length overall to fish for, take or possess menhaden within these restricted areas.

(2) It shall be unlawful for any carrier vessel to land more than 120,000 lbs of menhaden per day (00:01 AM to 11:59 PM) harvested from Maine Territorial waters, which includes Areas A, B & C.

(3) A carrier vessel may transport and land menhaden once per day at a limit of 120,000 lbs capacity.

Exception: Any carrier vessel less than 70 feet length overall (LOA) is exempted from the number of landings per day limitation in Chapter 41.30(3)(C)(3).

(4) It shall be unlawful for any carrier vessel greater than 90 feet LOA to transport menhaden harvested from Areas A, B & C. Any carrier vessel greater than 70 feet but not to exceed 90 feet LOA must be measured, plainly marked at a maximum 120,000 lbs capacity or equivalent volume; or marked at the maximum vessel capacity if under 120,000 lbs, and sealed* by the State Sealer of Weights and Measures.

*Sealed means receipt of the applicable Fish Carrier Calibration Report and sticker, seal or appropriate marking affixed by the State Sealer of Weights and Measures or their designee. This documentation must be obtained prior to transporting menhaden taken from these areas.

~~4~~ 7. Suspension of rules

The Commissioner has the authority to suspend all regulations in Chapter 41.30 in the event of a potential fish kill upon consultation with industry and Marine Patrol. Notice of rule suspension and duration shall be provided via the internet on the Department's web site and by email to industry members or telephone.

Rule-Making Fact Sheet

(5 M.R.S., §8057-A)

AGENCY: 13-188- Department of Marine Resources

NAME, ADDRESS, PHONE NUMBER OF AGENCY CONTACT PERSON:

Amanda Ellis, Department of Marine Resources, 21 State House Station, Augusta, Maine 04333-0021 Telephone: (207) 624-6573; web address: http://www.maine.gov/dmr/rulemaking/

CHAPTER NUMBER AND RULE: Chapter 41 Menhaden

STATUTORY AUTHORITY: 12 M.R.S. § 6171

DATE AND PLACE OF PUBLIC HEARING(S): January 31, 2018 at 1:00 p.m.: DMR Conference Room, Marquardt Building, 32 Blossom Lane, Augusta.

COMMENT DEADLINE: February 14, 2018

PRINCIPAL REASON(S) OR PURPOSE FOR PROPOSING THIS RULE: [*see* §8057-A(1)(A)&(C)]

This rule is intended to align State of Maine regulations with those set forth in the Amendment 3 to the Atlantic Menhaden Interstate Fishery Management Plan. Amendment 3 was adopted by the ASFMC Atlantic Menhaden Management Board's on November 14, 2017.

IS MATERIAL INCORPORATED BY REFERENCE IN THE RULE? ___YES__X__ NO [§8056(1)(B)]

ANALYSIS AND EXPECTED OPERATION OF THE RULE: [*see* §8057-A(1)(B)&(D)]

The adopted rule(s) seeks to expand opportunity in the Atlantic menhaden fishery in Maine territorial waters. The rule is intended to have a long-term positive impact on both the Atlantic Menhaden and Lobster fisheries.

BRIEF SUMMARY OF RELEVANT INFORMATION CONSIDERED DURING DEVELOPMENT OF THE RULE

New compliance measures as specified by Amendment 3 of the Interstate Fishery Management Plan for Atlantic Menhaden as determined by ASMFC's Atlantic Menhaden Management Board define three fishery programs that pertain to Maine territorial waters with respect to the harvest of the Atlantic menhaden resource.

ESTIMATED FISCAL IMPACT OF THE RULE: [*see* §8057-A(1)(C)]

Enforcement of these proposed amendments will not require additional activity in this Agency. Existing enforcement personnel will monitor compliance during their routine patrols.

FOR EXISTING RULES WITH FISCAL IMPACT OF $1 MILLION OR MORE, ALSO INCLUDE:

ECONOMIC IMPACT, WHETHER OR NOT QUANTIFIABLE IN MONETARY TERMS:

[see §8057-A(2)(A)]

INDIVIDUALS, MAJOR INTEREST GROUPS AND TYPES OF BUSINESSES AFFECTED AND HOW THEY WILL BE AFFECTED: [see §8057-A(2)(B)]

BENEFITS OF THE RULE: [see §8057-A(2)(C)]

Note: If necessary, additional pages may be used

New Hampshire
Fish and Game Department

HEADQUARTERS: 11 Hazen Drive, Concord, NH 03301-6500
(603) 271-3421
FAX (603) 271-1438

www.WildNH.com
e-mail: info@wildlife.nh.gov
TDD Access: Relay NH 1-800-735-2964

December 28, 2017

Max Appelman
Menhaden FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland Street
Suite 200A-N
Arlington, VA 22201

Reference: New Hampshire's Atlantic Menhaden Amendment 3 Implementation Plan

Dear Max,

New Hampshire Fish and Game is in the process of proposing rules that will bring New Hampshire into compliance with Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. Appendix A shows changes to NH's current Atlantic Menhaden rules being proposed. NH will be addressing the items outlined in the ASMFC's Amendment 3 Implementation Plan template as shown below.

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

- See proposed Fis 603.21 (d) and (e) in Appendix A.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

- See proposed Fis 603.21 (d) in Appendix A.

c) A mechanism to enable the transfer of unused quota been states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

- As with other species quota transfers NH has conducted, we will supply a letter of authority to ASMFC to transfer quota if warranted. ASMFC will determine the revised quota for NH based on the quota taken and transfers that occurred.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

- See proposed Fis 603.21 (d) in Appendix A.

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines,

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REGION 3
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REGION 4
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Keene, NH 03431
(603) 352-9669
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email: reg4@wildlife.nh.gov

fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

- See proposed Fis 603.21 (b), (c), (d) in Appendix A.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

- NH will maintain a more conservative approach and will not be implementing this management measure.

III. Prohibit a vessel from making multiple trips in one day.

- See proposed Fis 603.21 (e) in Appendix A.

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

- See proposed Fis 603.21 (f) in Appendix A.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

- NH will not be opting to participate in the Episodic Events Set Aside Program at this time.

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

- Not applicable to NH

i. Prohibit harvest for reduction purposes within the Chesapeake Bay when 100% of the 51,000 metric tons is harvested from the Bay.

ii. A repayment mechanism to reduce the subsequent year's harvest cap to account for an over-harvest of the cap on a pound-for-pound basis.

iii. No rollover of unused cap into the subsequent year.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

- While NH is exempt from this management measure see proposed Fis 603.21 (1) and Fis 608.02 and 609.01. NH will be proposing daily electronic dealer reporting through SAFIS to assure timely monitoring of menhaden quota through landings data instead of through

harvester estimated harvest. However, current rules require all harvesters to report trip level harvest on a monthly basis either to NH or to NOAA Fisheries depending on where they are fishing and who is the designated reporting compliance agency.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

- See proposed Fis 603.21 (j) and 608.02 in Appendix A.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

- NH currently is approved as a de minimis state which exempts NH from this management measure.

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina.

d) mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

- Not applicable, NH does not have any pound net fisheries occurring in its coastal/estuarine waters. If a pound net fishery develops they would be required to be permitted which requires reporting of catch and effort (Fis 608.02 in Appendix A).

i. total pounds (lbs) landed per day.

ii. number of pound nets fished per day.

If you have further questions on NH's approach to addressing Amendment 3's Atlantic menhaden management measures don't hesitate to contact me.

Sincerely,

Cheri Patterson

Cheri Patterson
Supervisor of Marine Programs

cc: Glenn Normandeau, Director
Doug Grout, Chief

Appendix A: New Hampshire's current and proposed rules implementing Amendment 3 of the Menhaden Fisheries Management Plan.

PART Fis 603 RULES FOR CERTAIN FIN FISH SPECIES

Fis 603.21 Atlantic Menhaden

(a) For purposes of this section, "land" means to transfer or attempt to transfer the catch of fish from any vessel to any other vessel or onto any land, pier, wharf, dock or other artificial structure.

(b) For the purpose of this section, "non-directed gears" includes pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

(c) For the purpose of this section, "small-scale gears" includes cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, and bait nets.

(~~a~~d) No person shall take, land, or possess Atlantic menhaden (*Brevortia tyrannus*) while on or leaving the waters under the jurisdiction of the state whenever the executive director has projected that 98 percent of the annual state quota established by the Atlantic States Marine Fisheries Commission (ASMFC) is projected to be taken; except that a person may land and possess up to a maximum of 6,000 pounds per day of incidentally caught Atlantic menhaden by non-directed or small-scale gears during a closure period. ~~No person shall take, land, or possess more than of 6,000 pounds of Atlantic menhaden (*Brevortia tyrannus*) per calendar day while on or leaving the waters under the jurisdiction of the state.~~

(~~b~~e) No vessel shall land menhaden more than once per calendar day.

(f) A vessel that is taking menhaden may not transfer menhaden at sea.

(g) Nothing in these provisions shall prohibit a person from possessing menhaden for use as bait while in the normal conduct of tending lobster and crab pots or any menhaden used as bait for angling purposes.

(h) Closure Procedure. A closure date shall be announced via notice by the executive director at least 2-days prior to the closure being enacted.

(i) Any individual engaged in the taking or landing of menhaden for the purpose of sale, trade, or barter shall sell the menhaden to a dealer issued a wholesale marine species license pursuant to RSA 211:49-aa or 211:49-c.

~~(c) For purposes of this section, "land" means to transfer or attempt to transfer the catch of fish from any vessel to any other vessel or onto any land, pier, wharf, dock or other artificial structure.~~

(~~d~~**j**) Any ~~person who is not a permitted federal~~ dealer shall **electronically** report all menhaden landing transactions daily with ~~each month~~ the following information ~~consistent with the minimum data requirements of~~ **through** the Standard Atlantic Fisheries Information System (SAFIS):

(1) Name of ~~processor,~~ primary dealer~~,~~ or properly licensed person;

(2) The dealer's ~~or processor's~~ wholesale marine species or commercial saltwater license number;

(3) Week of reporting period;

(4) Commercial harvester's trip start date;

(5) Vessel name;

(6) State of vessel registration and number or coast guard number;

(7) Commercial harvester's first name, last name, date of birth, and license number;

(8) Number of trips for commercial harvester per day;

(9) Species purchased;

(10) Number or pounds of species purchased;

(11) Disposition of species purchased;

(12) Ex-vessel value or price of purchased species;

(13) Port, county and state where species were landed;

(14) Date species unloaded from commercial harvester's vessel;

(15) Grade and market size of purchased species;

(16) Gear used to harvest species; and

(17) Dated signature of dealer ~~or processor~~, signed subject to the penalties for unsworn false statements under RSA 641:3.

~~(e) The reporting week shall be Sunday through Saturday.~~

~~(f) Reports shall be received by the 10th of the following month.~~

Source. #10375, EXEMPT, eff 7-17-13

PART Fis 608 REQUIRED REPORTS

Fis 608.02 Harvest Reports.

(a) Any person who possesses a permit in accordance with Fis 603.07, Fis 603.11, Fis 607.05 or Fis 609.01 shall submit the following information to the executive director by the 10th of each month for the month previous, whether or not fishing occurred:

(1) On a monthly basis:

a. Name;

b. Signature of permittee subject to the penalties for unsworn false statements under RSA 641:3;

c. Coastal harvest permit number;

d. Month and year; and

e. Whether fishing occurred that month.

(2) On a trip basis:

a. Trip date;

b. Dealer(s) name or license number(s) harvest was sold to;

c. Trip number;

d. Species harvested;

e. Quantity or weight of species harvested;

f. Disposition of harvested species;

g. Type and quantity of gear;

h. Hours gear fished or harvest time;

i. Size of gear;

j. Area of fishing activity;

k. Number of gear fished;

l. Port, county, state landed, if harvest sold;

m. Vessel name;

n. State vessel registration number, USCG documentation number, or National Marine Fisheries permit number; and

o. Unloading date, if harvest sold.

(b) Any permittee failing to report pursuant to Fis 608.02(a) and (b) shall not be issued a permit until such time that the required information is submitted. Before a permit is issued the information shall be reviewed by the department for completeness and information validated.

Source. #1878, eff 12-4-81; ss by #2839, eff 8-31-84; ss by #4868, eff 7-20-90; ss by #4868, eff 7-20-90; ss by #5789, eff 2-18-94; amd by #6176, eff 1-27-96; ss by #7215, eff 3-16-00; ss by #8302, eff 4-1-05; ss by #8819, EXEMPT, eff 2-1-07

PART Fis 609 REQUIRED PERMITS

Fis 609.01 Harvest Permit.

(a) No person shall take finfish by the use of a seine, net, weir, pot or trap, American eels as specified in Fis 603.11, or horseshoe crabs as specified in Fis 607.05, or any species for commercial purposes from coastal and estuarine waters without first obtaining a permit from the executive director, except those persons taking finfish in accordance with RSA 211:48, or RSA 211:49-a or 211:49-b and are reporting catch under another license or to NOAA Fisheries Service via vessel trip reports.

(b) The applicant shall provide:

(1) The applicant's:

a. Name and maiden name if applicable;

b. Street and mailing address;

c. Date of birth;

d. Telephone number;

e. Height and weight; and

f. Hair and eye color; and

g. Signature of permittee subject to the penalties for unsworn false statements under RSA 641:3.

(2) The type, size, and number of gear fished or used to harvest;

(3) The specific location(s) where fishing activity or harvesting will occur;

(4) Species sought;

(5) Specific months the permittee intends to fish or harvest;

(6) If the applicant is not the vessel owner, the following vessel owner information:

a. Name and address; and

b. Home telephone number.

(7) The following vessel information:

a. Vessel name;

b. State of registration;

c. State registration or coast guard number;

d. National Marine Fisheries Service federal permit number;

e. Principal port;

f. Hull ID number;

g. Hull construction material;

h. Vessel length;

i. Year built;

j. Gross and net tons, if federally documented vessel;

k. Horsepower, if federally documented vessel;

l. Hold capacity in tons, if federally documented vessel; and

m. Crew size.

(c) A helper may assist the permittee as long as the permittee is present.

(d) Any person possessing a permit shall file with the director the report as required in Fis 608.02.

Source. #1878, eff 12-4-81; ss by #2839, eff 8-31-84; ss by #4868, eff 7-20-90; ss by #5789, eff 2-18-94, EXPIRED: 2-18-00

New. #7215, eff 3-16-00; amd by #7371, eff 10-7-00; ss by #8819, EXEMPT, eff 2-1-07; ss by #10478, eff 1-1-14

New Hampshire's Revised Statutes Annotated (RSA's)

Section 211:49

RSA 211:49-a Nonresident Commercial Salt Water License. –

I. Any person who does not qualify as a resident under RSA 207:1, who takes, possesses, lands, or transports by any method, from or on the waters of this state, regardless of where the catch was taken, any marine species by any method for the purpose of selling the same, shall first procure a valid license from the executive director to do so. This license shall not include the taking, possession, landing, or transport of northern shrimp (Paudulus borealis) which requires a license under RSA 211:49-e, or the taking of lobsters and crabs, which requires a license under RSA 211:18. A nonresident shall not take sea urchins, clam worms, river herring, or scallops unless the state in which such person is a resident provides a reciprocal licensing privilege for residents of this state.

II. The fee for an annual license shall be set by the executive director pursuant to RSA 206:10, I. The license shall be for the operator of the boat, vessel, flotation device, or gear, and helpers; provided, however, that helpers shall not be allowed for the taking of sea urchins or scallops by diving.

III. Licensees shall be responsible for conducting their fishing activities in compliance with rules adopted by the executive director under RSA 541-A.

IV. Any person so licensed shall furnish to the executive director such information concerning marine species and fishing activities as the executive director may require by rules adopted under RSA 541-A.

V. Any person convicted of violating any provision of this section shall be guilty of a violation if a natural person or guilty of a misdemeanor if any other person. In addition, the defendant's catch shall be confiscated and sold according to rules adopted by the executive director pursuant to RSA 541-A, the proceeds of such sale to become the property of the New Hampshire fish and game department.

Source. 1973, 348:2. 1983, 81:1. 1994, 150:1, 2. 1997, 10:6. 2004, 166:4. 2009, 10:4, eff. June 16, 2009; 83:1, eff. July 1, 2009. 2013, 129:2, eff. Jan. 1, 2014. 2015, 186:14, eff. July 1, 2015.

RSA 211:49-aa Nonresident Wholesaler License. –

I. Any person, firm, or corporation who does not qualify as a resident under RSA 207:1 or RSA 211:43 and who is engaged in a wholesale trade in any marine species shall first procure a valid license from the executive director to do so in this state. The license shall entitle the licensee to buy, sell, process, and transport any marine species in wholesale trade within the state and to ship any marine species within and outside the state. A separate extra facility license shall be required for each market, store, vehicle, or facility where such marine species are bought or sold at wholesale. A nonresident wholesale license shall not be required by a person properly licensed pursuant to RSA 211:49-a. The fees for an annual license and for each extra facility license shall be set by the executive director pursuant to RSA 206:10, I. A copy of the license shall be carried in each vehicle and displayed at all facilities.

II. No person, firm, or corporation, whose ship, vessel, or similar craft is within the territorial waters of this state shall engage in the processing or wholesale trade of any marine species, excluding northern shrimp, lobster, and crabs, without first procuring a license under this section.

III. The license under this section shall not entitle a person, firm, or corporation to transport on state waters lobsters and crabs or northern shrimp taken outside the jurisdiction of the state via ship, vessel, or similar craft for the purposes of landing the lobsters and crabs in the state as permitted under RSA 211:49-d and the northern shrimp in this state under RSA 211:49-e.

Source. 1988, 99:1. 1990, 32:1. 1997, 10:7. 2009, 83:2, eff. July 1, 2009. 2013, 129:3, eff. Jan. 1, 2014. 2015, 186:15, eff. July 1, 2015.

RSA 211:49-b Resident Commercial Salt Water License. –

I. Any resident of this state who takes, possesses, lands, or transports on the waters of this state any marine species by any method for the purpose of sale, regardless of where the catch was taken, shall first procure a valid license from the executive director to do so. This license shall not include the taking, possession, landing, or transport of northern shrimp (Paudulus borealis) which requires a license under RSA 211:49-e, or the taking of lobsters and crabs, which requires a license under RSA 211:18.

II. The fee for such annual license shall be set by the executive director pursuant to RSA 206:10, I. The license shall be for the operator of the boat, vessel, flotation device, or gear, and helpers; provided, however, that helpers shall not be allowed for the taking of sea urchins or scallops by diving.

III. Any person so licensed shall furnish to the executive director such information concerning the marine species or fishing activities as the executive director may require by rule.

IV. Licensees shall be responsible for conducting their fishing activities in compliance with the rules adopted by the executive director under RSA 541-A.

V. Any person convicted of violating any provision of this section shall be guilty of a violation if a natural person and a misdemeanor if any other person. In addition, the defendant's catch shall be confiscated and sold according to rules adopted by the executive director pursuant to RSA 541-A and the proceeds of such sale shall become the property of the New Hampshire fish and game department.

Source. 1983, 254:1. 1986, 9:2. 1991, 229:3. 1994, 150:3. 1997, 10:8. 2004, 166:5, eff. May 24, 2004. 2013, 129:4, eff. Jan. 1, 2014. 2015, 186:16, eff. July 1, 2015.

Section 211:49-c

RSA 211:49-c Resident Wholesaler License. –

I. Any person, firm, or corporation engaged in a wholesale trade in any marine species shall first procure from the executive director a license to do so. Said license shall entitle the licensee to buy, sell, process, and transport any marine species in wholesale trade within the state and to ship any marine species within and outside the state. A separate extra facility license shall be required for each market, store, vehicle, or facility where such marine species are bought or sold at wholesale. A resident wholesaler license shall not be required by a person properly licensed pursuant to RSA 211:49-b. The fees for an annual license and for each extra facility license shall be set by the executive director pursuant to RSA 206:10, I. A copy of the license shall be carried in each vehicle and displayed at all facilities.

II. Any person, firm, or corporation, whose ship, vessel, or similar craft is within the territorial waters of this state and engaged in the processing or wholesale trade of any marine species, excluding northern shrimp, lobster, and crabs, shall first procure a license as required under this section.

Source. 1988, 99:2. 1990, 32:2. 1997, 10:9, eff. Jan. 1, 1998. 2013, 129:5, eff. Jan. 1, 2014. 2015, 186:17, eff. July 1, 2015.

Commonwealth of Massachusetts

Division of Marine Fisheries

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David E. Pierce, Ph.D.
Director

Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Matthew A. Beaton
Secretary
Ronald Amidon
Commissioner
Mary-Lee King
Deputy Commissioner

MEMORANDUM

TO: Max Appelman, ASMFC FMP Coordinator

FROM: Nichola Meserve, MA DMF Policy Analyst

THRU: David Pierce, MA DMF Director

DATE: December 29, 2017

SUBJECT: Atlantic Menhaden Amendment 3 Implementation Plan

Overview

Massachusetts' implementation plan for Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden is below (per the ASMFC-provided template). The Division of Marine Fisheries (DMF) anticipates one rule change being required, to exclude vessels deploying large purse seines from MA's bycatch tolerance. This minor revision will be taken to public hearing during the winter of 2018 as part of a slate of other issues scheduled for public comment, with an intended effective date of the April 15 deadline.

Implementation Plan

The referenced regulations at 322 CMR are enclosed.

1. Commercial Fishery Management Measures

a. A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include the language below.
Massachusetts' allocation of the TAC under Amendment 3 is 1.27%. Per 322 CMR 6.43(4)(c), the directed commercial menhaden fishery is closed once the Director has declared that 100% of the quota has been harvested. The process to close the fishery for quota managed species in Massachusetts, including menhaden, is established at 322 CMR 6.41(2)(c). Massachusetts' annual commercial Atlantic menhaden "quota" is defined at 322 CMR 6.43(1) as the amount adopted by the ASMFC; the actual weight of the quota is not specified in the regulations.

b. A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.
Menhaden quota is defined at 322 CMR 6.43(1) as "the Commonwealth of Massachusetts' annual commercial Atlantic menhaden quota adopted by the Atlantic States Marine Fisheries Commission and amended by required paybacks and authorized quota transfers and rollovers."

c. A mechanism to enable the transfer of unused quota between states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.
Menhaden quota is defined at 322 CMR 6.43(1) as "the Commonwealth of Massachusetts' annual commercial Atlantic menhaden quota adopted by the Atlantic States Marine Fisheries Commission and amended by required paybacks and authorized quota transfers and rollovers."

d. A mechanism for pound-for-pound payback to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.
Menhaden quota is defined at 322 CMR 6.43(1) as "the Commonwealth of Massachusetts' annual commercial Atlantic menhaden quota adopted by the Atlantic States Marine Fisheries Commission and amended by required paybacks and authorized quota transfers and rollovers."

e. A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.
Per 322 CMR 6.43(4)(d), Massachusetts regulations allow a bycatch tolerance of up to 1,000 pounds menhaden per trip or per 24-hour day, whichever is longer, when the commercial quota has been harvested and the commercial fishery closed. The weight of the menhaden bycatch shall not exceed 5% of the weight of the entire catch being landed.

i. 6,000 pound trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps, (except floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stakes gillnets, drift gill nets, fishing weirs, fyke nets, and floating fish traps.
Massachusetts' bycatch tolerance is more restrictive than Amendment 3's incidental catch limit by weight (1,000 pounds versus 6,000 pounds). "Bycatch" is defined as "non-targeted commercial catch and possession;" and harvest under the bycatch tolerance is restricted to non-targeted fishing by way of a percent catch restriction (5% the total weight being landed). Currently, this applies to any and all gears. While it's highly unlikely that a vessel deploying purse seine larger than 150 fathom long and 8 fathom deep would utilize the bycatch tolerance, DMF plans to amend 322 CMR 6.43(4)(d) to exclude this gear.

ii. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/staked gill gillnets, fishing weirs, floating fish traps, and fyke nets.
Per 322 CMR 6.41(2)(b), trip limits for menhaden are applied to the vessel per calendar day, regardless of the number of commercial fishing permits carried on board the vessel.

iii. Prohibit a vessel from making multiple trips in one day.
Massachusetts' menhaden bycatch tolerance is per trip or per 24-hour day, whichever is longer, per 322 CMR 6.43(4)(d).

iv. Prohibit the use of carrier vessels to offload catch exceeding 6,000 pounds.
Massachusetts' bycatch tolerance restricts commercial fishermen from landing more than 1,000 pounds. The definition of "land" includes transferring fish onto another vessel (322 CMR 6.43(1)), thus prohibiting the use of carrier vessels to offload catch in excess of the bycatch tolerance.

f. For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. To be eligible to participate in the episodic events set-aside, a state must implement three provisions: daily trip level harvester reporting; episodic event harvest and landings be restricted to states waters of the jurisdiction; and maximum daily trip limit no greater than 120,000 pounds per vessel.
DMF has structured its management of the commercial menhaden fishery in Massachusetts such that participation in the episodic events set aside program is unlikely. Our system of declining trip

limits tied to available quota has thus far prevented a quota closure of the fishery, a prerequisite for participation. Should this change, the DMF Director has authority via declaration to adjust the manner, times, and quantity of menhaden harvest to ensure available quota is taken (322 CMR 6.41(2)(d)). In addition, the Director may condition permits as needed (322 CMR 7.01(7)). DMF could implement the three provisions above through these means.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. Purse seine vessels and snapper rigs are required to submit trip level reports.

Dealer reported data are used to monitor Massachusetts' menhaden quota. Transaction level records are due from dealers on a weekly basis. All limited entry menhaden harvesters—those authorized to fish at higher trip limits and consequently responsible for the vast majority of Massachusetts menhaden landings—are also required to hold a bait dealer permit and report daily. All Massachusetts commercial harvesters, regardless of permit-type or gear-type, are required to submit trip level reports on a monthly basis.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

Any bycatch allowance landings would also be reported by dealers, at least weekly. Note that Massachusetts has avoided a quota closure in all years due to its trip limit management system and thus has had zero bycatch landings since the implementation of quotas.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. Massachusetts is required to collect one 10-fish sample (age and length) per 300 metric tons landed for bait purposes.

DMF will continue its biological sampling of the commercial bait sector. In past years, effort has been focused on dock-side sampling the local purse seine and cast net fisheries. When unable to collect the necessary sample number from the fishery (due to difficulty intercepting the harvesters), DMF samplers have resorted to using the same small scale gear (cast nets) to capture their own sample directly.

Massachusetts' preliminary quota for 2018 (per ASMFC's December 6 memo) is 2,751 metric tons, which would require ten 10-fish samples if landed in full. We expect to fulfill this sampling requirement.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements.

Massachusetts commercial fishermen using pound nets are required to report the total pounds landed per day, as well as the number of pound nets fished per day.

Enc.

322 CMR 6.41: The Further Regulation of Possession and Size Limits

(1) Definitions. For the purpose of 322 CMR 6.41, the following terms and words shall have the following meanings:

Quota Managed Species means any species for which the Division of Marine Fisheries manages commercial fisheries by an annual quota that corresponds to Massachusetts' annual share quota for that species as established by federal or interstate fishery management plans. Examples of quota managed species include, but are not limited to, striped bass, bluefish, black sea bass, scup, fluke, menhaden and horseshoe crabs.

(2) Commercial Fishing

(b) Trip Limits for All Quota Managed Species. Except as otherwise specifically provided for in any provision of 322 CMR, all possession limits shall be applied to the vessel per calendar day, regardless of the number of commercial fishing permits or letters of authorization carried on board the vessel.

(c) Procedure to Close Quota and Quota Managed Fisheries. To prevent an overage of the annual Massachusetts quota or a period or seasonal quota allocation, when the Director projects that 100% of an annual Massachusetts quota or a period or seasonal allocation will be landed, based upon data compiled by the Division, the Director shall issue a Declaration of Closure to close the fishery. This Declaration of Closure shall set forth the closure date for the quota managed fishery. A written copy of the Declaration of Closure shall be:

1. Filed with the Secretary of the Commonwealth, for publication in the *Massachusetts Register*;
2. distributed via the Division's e-mail list-serve;
3. posted a written Declaration of Closure on the Division's Legal Notice webpage; and
4. distributed by fax or e-mail to all primary buyers of the quota managed species, permitted in accordance with 322 CMR 7.01(3): *Dealer Permits* and 7.07: *Dealers Acting as Primary Buyers*.

(d) Commercial Fishery Limit Adjustments for Quota Managed Species.

1. The Director may, by declaration, adjust the manner and times of taking fish, legal size limits, as well as the quantities of fish to be take to prevent overages of the annual Massachusetts quota or a period or seasonal allocation, to increase landings to ensure available quota is taken, and to address issues resulting from limits implemented by other states.
2. Declaration Process.

a. Adjustment has been approved by a majority of the Massachusetts Marine Fisheries Advisory Commission;

b. A Notice of Declaration is filed with the *Massachusetts Register*, published in at least one newspaper, emailed via the Division's email listserve and Declaration is posted on the Division's legal notice website; and

c. A two-week comment period is conducted. This comment period may be ongoing when a Declaration is issued. The Director may adjust the Declaration, subject to the Declaration Process, based on comment received during this comment period.

322 CMR 6.43: Atlantic Menhaden Management

(1) Purpose. The purpose of 322 CMR 6.43 is to comply with the Interstate Fishery Management Plan for Atlantic Menhaden to manage the Atlantic menhaden fishery in a manner that is biologically, economically, socially and ecologically sound, while protecting the resource and those who benefit from it.

(2) Definitions.

Atlantic Menhaden means that species known as *Brevoortia tyrannus* or commonly referred to as pogy or bunker.

Bait Dealer means any person issued a bait dealer permit in accordance with 322 CMR 7.01(3)(g): *Bait Dealer*.

Bycatch means the non-targeted commercial catch and possession of a species.
Commercial Fisherman means any person fishing under the authority of a permit issued in accordance with 322 CMR 7.01(2): *Commercial Fisherman Permits*.
Declare means to file an advisory notification with the *Massachusetts Register* and publish it via the Marine Fisheries electronic mailing list and website.
Director means the Director of the Division of Marine Fisheries.
Land means to transfer or attempt to transfer the catch of fish from any vessel to any other vessel or onto any land, pier, wharf, dock or other artificial structure, or for a fishing vessel with any fish on board to tie up to any dock, pier or other artificial structure.
Quota means the Commonwealth of Massachusetts' annual commercial Atlantic menhaden quota adopted by the Atlantic States Marine Fisheries Commission and amended by required paybacks and authorized quota transfers and rollovers.
Trip means the time period that begins when a vessel departs from any land, pier, wharf, dock or other artificial structure to carry out commercial fishing operations, including the at-sea transfer and transport of fish, and that terminates with a return to any land, pier, wharf, dock or other artificial structure.

(3) Regulated Fishery Permit Endorsement Requirement. It shall be unlawful for any fisherman or vessel to take, land, or possess Atlantic menhaden in excess of 6,000 pounds per trip or 24-hour day, whichever duration is longer, without a regulated commercial fishery permit endorsement for Atlantic menhaden issued by the Director, in accordance with 322 CMR 7.01(4)(a)4: *Renewals*.

(4) Commercial Fishing Limits.

(a) Regulated Fishery Trip Limits. Commercial fishermen who have been issued a regulated Atlantic menhaden fishery permit endorsement, in accordance with 322 CMR 6.43(3) and 7.01(4)(a)4.: *Renewals*, shall abide by the following trip limits:

1. Until the Director declares that 85% of the commercial menhaden quota has been landed, it shall be unlawful to possess or land more than 125,000 pounds of menhaden in the coastal waters of the Commonwealth per trip or calendar day, whichever duration is longer;
2. Once the Director has declared that 85% of the commercial menhaden quota has been landed, it shall be unlawful to possess or land more than 25,000 pounds of menhaden in the coastal waters of the Commonwealth per trip or calendar day, whichever duration is longer; and
3. Once the Director has declared that 95% of the commercial menhaden quota has been landed, it shall be unlawful to possess or land more than 6,000 pounds of menhaden in the coastal waters of the Commonwealth during per trip or calendar day, whichever duration is longer.

(b) Open Access Fishery Trip Limits. Commercial fishermen who have not been issued a regulated Atlantic menhaden fishery permit in accordance with 322 CMR 6.43(3) and 7.01(4)(a)4.: *Renewals* may possess and land up to 6,000 lbs of Atlantic menhaden per trip or 24-hour day, whichever duration is longer.

(c) Closure. It shall be unlawful to catch and retain or land Atlantic menhaden once the Director has declared that 100% of the quota has been harvested, except as provided at 322 CMR 6.43(4)(d).

(d) Bycatch Tolerance. When the commercial quota has been harvested and the commercial fishery is closed, commercial fishermen may possess or land up to 1,000 pounds of Atlantic menhaden bycatch per trip or per 24-hour day, whichever is longer. The weight of the Atlantic menhaden bycatch shall not exceed 5% of the weight of the entire catch being landed.

(5) Daily Catch Reporting. All regulated Atlantic menhaden fishery permit endorsement holders must obtain a bait dealers permit, as defined at 322 CMR 7.01(3)(g): *Bait Dealer*, and report to the Division of Marine Fisheries their directed commercial Atlantic menhaden landings in the Commonwealth on a daily basis on forms provided by the Director.

322 CMR 7.01: Form, Use and Content of Permits

(4) Special Permits

(a) Regulated Fishery Permit Endorsement. In accordance with M.G.L. c. 130, §§ 2 and 80, regulated fishery permit endorsements may be added to commercial fisherman permits, issued pursuant to 322 CMR 7.01(2), to authorize the named individual and/or commercial fishing vessel to harvest, possess or land fish or shellfish or use certain fishing gears in a fishery regulated pursuant to M.G.L. c. 130, §17A.

2. Limited Entry Regulated Fishery Permit Endorsements. Commercial fisherman permits, issued in accordance with 322 CMR 7.01(2), may be endorsed with the following regulated fishery permit endorsements. Pursuant to the authority at M.G.L. c. 130, § 2, the following regulated fishery permit endorsements are limited entry and may only be renewed and transferred subject to the provisions set forth at 322 CMR 7.06. These regulated fishery permit endorsements are required for the following:

h. Menhaden. For a named individual and/or vessel to commercially fish for menhaden within the waters under the jurisdiction of the Commonwealth, or to harvest, possess or land any menhaden for commercial purposes in the Commonwealth. A menhaden regulated fishery permit endorsement is not required to commercially fish for menhaden in the Commonwealth, provided no more than 6,000 pounds of menhaden are possessed at any one time or landed within a calendar day or fishing trip, whichever period is longer.

(7) Conditions. The Director may at any time, in his discretion, attach any written conditions or restrictions to the permit deemed necessary or appropriate for purposes of conservation and management or to protect the public health, welfare and safety.

Rhode Island

Department of Environmental Management

DIVISION OF MARINE FISHERIES

401 423-1920

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3 Fort Wetherill Rd

Jamestown, RI 02835

MEMORANDUM

To: Max Appelman

Atlantic States Marine Fisheries Commission

From: Jason McNamee

RI Division of Marine Fisheries

Date: January 8, 2018

SUBJECT:Implementation Plan Requirements for Amendment 3 to the Fishery Management Plan (FMP) for Atlantic Menhaden for the state of Rhode Island (RI).

The following information details the information template as was outlined in the ASMFC memorandum dated Dec 6, 2017. Each section is titled as requested in the memorandum and RI's plan or existing regulations are defined within each section. The numbers before regulatory language indicate the section of RI regulations in which the regulation exists, all regulations for marine fisheries for RI can be found at the following link: http://www.dem.ri.gov/programs/fish-wildlife/marine-fisheries/rimftoc.php

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

The RI Department of Environmental Management (RIDEM) has the authority to close fisheries governed by a federal or ASMFC management plan. The following is the state's regulatory section and language specific to menhaden with regard to commercial measures for menhaden:

3.22.2.B.2

Once the quota has been reached, the fishery will close for directed fisheries, including but not limited to purse seine operations, and a bycatch limit will be in effect. The bycatch limit will be:

a. Non-directed fisheries: 6,000 pounds per vessel per day.
b. Pound nets, fish traps, anchored/staked gill nets, and fyke nets: If two commercially licensed individuals are harvesting from the same vessel, two (2) daily possession limits (12,000 pounds per vessel per day).

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

3.22.2.B

Landing of menhaden in RI under State Quota Program: An annual statewide quota for menhaden is established annually for the State by the ASMFC. The quota shall pertain solely to landings of menhaden in RI and shall not pertain to the possession of menhaden in RI waters prior to landing.

c) A mechanism to enable the transfer of unused quota been states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

The state of RI and the Director of RIDEM have broad authority to manage natural resources in a manner that is in the state's best interest and that complies with appropriate federal and ACFCMA rules. The following are state statutes related to this authority:

§ 20-1-2. Authority over fish and wildlife.

The general assembly hereby vests in the director of the department of environmental management authority and responsibility over the fish and wildlife of the state and over the fish, lobsters, shellfish, and other biological resources of marine waters of the state.

§ 20-1-17. Cooperation with other states.

The director may cooperate with the fish and wildlife commissioners or other similar bodies or agencies of other states in carrying out the purpose of this title.

§ 20-8-1. Entry into compact authorized – Text.

The governor of this state is hereby authorized and directed to execute a compact on behalf of the state of Rhode Island with any one or more of the states of Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida and with such other states as may enter into the compact, legally joining therein in the form substantially as follows:

The statute then cites the ASMFC compact language.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

Under the authorities cited above, the RIDEM can alter quotas as needed to account for overages or underages. The following is the general regulatory language defining this authority:

1.6.A.1.b.

Over-harvest:

(1) Any over-harvest of a sub-period allocation will be deducted from the allocations of the remaining sub-periods in the same calendar year.

(2) Annually, the DFW will charge any over-harvest from the previous year to the entire state allocation of the current year before redistributing according to the species specific management plan. For the Tautog fishery, if an over-harvest has occurred for the entire year, that over-harvest will be deducted from the Summer sub-period of the following calendar year.

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

III. Prohibit a vessel from making multiple trips in one day.

The state of RI will be going to hearing on February 19, 2018 with the following changes to meet the requirements of Amendment 3. Strikethrough represents existing language that will be removed, red bold font represents new language that will be added:

3.22.2.B.2

2. Once the quota has been reached, the fishery will close for directed fisheries, including but not limited to purse seine operations, and a ~~bycatch~~ **6,000 pound possession** limit **per day** will be in effect **for non-directed and small-scale gears**. ~~The bycatch limit will be~~**Non-directed and small-scale gears will be defined as**:

a. Non-directed ~~fisheries~~ **gears**: ~~6,000 pounds per vessel per day~~**Pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps**.

b. **Small-scale gears: Cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep.**

c. ~~Pound nets, fish traps, anchored/staked gill nets, and fyke nets: If t~~**T**wo commercially licensed individuals ~~are~~ harvesting from the same vessel**, fishing stationary multi-species gears, are authorized to take**~~,~~ two (2) daily possession limits (12,000 pounds per vessel per day). **Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.**

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

The following is our general regulation that prohibits this from occurring in state waters:

3.22.2.E. No person may transfer or attempt to transfer at sea, from one vessel to another, any finfish identified in these regulations.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

The following is our existing language defining the requirements of the episodic event program:

3.22.2.C.

Episodic Event Set Aside Program:

1. After the State's quota has been reached, if RI is approved to participate in the Episodic Event Set Aside Program for Menhaden, as established by the ASMFC, the landing limit for menhaden will be 120,000 pounds per vessel per day for vessels associated with directed fisheries for Menhaden, until the Set Aside quota has been exhausted, as determined by the ASMFC and/or the DEM, at which time the program will end and the directed fishery will close. Vessels that target and land menhaden in RI under this program must harvest only from RI waters and, if operating in the Management Area, must adhere to all of the provisions as specified in these regulations.
2. Reporting Requirements:

a. Any person intending to engage in the commercial menhaden fishery under the Episodic Event Set Aside Program must notify the DLE at (401) 222-3070 prior to taking or possessing menhaden. At the time that a fisher advises the DLE of his/her intent to harvest menhaden, the DLE shall notify said fisher of any modification to the possession limit for menhaden that is applicable to operations conducted in the Management Area.
b. Each person engaged in the commercial menhaden fishery shall contact the DFW at (401) 423-1940 at the end of each daily trip or within four hours thereof to report the amount of menhaden landed by the fisher in pounds. These menhaden-specific reporting requirements are in addition to all other existing commercial fishing reporting requirements as set forth in the RI Marine Fisheries regulations.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

All RI commercial fishermen and seafood dealers are required to report all of their landings through SAFIS, therefore all of the required monitoring in Amendment 3 is already implemented in RI. Additionally, for purse seine operators in our management area, additional reporting is required. The following is the regulatory language pursuant to these requirements:

7.7.F. Reporting frequency and required trip level data elements:

1. Weekly reporting: Trip level data for all species landed shall be reported each week on Mondays and Thursdays, are due no more than five days after the date of purchase, and shall consist of the following:

    a. The species common name including market level and grade;

    b. The amount landed or purchased including the units the product was measured in (i.e. pounds);

    c. The area where product was taken (only applicable to shellfish purchases);

    d. The date the product was landed or purchased;

    e. The R.I. commercial fishing license or landing permit number of the fisherman selling the product to the dealer;

    f. The vessel identification number (Coast Guard documentation number and/or State of R.I. registration number);

    g. The port or location where the catch was landed or purchased; and,

h. When a seafood dealer is purchasing research set aside from a permitted and properly licensed fisherman, the poundage purchased will be designated in the catch source field as “RSA”.

3.22.2A

6. Reporting requirements:

a. Any fisher intending to engage in the commercial menhaden fishery in the Management Area shall notify the DLE at (401) 222-3070 prior to taking or possessing menhaden. At the time that a fisher advises the DLE of his/her intent to harvest menhaden, the DLE shall notify said fisher of any modification which may have been established in the possession limit for menhaden.

b. Each person engaging in the commercial menhaden fishery shall contact the DEM at (401) 423-1940 at the end of each day to report the area fished and the amount of menhaden in possession by the fisher in pounds.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

There is no regulatory construct to require sampling, but RI maintains a sampling program and we are routinely able to meet the required biological samples needed per the menhaden FMP. While there is no specific requirement for menhaden, the Director of DEM has broad authority to require fishermen to allow sampling when required.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day

ii. number of pound nets fished per day

The state of RI requires all fishermen to submit reports on their fishing at the trip level. The data elements in i and ii are captured by this requirement:

6.6.1

(a) The holder of any type of commercial fishing license, dealer license, or landing permit shall be deemed to have consented to providing such fishery-related information as the Department may require, including but not limited to, catch, effort, and areas fished.

(b) Applicants for commercial fishing or dealer licenses or landing permits will be provided a list of applicable reporting requirements at the time of license issuance or renewal.

(c) The Department may amend reporting requirements, no later than December 1 for the following calendar year.

(d) The license or permit of any individual who fails to report required information in a timely fashion or who files a false report shall be subject to suspension or revocation. No application for a license renewal will be accepted from a person who has failed to submit reports in a timely fashion and who has been previously notified, via certified mail, regarding the deficiency and the inability to renew if the required reports are not filed by the license application deadline.

State of Connecticut
Atlantic Menhaden Amendment 3 Implementation Plan

December 29, 2017

Introduction

The Atlantic States Marine Fisheries Commission (ASMFC) approved Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden in November of 2017. The Amendment establishes a 216,000 MT total allowable catch (TAC) for 2018 and 2019 unless menhaden-specific ecological reference points become available for management use. It also establishes revised state quotas, measures related to catch and biological monitoring, quota transfers, quota rollovers, incidental catch and the episodic events set aside program. This report includes specific compliance criteria established under Amendment 3 for implementation in Connecticut.

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

interim measures adopted by Commissioner Declaration authority (Declaration D18-01, Appendix 1) effective December 23, 2017, maintain regulations implemented by Connecticut under Amendment 2 that impose a maximum possession limit of 6,000 pounds in all fisheries. The interim measures also set a zero pound menhaden possession limit in all fisheries once 100% of the Connecticut quota is landed.

Connecticut presently has no directed fishery for menhaden. The use of purse seines, the principal gear used to target menhaden on the Atlantic and Gulf coasts, is prohibited in state waters by statute. Purse seine vessels could land in Connecticut if the operator has a Commercial Landing Vessel Operator's License and the vessel has a Commercial Fishing Vessel Permit. However, the current 6,000 pound possession limit makes this impractical. Pound nets are also used in some regions to target menhaden and are allowed in Connecticut, but none are currently authorized to be fished in state waters. Siting a pound net in Connecticut requires a structures and dredging permit from DEEP Land and Water Resources Division under the Coastal Management Act (CGS §22a-90 et seq.). Application fees for in-water structures, whether a pound net or a new marina are based on the total area impacted (a rectangle encompassing the outer points of any netting or anchors), making an application for a pound net prohibitively expensive. Connecticut plans to convene a public meeting in early 2018 to explore options for a modest directed fishery and/or larger scale landings.

Connecticut does not explicitly include its annual quotas in regulations (see b below).

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

Connecticut generally incorporates quotas into regulations by reference to the relevant ASMFC FMP, thus eliminating the need to change regulations every time the quota changes. The interim measures follow this practice and make reference to "Connecticut's Atlantic menhaden quota specified in the Atlantic Menhaden Fishery Management Plan of the Atlantic States Marine Fisheries Commission".

c) A mechanism to enable the transfer of unused quota between states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

Regulations of Connecticut State Agencies (RCSA) *§26-159a-27. Transfers of Quotas.* (see Appendix 2) provides the authority and mechanism to enable transfer of unused quota between states if warranted. Such transfers are handled administratively according to the requirements and standards of the underlying fishery management plan and ASFMC and/or NOAA policy (depending on the species). In addition, interim measures provide a mechanism for out-of-state vessels wishing to land large quantities of menhaden (>6,000 lb.) in Connecticut, provided a quota transfer from its home state is arranged in advance. This later provision may change, subject to public comment at the planned public meeting.

d) A mechanism for pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

The present 6,000 lb. possession limit restricts fishing to small-scale gears and non-directed gears. In the unlikely event of an overage, overage paybacks are implicit in the interim measures' reference to "Connecticut's Atlantic menhaden quota specified in the Atlantic Menhaden Fishery Management Plan of the Atlantic States Marine Fisheries Commission".

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pound trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

Interim measures, presently in effect, conservatively close small scale and non-directed gear fishery landings in the event 100% of the Connecticut quota is landed. By April 15, 2018, the department will implement measures to allow a 6,000 pound possession limit for incidental catch and small-scale gear fisheries following the harvest of the quota and closure of the directed fisheries.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

For simplicity, the interim measures do not contain a provision to implement this exception. Pound nets, fishing weirs, floating fish traps and large fyke nets are not presently used in Connecticut. However, a significant portion of Connecticut landings (about half in 2016) come from anchored gillnets. Should comment at the public meeting indicate an interest in this provision for such gears, the department may consider adding it to its regulations.

III. Prohibit a vessel from making multiple trips in one day.

The interim measures specify that "Possession limits shall apply per trip or per day, whichever is the longer period of time." This language is common to most of our regulations and effectively limits vessels to landing one possession limit per day, regardless of the number of trips made in a day. This language will be maintained in future management measures.

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

Present regulations specify that "The transfer of more than 6,000 pounds per day of menhaden between vessels at sea is prohibited." This language will be maintained in future management measures.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

Connecticut does not intend to opt into the episodic event set aside program at this time.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

i. Prohibit harvest for reduction purposes within the Chesapeake Bay when 100% of the 51,000 metric tons is harvested from the Bay.

ii. A repayment mechanism to reduce the subsequent year's harvest cap to account for an over-harvest of the cap on a pound-for-pound basis.

iii. No rollover of unused cap into the subsequent year.

Not applicable.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

Atlantic menhaden landings will be monitored via Commercial Fisheries Catch Logs and NMFS Fishing Vessel Trip Reports (VTR) on a monthly basis. These reports contain trip-level records of fishing activity that include the prescribed ACCSP data elements (see RCSA §26-157b-1 in Appendix 3). Marine Fisheries staff enter Catch Logs into the Standard Atlantic Fisheries Information System (SAFIS) as reports are received. VTR data is downloaded weekly.

Having no directed fisheries for menhaden and having a possession limit that is the same as the bycatch limit, Connecticut avoided the need under Amendment 2 for weekly monitoring commonly used to effectively manage landings in such large-scale fisheries. Should Connecticut implement a directed fishery, weekly or trip-level reporting, daily electronic reporting or call-in will be implemented.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

Atlantic menhaden landings will be monitored via Commercial Fisheries Catch Logs and NMFS Fishing Vessel Trip Reports (VTR) on a monthly basis. These reports contain trip-level records of fishing activity that include the prescribed ACCSP data elements (see RCSA §26-157b-1 in Appendix 3). Marine Fisheries staff enter Catch Logs into the Standard Atlantic Fisheries Information System (SAFIS) as reports are received. VTR data is downloaded weekly.

Should total landings exceed the quota under the 6,000 pound limit, those excess landings will be reported to the Board as part of the annual FMP review.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

Connecticut's 2018 quota is 2,432,640 lb. or 1,105.7 metric tons. This equates to 3.7 (or 4) 10-fish samples. Fish will either be sampled opportunistically on four occasions from cooperating fishermen, or collected in the course of the Department's Long Island Sound Trawl Survey (LISTS). Though the latter is a fishery-independent sampling effort, the 100-400 ageing structures collected per year well exceed the minimum, are from fish captured in a commercial gear type and are still representative of the sizes encountered in the commercial fishery. This intent is similar to the action being contemplated by the Weakfish Board to consider the use of fishery-independent samples in fulfilling biological sampling requirements. The fished will either be aged in-house or sent to the Beaufort Lab for ageing.

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

Not applicable.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day

ii. number of pound nets fished per day

Connecticut has no active pound nets. Should any become active, these data will be collected via Connecticut Commercial Fisheries Catch Logs or NMFS Fishing Vessel Trip Reports (VTR) on a monthly basis. These reports contain trip-level records of fishing activity that include the prescribed ACCSP data elements (see RCSA §26-157b-1 in Appendix 3). Marine Fisheries staff enter Catch Logs into the Standard Atlantic Fisheries Information System (SAFIS) as reports are received. VTR data is downloaded weekly.

Appendix 1

Current Connecticut Commercial Menhaden Regulations (Declaration D08-01)

Atlantic Menhaden (*Brevoortia tyrannus*)

(a) Commercial Fishery Possession Limits.

(1) Except as provided in subdivision (4) of this subsection, no person engaged in commercial fishing shall possess or land Atlantic menhaden in excess of the following possession limit that is based on Connecticut's Atlantic menhaden quota specified in the Atlantic Menhaden Fishery Management Plan of the Atlantic States Marine Fisheries Commission: 6,000 pounds.

(2) The possession and landing limits specified in subdivision (1) of this subsection shall apply to the vessel, regardless of how many persons are on board. Possession limits shall apply per trip or per day, whichever is the longer period of time. The transfer of more than 6,000 pounds per day of menhaden between vessels at sea is prohibited. In any instance when there is a violation of the possession limit on board a vessel carrying more than one person when the catch is commingled, the violation shall be deemed to have been committed by the owner of the vessel, or the operator of the vessel, if the owner is not on board.

(3) Any Atlantic menhaden taken contrary to this section shall, without avoidable injury, be returned immediately to the water from which taken.

(4) Landing in excess of 6,000 pounds shall be permitted provided:

(A) the Commissioner receives and accepts an offer of quota transfer from another state in an amount equal to or greater than the amount of fish to be landed, and;

(B) such quota transfer conforms with the requirements of the Atlantic Menhaden Fishery Management Plan of the Atlantic States Marine Fisheries Commission for quota transfers between states, and;

(C) such quota transfer is completed before fish are offloaded in this state.

(5) When 100% of Connecticut's annual menhaden quota is landed the possession limit shall be zero pounds.

Appendix 2

Regulations of Connecticut State Agencies 26-159a-27. Transfers of quotas

Upon the request of a member state of the Atlantic States Marine Fisheries Commission and subject to a determination by the Commissioner that Connecticut will not be able to utilize its commercial quota for a quota-managed species before the end of the state-specific quota period, the Commissioner may transfer a portion of the Connecticut quota to the state making the request.

Appendix 3

Regulations of Connecticut State Agencies 26-157b-1. Reports

Each holder of any commercial fishing license, landing license, pound net registration, or charter-party boat registration, each person licensed to take lobsters or fish for personal use only, and each person licensed to purchase marine species for resale shall, as provided in this section, report to the commissioner. These reports may include but are not limited to the number, weight and sex of finfish, squid, sea scallops, lobsters or crabs in the catch and landings by species and market size and grade; gear used and effort expended; area fished; port landed; disposition of catch; type and value of nets, boats and other equipment used; number of persons employed; number, weight, market size, grade and price of marine species purchased and distributed, including conch, and the number of anglers

fishing on board charter-party boats. These reports shall be made on forms provided by the commissioner or by other methods approved by the Commissioner. Said reports shall be completed in their entirety and submitted to the Marine Fisheries Division office of the department (P. O. Box 719, Old Lyme, CT 06371).

(a) Each licensed commercial shad fisherman shall submit a report of daily fishing activities no later than June 30 of the year covered by the report.

(b) Each person licensed to take blue crabs for commercial purposes shall submit a report of daily fishing activities no later than the tenth of the month following the month covered by the report.

(c) Each person or firm issued a registration for a pound net or similar device shall submit a report of daily fishing activities no later than the tenth of the month following the month covered by the report.

(d) Each person licensed to set, tend or assist in setting or tending gill nets, seines, trap nets, fish pots, fykes, scaps, scoops, weirs, eel pots or similar devices to take finfish, or licensed to take finfish for commercial purposes by hook and line or licensed to take horseshoe crabs by hand, shall complete a report of all fishing activities, daily or at the end of the fishing trip. Said reports shall be submitted no later than the tenth of the month following the month covered by the report. Such reports shall be available on board any vessel at any time for inspection by authorized agents of the commissioner.

(e) Each person licensed to set, tend, or assist in setting or tending seines, traps, scaps, scoops, weirs or similar devices to take bait species for commercial purposes shall submit a report of daily fishing activities no later than the tenth of the month following the month covered by the report.

(f) Each person licensed to take lobsters or fish for personal use only, by means of not more than ten lobster pots, by skin diving, scuba diving or by hand, and each person licensed to take menhaden for personal use, shall submit a report of daily fishing activities no later than January thirty-first of the year following the year covered by the report.

(g) Each person (resident or nonresident) licensed to take lobsters, squid, sea scallops, crabs (other than blue crabs) or finfish for personal use or for sale by means of more than ten lobster pots or similar devices, or by the use of otter trawls, balloon trawls, beam trawls or similar devices, and each person licensed to land lobsters, sea scallops, finfish, crabs, including blue crabs, or squid shall complete a report of all fishing activities, daily or at the end of the fishing trip. Said reports shall be submitted no later than the tenth of the 2month following the month covered by the report. Such reports shall be available on board any vessel at any time for inspection by authorized agents of the commissioner.

(h) Each person or firm licensed to buy lobsters, finfish, squid, crabs, or sea scallops for resale from commercial fishermen licensed by the commissioner shall complete a report of individual purchase transactions of such species, including conch, and this report shall be submitted no later than the tenth of the month following the month covered by the report.

(i) Each person or firm issued a charter boat or party boat registration shall submit a report of daily fishing activities no later than the tenth of the month following the month covered by the report.

(j) In addition to the provisions of subsections (a) through (i), inclusive, of this section for all species managed by quota, all holders of licenses or registrations issued under section 26-142a of the Connecticut General Statutes concerning the purchase for resale of finfish, lobsters, crabs, sea scallops or squid, or the taking of said resources, shall report weekly total landings in pounds and Connecticut port where landed. Weekly reports shall be submitted for the period

commencing on Sunday and concluding on the following Saturday, and shall be submitted by a method approved by the commissioner no later than 4:30pm on the following Tuesday or 24 hours after the end of any fishing trip commencing prior to a Saturday and concluding after the following Monday.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Marine Resources
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TO: ASMFC Atlantic Menhaden Management Board
FROM: John Maniscalco, NY Administrative Board Member (Proxy)
DATE: December 20, 2017
SUBJECT: Amendment 3 Implementation Plan

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

c) A mechanism to enable the transfer of unused quota been states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

III. Prohibit a vessel from making multiple trips in one day.

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

All aspects of commercial Atlantic menhaden fishery management, as mandated by the Atlantic States Marine Fisheries Commission FMP including changes made under Amendment 3, have already been implemented in New York State. The Director of the Division of Marine Resources has the authority to establish fishing limits and closures for the commercial Atlantic menhaden fishery. See attached regulations.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

Not applicable to the New York State commercial Atlantic menhaden fishery.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

New York State already requires all marine commercial food fish license, food fish landing license and marine bait permit holders to submit trip level reporting. See attached regulations.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

New York State will continue to collect and age sufficient biological samples from the Atlantic menhaden commercial fishery (as per Amendment 2) and provide that data when requested.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day

ii. number of pound nets fished per day

New York State already requires all marine commercial food fish license holders to submit trip level reporting. Requested data elements are captured by New York State Vessel Trip Reports. See attached regulations.

Regulations 40.1

(a) Definitions.

For the purposes of this section, the following definitions apply:

(1) A *trip limit* means the maximum amount of fish that can be possessed on board or landed by a vessel during a period of time, not less than 24 hours, in which fishing is conducted, beginning when the vessel leaves port and ending when the vessel returns to port. A vessel or fisher shall not land more than a possession limit or trip limit per species in any one calendar day, except that, where a weekly limit or biweekly limit is specifically authorized by the department pursuant to subdivision (i) of this section, a fisher authorized to take the weekly or biweekly limit shall not possess or land more than the weekly limit or biweekly limit in one calendar day or; where one trip limit for each of two commercial license holders on board a single vessel is specifically authorized by the department pursuant to subdivision (i) of this section, a vessel with two or more commercial license holders on board shall not possess more than two trip limits of the authorized species in one calendar day.

(b) General provisions.

(1) It is unlawful for any person to take or possess on the waters of the marine and coastal district, as defined in Environmental Conservation Law (ECL) section 13-0103, or the shores thereof, or anywhere inland from such shores in the Counties of Suffolk, Nassau, Queens, Kings, Richmond, New York, Bronx, and those portions of Westchester County within the marine and coastal district bordering on Long Island Sound, fish of the species listed in Table A, B or C:

(i) other than during the open season specified for the species;

(ii) of a size less than that specified for such species or outside of any slot size limit specified for such species;

(iii) in excess of the possession limit or trip limit specified for such species, except that where a weekly limit or biweekly limit is specifically authorized by the department pursuant to subdivision (i) of this section, such fish shall not be taken or possessed in excess of the weekly limit or biweekly limit specified for such species;

(iv) contrary to the provisions of any special regulations for such species;

(v) contrary to any directive issued by the department pursuant to the provisions of this section; or

(vi) except in accordance with this Part. Nothing in this Part shall be construed as authorizing any person to possess fish described in this Part except as permitted by these regulations.

(c) Reporting requirements.

(1) Marine commercial food fishing license, food fish landing license and marine bait permit holders.

(i) Any person who is the holder of a marine commercial food fishing license, food fish landing license, or marine bait permit issued pursuant to section 13-0335 of the Environmental Conservation Law shall complete and submit an accurate fishing vessel trip report for each commercial fishing trip, detailing all fishing activities and all species landed, on a form prescribed by the department. If more than one commercial license holder on board a single vessel is authorized to possess and land the trip limit of a regulated species pursuant to paragraph (a)(1) of this section, then each authorized license holder shall complete and submit a separate, accurate fishing vessel trip report documenting the fishing activities and species landed under the authority of the license holder's permit. The license holder shall submit such fishing reports monthly to the department within 15 days after the end of each month or at a frequency specified by the department in writing. Fishing vessel trip reports shall be completed, signed, and submitted to the department for each month; if no fishing trips were made during a month, a report must be submitted stating no trips were made for that month. Incomplete fishing vessel trip reports or unsigned reports will not satisfy these reporting requirements. Any New York license holder who is also the holder of a Federal fishing permit issued by NOAA Fisheries Service must instead satisfy the reporting requirements specified by NOAA Fisheries Service. If requested in writing by the department, New York license holders who also hold Federal fishing permits shall submit to the department the State (blue) copy of the fishing vessel trip report (NOAA Form No. 88-30) for the month or months identified in the written notification.

(ii) The fishing vessel trip report must be completed with all required information, except for information not yet ascertainable, and signed before the vessel arrives at the dock or lands the catch. Information that may be considered unascertainable before arriving at the dock or landing includes dealer name, dealer number, and date sold.

(u) Authority to establish fishing limits and closures for quota-based fisheries.

The Chief of the Bureau of Marine Resources within the Department's Division of Fish, Wildlife and Marine Resources is authorized to:

(1) establish, by directive, quota periods, allocations for quota periods, directed fishery thresholds, trip limits and weekly or biweekly limits according to the schedules required under the applicable provisions of this Part and provide written notice to applicable license and/or permit holders of the appropriate limits for the time specified;

(2) prohibit the harvesting for commercial purposes and possession of any species for which an annual harvest quota is established pursuant to this Part, by all applicable license/permit holders, when the determination has been made by the Bureau of Marine Resources that the maximum allowable harvest of that species, in any specified time period is projected to have taken place or has taken place. The chief will provide written notice of a closure directive to appropriate permit and license holders, the Division of Law Enforcement and the National Marine Fisheries Service's Northeast Regional Administrator;

(3) reopen any closed period as provided in this Part;

(4) specify, by directive, the threshold amounts of regulated species which will trigger the manner of taking and the gear which is required to be used pursuant to this Part once any threshold amounts have been taken;

(5) approve the export program of another state lawfully eligible to ship commercially taken marine fish species into New York during any closure periods or periods when possession in New York is restricted for a regulated species; and

(6) under mutual agreement with another state and with the concurrence of the Regional Administrator of the Northeast Region, National Marine Fisheries Service, or the Atlantic States Marine Fisheries Commission, transfer quota to that State or combine the quota from that State with the New York quota.

(x) Atlantic menhaden commercial fishing - special regulations.

(1) Permits. It is unlawful for any person to take or land menhaden for commercial purposes without having in possession a valid commercial food fishing license, commercial food fish landing license, a menhaden vessel license, or marine bait permit issued by the State of New York. For purposes of this subdivision, a person is presumed to be taking menhaden for commercial purposes when that person possesses more than 100 menhaden, or more than the possession limit for menhaden listed in Table A of this section, whichever is less. A person who holds a lobster bait gill net permit may take or land more than 100 menhaden; menhaden taken using this permit are for the sole use of the permittee to pursue the permittee's lobster fishery and may not be sold. A person who holds a lobster bait gill net permit must abide by the special regulations of this subdivision.

(2) Quota harvest and trip limits.

(i) The total annual harvest of menhaden may not exceed that amount annually allocated to New York State by the Atlantic States Marine Fisheries Commission (ASMFC) for the period January 1st through December 31st. Annual harvest limits for menhaden are based on the Fishery Management Plan (FMP) for menhaden as adopted and approved by the ASMFC pursuant to the Atlantic Coastal Fisheries Cooperative Management Act, 16 U.S.C., section 5101, *et seq.*

(ii) Following consultation with industry, the department may establish quota periods, trip limits and directed fishery thresholds such that the harvest does not exceed the quota assigned to New York.

(iii) When the department determines, based on a projection of landings using daily fishing vessel trip reports, that trip limits are necessary as provided in Table B of subdivision (i) of this section, such trip limits will be required and enforceable upon 72 hours written notice to license holders referenced in paragraph (1) of this subdivision of the appropriate limit allowed per vessel for that time period. Such trip limits may be further reduced by written direction of the department if the projection of the landings indicates a closure will be required before the end of the period. In any time period, the trip limits may be increased if the projection of the landings indicates the total quota will not be caught.

(3) Fishery closures.

(i) If the department determines that the maximum allowable harvest of menhaden will take place before the end of any period, the directed harvesting of menhaden for commercial purposes will be prohibited, except that the department may allow a bycatch of menhaden in non-directed fisheries, not to exceed 6,000 pounds daily per vessel trip. Directed harvest may be prohibited for all license holders, or for users of specific gear types as directed by the department upon 72 hours written notice to all license holders referenced in paragraph (1) of this subdivision. If the department closes the period, but unanticipated events result in the quota not being landed by the projected date, then the department may reopen the period for a specified time and a specified trip limit upon 72 hours written notice to all license holders referenced in paragraph (1) of this subdivision.

(4) Possession, transport and sale.

(i) During periods of trip limits, all menhaden must be held together in a separate container or containers readily available for inspection and may not be mixed with other species while on board any vessel.

(ii) During closed periods, no possession of menhaden shall be permitted on the waters of the marine and coastal district except as bycatch aboard vessels participating in other fisheries.

(5) Reporting requirements.

Any person who is the holder of a marine commercial food fishing license, commercial food fish landing license, a menhaden vessel license, marine bait permit, or lobster bait gill net permit issued by the State of New York shall report all harvest of menhaden in accordance with the requirements established in paragraph (c)(1) of this section.

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

MEMORANDUM
December 26, 2017

TO: Max Appelman, Atlantic Menhaden Species Coordinator

FROM: Jeffrey Brust, Research Scientist, NJ Marine Fisheries Administration

SUBJECT: New Jersey's Atlantic menhaden implementation plan

Attached, please find legislation regarding New Jersey's management strategy for the Atlantic menhaden fishery implemented under Amendment 2 to the fishery management plan. This legislation explicitly outlines how New Jersey will be able to control effort, allocate harvest among gears, and track harvest for quota monitoring purposes under Amendment 3. The following bullets summarize the key points of the plan.

- All harvesters that wish to land menhaden in New Jersey must possess a menhaden landing license. Each gear type has specific eligibility criteria.
- Harvest of menhaden in state waters by purse seine will require a purse seine license by vessel type. The regulations outline approved uses of the different vessel types.
- All harvesters must submit monthly trip-level reports of catch and effort through eTrips or other approved electronic reporting system.
- All dealers who wish to purchase and/or sell menhaden in New Jersey must purchase a menhaden dealer's license. Harvesters may only sell menhaden to licensed dealers or must possess a dealer's license themselves.
- All dealers must submit weekly transaction-level reports of menhaden sales and purchases through eDR or other approved electronic reporting system.
- Harvest will initially be allocated 95% to purse seine and 5% to all other gears, but these allocations may change in the future.
- All gears will have a season from January 1 through December 31 or until the quota is reached.
- The State can close the fishery with two days notice, distributed electronically, to all menhaden landing license and dealer license holders.
- If the fishery closes prior to the end of the year, harvesters will be allowed a 6,000 pound daily bycatch limit.

It should be noted that, due to time constraints under Amendment 2, management of menhaden in NJ was implemented through legislation, rather than through the normal regulatory process. A regulatory package is in development that will maintain management plan requirements, but allow additional freedom to NJ Marine Fisheries Administration adjusting regulations to maintain compliance with ASMFC mandates as the FMP evolves.

Thank you for your consideration in this matter. If you have any questions, please do not hesitate to contact me.

New Jersey Atlantic Menhaden
Amendment 3 Implementation Plan

Introduction

The Atlantic States Marine Fisheries Commission passed Amendment 3 to the Atlantic Menhaden Fishery Management Plan in November 2017. Compliance elements include monitoring and management of a state's commercial harvest quota, and fishery dependent biological data collection. Due to time constraints during implementation of Amendment 2 in 2013, management of menhaden in New Jersey was enacted through legislation (Appendix 1; available online at http://www.njleg.state.nj.us/2012/Bills/PL13/74_.HTM), rather than the typical regulatory process. Responses to the majority of the following compliance requirements include a reference to specific sections of the attached legislation. New Jersey is in the process of passing regulatory language that parallels the legislation to maintain compliance with the FMP, but will give New Jersey additional freedom to adjust management measures as the FMP evolves. It has been agreed that the regulatory language will supersede the legislation once adopted.

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

Appendix 1, section C.23:3-51.11 13 d.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

Appendix 1, section C.23:3-51.11 13 a. Once a regulatory package is adopted, annual quotas may be adjusted through a Notice of Administrative change, which requires approval of the New Jersey Marine Fisheries Council and signature of the Commissioner of New Jersey DEP.

c) A mechanism to enable the transfer of unused quota been states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

Appendix 1, section C.23:3-51.11 13 a. Although this language explicitly states that NJ may receive a transfer of quota, it also implies that NJ may choose to donate unused quota under the same process.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

Appendix 1, section C.23:3-51.11 13 a(2).

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

Appendix 1, section C.23:3-51.11 13 e.

II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

Addendum 1 was passed in 2016 following adoption of NJ's menhaden legislation, and this provision is therefore not included in our management strategy. Language to this effect has been included in the draft regulatory package and will go into effect once approved.

III. Prohibit a vessel from making multiple trips in one day.

Appendix 1, section C.23:3-51.11 13 e. The language explicitly states the incidental limit is 6,000 lbs per day, and that permitted dealers may not receive more than 6,000 lbs per day from any given harvester.

IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds. Although this is not explicitly included in the legislation, NJ's purse seine fishermen have indicated that the 6,000 lb trip limit is insufficient to justify a trip and have never participated in the incidental fishery. Specific language to address this loophole is included in the draft regulations.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

These provisions are not applicable to New Jersey.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

i. Prohibit harvest for reduction purposes within the Chesapeake Bay when 100% of the 51,000 metric tons is harvested from the Bay.

ii. A repayment mechanism to reduce the subsequent year's harvest cap to account for an over-harvest of the cap on a pound-for-pound basis.

iii. No rollover of unused cap into the subsequent year.

These provisions are not applicable to New Jersey.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

Harvester reports are discussed in Appendix 1, section C.23:3-51.3 and section C.23:3-51.6. Dealer reports are discussed in Appendix 1, section C.23:3-51.7 and section C.23:3-51.8.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

Reporting requirements described above apply to both the directed and incidental harvest.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

New Jersey has collected biological samples from the bait fishery since 2006, primarily from the purse seine fishery. Beginning in 2013 with implementation of Amendment 2, sampling was expanded to achieve the required sampling intensity for all gears. The table below shows target and achieved sampling levels for the 2016 fishery. Samples from 2017 have not been tabulated, but are available upon request.

State	Total Bait Landings (pounds)	#10-fish samples required	#10-fish samples collected	Age samples collected	Length samples collected	Gear/Comments
NJ	43,714,698	66	100	1000	1000	Purse seine
NJ	2,111,775	4	13	130	130	"Other gear" grouped for confidentiality reasons; includes non-directed harvest

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

These provisions are not applicable to New Jersey.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day

ii. number of pound nets fished per day

Harvester reports are discussed in Appendix 1, section C.23:3-51.3 and section C.23:3-51.6. Data elements include catch and effort data, as shown on the New Jersey commercial reporting form provided in Appendix 2.

Appendix 1
New Jersey Atlantic Menhaden Legislation

CHAPTER 74

AN ACT concerning the taking of menhaden for bait and human food, amending P.L.1979, c.199, R.S.23:3-51, and R.S.23:3-52, and supplementing Title 23 of the Revised Statutes.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Section 73 of P.L.1979, c.199 (C.23:2B-14) is amended to read as follows:

C.23:2B-14 "Act" defined, penalties; enforcement.

73. For purposes of this section, the "act" means and includes all the new sections and amended sections contained herein, all the remaining sections of Title 50 of the Revised Statutes, sections 23:3-41, 23:3-46, 23:3-47, 23:3-48, 23:3-51, 23:3-52, 23:5-9, 23:5-16, 23:9-114, 23:9-115 and 23:9-120 of Title 23 of the Revised Statutes, sections 1, 2, and 3 of P.L.1941, c.211 (C.23:5-24.1 to 23:5-24.3), and sections 4 through 17 of P.L.2013, c.74 (C.23:3-51.2 through C.23:3-51.15).

The commissioner may utilize any or all of the following remedies for any violation of this act:

a. (1) A person who violates the provisions of this act or of any rule, regulation, license or permit adopted or issued pursuant to this act shall be liable to a penalty of not less than $300 or more than $3,000 for the first offense and not less than $500 or more than $5,000 for any subsequent offense, unless the commissioner has established an alternate penalty for a specific offense pursuant to paragraph (2) of this subsection.

(2) The Commissioner of Environmental Protection, with the approval of the Marine Fisheries Council, may, by regulation, establish a penalty schedule for any specific violation of this act or of any rule or regulation adopted pursuant to this act. No such penalty may be less than $30 or more than $100 for the first offense or less than $50 or more than $200 for any subsequent offense. Any penalty provided for by this act or by the fee schedule adopted by the commissioner shall be collected in a civil action by a summary proceeding pursuant to the "Penalty Enforcement Law of 1999," P.L.1999, c.274 (C.2A:58-10 et seq.). The Superior Court or any municipal court shall have jurisdiction to enforce the "Penalty Enforcement Law of 1999." If the violation is of a continuing nature, each day during which it continues shall constitute an additional, separate and distinct offense.

b. (1) A person who violates the provisions of this act or any rule or regulation or any license or permit adopted or issued pursuant to this act shall be liable to the revocation or suspension of any license or permit held by the violator pursuant to this act for such period of time as the court may choose, except when the rule or regulation violated includes a mandatory revocation or suspension schedule in which case that schedule shall determine the period of time of the revocation or suspension.

(2) In the case of a person who knowingly violates the provisions of R.S.50:2-11,R.S.50:3-13, R.S.50:4-2 or R.S.50:4-3, or any rule or regulation or any license or permit adopted or issued pursuant thereto, the violator shall be subject to a mandatory revocation or suspension of the license or permit or privilege for the taking of oysters, clams or other shellfish held by

the violator, or in the case of a violator without the necessary license or permit the loss of the privilege to take oysters, clams or other shellfish, for a period of three years for a first offense, five years for a second offense, and 10 years for the third and any subsequent offense. For purposes of this paragraph, a knowing violator shall include, but need not be limited to: (a) a person who is the holder of a commercial shellfish license or permit; (b) a person who is the holder of a recreational shellfish license or permit who is in possession of more than the daily recreational shellfish limit; (c) a person without any shellfish license or permit who is in possession of more than the daily recreational shellfish limit; (d) a person who is the holder of a recreational shellfish license or permit who is engaging in shellfish activities with the holder of a commercial shellfish license or permit; or (e) a person without the necessary shellfish license or permit who is engaging in shellfish activities with the holder of a commercial shellfish license or permit.

c. If a person violates any of the provisions of this act, or any rule or regulation or any license or permit adopted or issued pursuant to this act, the department may institute a civil action in a court of competent jurisdiction for injunctive relief to prohibit and prevent the violation or violations and the court may proceed in the action in a summary manner.

The department is hereby authorized and empowered to compromise and settle any claim for a penalty under this section in such amount in the discretion of the department as may appear appropriate and equitable under all of the circumstances.

d. In addition to the penalties prescribed by this section, a person who violates the provisions of R.S.50:2-11, R.S.50:3-13, R.S.50:4-2 or R.S.50:4-3, or any rule or regulation or any license or permit adopted or issued pursuant thereto, shall be subject to the forfeiture of any vessel, vehicle, or equipment used in the commission of the violation. A designated conservation officer of the Department of Environmental Protection, a member of the State Police, or any other law enforcement officer may seize and secure any vessel, vehicle, or equipment used in the commission of such a violation. Upon the seizure of the vessel, vehicle, or equipment, the conservation officer, member of the State Police, or other law enforcement officer shall immediately thereafter institute a civil action to determine if the forfeiture is warranted in the court in which the penalty action was filed pursuant to this section, which court shall have jurisdiction to adjudicate the forfeiture action. The owner or any person having a security interest in the vessel, vehicle, or equipment may secure its release by depositing with the clerk of the court in which the action is pending a bond with good and sufficient sureties in an amount to be fixed by the court, conditioned upon the return of the vessel, vehicle, or equipment to the Department of Environmental Protection upon demand after completion of the court proceeding. The court may proceed in a summary manner and may direct the confiscation of the vessel, vehicle, or equipment by the department for its use or for disposal by sale or public auction. Moneys collected by the department through the sale or public auction of the vessel, vehicle, or equipment shall be used by the Division of Fish and Wildlife for the enforcement of the provisions of this act.

2. R.S.23:3-51 is amended to read as follows:

License to take menhaden, prohibited takings.

23:3-51. a. Any person who intends to take menhaden with a purse seine or shirred net from any State waters, including the waters of the Atlantic ocean within three nautical miles of the State coast line, shall apply to the commissioner for a Menhaden Purse Seine Fishing Vessel

License or a Menhaden Purse Seine Fishing Vessel Operator's License, as appropriate, in accordance with the provisions of this section. Upon receipt of the application and payment of the fee required pursuant to R.S.23:3-52, the commissioner may, in the commissioner's discretion and as prescribed pursuant to sections 2 and 3 of P.L.2010, c.72, issue to the applicant a Menhaden Purse Seine Fishing Vessel License or a Menhaden Purse Seine Fishing Vessel Operator's License, as appropriate, except as prohibited by subsection b. of this section. A license issued pursuant to this section shall be valid only for the calendar year for which it is issued, and shall be renewed on an annual basis.

b. Notwithstanding the provisions of subsection a. of this section, the provisions of P.L.2013, c.74 (C.23:3-51.2 et al.), or the provisions of any other law, or any rule or regulation adopted pursuant thereto, to the contrary, the commissioner shall not issue a license for the taking of menhaden, and no person shall take menhaden, from State coastal waters, including the Delaware, Great, Raritan, and Sandy Hook bays, for the purpose of reduction, including the conversion of menhaden to fish meal, oil, or other components.

This subsection shall not be understood to prohibit the taking of menhaden in State coastal waters for the use as bait for commercial or recreational purposes or in whole frozen form for use as human food.

c. (1) The following types of vessels, and their owners or operators, are subject to licensure pursuant to this section:

(a) Any purse seine catch vessel that takes menhaden from State waters on an individual trip basis; and

(b) Any purse seine carry vessel that works in conjunction with the purse seine catch vessel identified in subparagraph (a) of this paragraph.

(2) A menhaden set vessel that participates only in the setting of a purse seine or shirred net in conjunction with a purse seine catch vessel is exempt from licensure pursuant to this section.

(3) A license issued pursuant to this section shall remain on board the licensed vessel at all times.

(4) The holder of a license issued pursuant to this section shall not use, have on board the licensed vessel, or work in conjunction with any other vessel that uses any type of fishing gear other than a purse seine or shirred net.

d. A Menhaden Purse Seine Fishing Vessel License shall be issued in the name of the vessel and the vessel's owner or owner/operator. If the vessel owner is not the operator of the vessel, a Menhaden Purse Seine Fishing Vessel License shall be issued to the vessel owner, as provided in this paragraph, and a separate Menhaden Purse Seine Fishing Vessel Operator's License shall be issued to, and in the name of, the vessel operator, in accordance with the provisions of this section and subsection c. of R.S.23:3-52.

e. (1) No vessel licensed pursuant to this section shall be greater than 90 feet in overall length.

(2) Whenever a Menhaden Purse Seine Fishing Vessel License is issued for a menhaden purse seine catch vessel pursuant to this section, the licensee shall provide the commissioner with certified baseline data indicating the overall length and horsepower of the vessel. Any upgrade or replacement of a licensed purse seine catch vessel shall be limited to a 10 percent increase in overall vessel length, and a 20 percent increase in horsepower.

f. The possession of any fish other than menhaden on a vessel licensed under this section is limited to no more than 500 pounds. The simultaneous possession aboard a vessel of a purse

seine or shirred net, menhaden, and any other fish in an amount greater than 500 pounds shall be prima facie evidence of a violation of this subsection.

g. (1) Before commencing menhaden fishing activities on any given day, a person licensed under this section shall notify the department, by phone or, if applicable and offered by the department, by electronic means, of the intention to fish under this section, and the vessel's intended fishing location. The licensee shall also notify the department, by phone or, if applicable and offered by the department, by electronic means, of any anticipated change in the vessel's fishing location. After a licensee has provided notice to the department of their intention to fish for menhaden pursuant to this section on any particular day, the licensee shall be limited, on that day, to the use of a purse seine or shirred net.

(2) Fishing for menhaden pursuant to this section shall be restricted to those areas in the Raritan, Sandy Hook, and Delaware Bays, and in the Atlantic Ocean, which are located at a distance of 0.6 nautical miles or more from the New Jersey coastline and the jetties and fishing piers extending therefrom.

(3) Fishing for menhaden in the Delaware Bay shall be further restricted to those areas of the Bay that lie south and east of LORAN C line 42850, or to any other area of the Bay, as may be designated by the commissioner.

(4) It shall be incumbent upon the vessel operator to determine whether a purse seine or shirred net is likely to drift, during fishing, beyond the fishing boundaries established by this subsection. The drifting of a purse seine or shirred net into any restricted area along the shore or around a jetty or pier while fishing shall constitute a violation of this subsection.

h. No person engaged in the act of fishing pursuant to this section shall disturb any: (a) channel designating stakes, markers, or buoys; (b) crab pots, lobster pots, fish pots, or traps; or (c) staked and leased shellfish grounds.

3. R.S.23:3-52 is amended to read as follows:

Fee.

23:3-52. a. Except as provided by subsection b. of this section, the fees for a Menhaden Purse Seine Fishing Vessel License, issued pursuant to R.S.23:3-51, shall be as follows:

(1) For vessels owned by a resident of New Jersey:

(a) $125 for each vessel not less than 30 nor more than 100 tons in gross tonnage;

(b) $250 for each vessel not less than 100 nor more than 150 tons in gross tonnage;

(c) $400 for each vessel not less than 150 nor more than 175 tons in gross tonnage;

(d) $550 for each vessel not less than 175 nor more than 200 tons in gross tonnage;

(e) $900 for each vessel more than 200 tons in gross tonnage; and

(f) $20 for each vessel up to 30 tons in gross tonnage, which is used to take menhaden for bait purposes only;

(2) For vessels owned by non-residents of New Jersey:

(a) $450 for each vessel not less than 30 nor more than 100 tons in gross tonnage;

(b) $700 for each vessel not less than 100 nor more than 150 tons in gross tonnage;

(c) $1,000 for each vessel not less than 150 nor more than 175 tons in gross tonnage;

(d) $1,150 for each vessel not less than 175 nor more than 200 tons in gross tonnage; and

(e) $1,500 for each vessel more than 200 tons in gross tonnage.

b. Notwithstanding the provisions of subsection a. of this section to the contrary, if a resident of New Jersey leases a vessel from out of State, the vessel licensing fee shall be the

same as the fee that is applicable to a vessel owned or leased by a nonresident, as provided by paragraph (2) of subsection a. of this section.

c. The fee for a Menhaden Purse Seine Fishing Vessel Operator's License, issued pursuant to R.S.23:3-51, shall be $50 for a resident of New Jersey and $75 for a non-resident of New Jersey.

d. Gross tonnage determinations under this section shall be made using Custom House measurements.

e. Any license fees collected pursuant to this section shall be deposited in the "Marine Fisheries Management Account," established pursuant to section 14 of P.L.2013, c.74 (C.23:3-51.12).

C.23:3-51.2 Definitions relative to taking of menhaden.

4. As used in R.S.23:3-51, section 3 of P.L.2010, c.72 (C.23:3-51.1) and sections 4 through 17 of P.L.2013, c.74(C.23:3-51.2 through C.23:3-51.15):

"Bait net" means a net, including but not limited to a bait seine, cast net, dip net, lift or umbrella net, or kill pot, deployed for the purpose of taking menhaden to be landed or sold in the State.

"Commissioner" means the Commissioner of Environmental Protection.

"Dealer" means a person who is authorized, by a license issued pursuant to section 9 of P.L.2013, c.74 (C.23:3-51.7), to purchase or barter for menhaden landed in the State, and who is considered a primary buyer of menhaden.

"Fishing" means the taking of menhaden from State or federal waters.

"Gill net vessel" means a vessel that is used in the deployment of a gill net for the purpose of taking menhaden to be landed or sold in the State.

"Menhaden" means a marine fish of the herring family (*Brevoortia tyrannus*).

"Menhaden set vessel" means the smaller of two vessels, often employed in conjunction with a purse seine catch vessel, and used as a replacement for the weight of a purse seine to assist in setting the net.

"Pound net vessel" means a vessel that is used in the deployment of a pound net for the purpose of taking menhaden to be landed or sold in the State.

"Purse seine catch vessel" means a vessel that is used in the deployment of a purse seine or shirred net for the purpose of taking menhaden to be landed or sold in the State, and which may work in conjunction with a purse seine carry vessel or menhaden set vessel in the taking of menhaden by purse seine or shirred net.

"Purse seine carry vessel" means a vessel that is used to carry and land or sell menhaden that has been taken from State or federal waters, and which works in conjunction with a purse seine catch vessel or menhaden set vessel in the taking of menhaden by purse seine.

"Trawl vessel" means a vessel that is used in the deployment of a trawl for the purpose of taking menhaden to be landed or sold in the State.

C.23:3-51.3 Menhaden Landing License.

5. a. No person shall land for the purposes of sale or barter, or otherwise sell or barter, 100 pounds or more of menhaden at any time in the State, unless the person is in possession of a Menhaden Landing License which authorizes the person to participate in the directed bait and whole frozen human food fishery for menhaden.

b. (1) Any person who intends to land for the purposes of sale or barter, or otherwise sell or barter, 100 pounds or more of menhaden at any time shall submit to the commissioner an application for a Menhaden Landing License. Any license application for a Menhaden Landing License shall be filed with the commissioner prior to the annual deadline established thereby for application submission, and any application received by the commissioner after this deadline shall be denied.

(2) A Menhaden Landing License issued pursuant to this subsection shall be valid only for the calendar year for which it is issued, and shall be renewed on an annual basis. The failure of a licensee to annually renew a Menhaden Landing License in accordance with established deadlines shall result in forfeiture of the right to obtain a Menhaden Landing License in future years, except as provided by section 6 of P.L.2013, c.74 (C.23:3-51.4).

c. (1) The following types of vessels, and their owners or operators, are subject to licensure pursuant to this section:

(a) a gill net vessel that is used or is intended to be used to land 100 pounds or more of menhaden on an individual trip basis, for the purposes of sale or barter;

(b) a pound net vessel that is used or is intended to be used to land 100 pounds or more of menhaden on an individual trip basis, for the purposes of sale or barter;

(c) a trawl vessel that is used or is intended to be used to land 100 pounds or more of menhaden on an individual trip basis, for the purposes of sale or barter;

(d) a vessel that is used or is intended to be used to land, on an individual trip basis, and for the purposes of sale or barter, 100 pounds or more of menhaden taken by bait net;

(e) a purse seine carry vessel that is used or is intended to be used to land, on an individual trip basis, and for the purposes of sale or barter, 100 pounds or more of menhaden taken from State or federal waters; and

(f) a purse seine catch vessel that functions as a purse seine carry vessel and satisfies the requirements of subparagraph (e) of this paragraph.

(2) A purse seine catch vessel that does not function as a purse seine carry vessel is exempt from licensure pursuant to this section. However, the owner or operator of a purse seine carry vessel that works in conjunction with a purse seine catch vessel shall identify the purse seine catch vessel on the landing report prepared thereby.

(3) (a) No purse seine carry vessel or purse seine catch vessel functioning as a purse seine carry vessel shall be licensed pursuant to this subsection to land menhaden taken from State waters, unless the vessel is 90 feet or less in overall length.

(b) Nothing in subparagraph (a) of this paragraph shall prohibit the licensure of a purse seine carry vessel or purse seine catch vessel that is greater than 90 feet in overall length, so long as the vessel lands menhaden taken only from federal waters.

(4) A Menhaden Landing License shall be issued by the commissioner in the name of: (a) the vessel and the vessel's owner or operator; or (b) if no vessel will be used in the landing or sale of menhaden, the person applying for the license. If a purse seine carry vessel or a purse seine catch vessel functioning as a purse seine carry vessel is operated by a person who is not the owner of the vessel, the vessel operator shall be licensed separately and apart from the vessel owner.

(5) Any license issued pursuant to this section shall specify the types of gear that may be used by the licensee in the taking of menhaden to be landed thereby.

d. The holder of a Menhaden Landing License shall not use, have on board the licensed vessel, or work in conjunction with any other vessel that uses any type of fishing gear other than the type of gear specifically identified in the license.

e. A Menhaden Landing License issued pursuant to this section shall remain on board the licensed vessel, or, if no vessel is used, in the possession of the licensee, at all times.

f. A person applying for a Menhaden Landing License shall meet the following criteria:

(1) In order to obtain a license to land menhaden taken by purse seine, the vessel shall have landed in the State at least 500,000 pounds of menhaden during one year between 2009 and 2012, inclusive;

(2) In order to obtain a license to land menhaden taken by pound net, the vessel shall have landed in the State at least 100,000 pounds of menhaden during one year between 2009 and 2012, inclusive;

(3) In order to obtain a license to land menhaden taken by gill net, the vessel shall have landed in the State at least 10,000 pounds of menhaden during one year between 2009 and 2012, inclusive;

(4) In order to obtain a license to land menhaden taken by trawl, the vessel shall have landed in the State at least 200 pounds of menhaden during one year between 2009 and 2012, inclusive; and

(5) In order to obtain a license to land menhaden taken by bait net, the person shall have possessed a New Jersey Bait Net License during one year between 2009 and 2012, inclusive. If a person's application for a license to land menhaden taken by bait net is submitted in the year 2014 or thereafter, the commissioner may require the applicant to prove landings and sale of menhaden during the respective years commencing in 2013.

g. (1) A resident of the State who is licensed under this section to land menhaden taken by purse seine shall be required to pay an annual fee of $150. A resident of the State who is licensed under this section to land menhaden taken using any other type of gear shall be required to pay an annual fee of $50.

(2) A non-resident of the State who is licensed under this section to land menhaden taken by purse seine shall be required to pay an annual fee of $750, or an amount equal to the non-resident fee charged for the landing of menhaden in the non-resident's state, whichever is greater. A non-resident of the State who is licensed under this section to land menhaden taken with any other type of gear shall be required to pay an annual fee of $250, or an amount equal to the non-resident fee charged for the landing of menhaden in the non-resident's state, whichever is greater.

(3) Any license fees collected pursuant to this subsection shall be deposited in the Marine Fisheries Management Account, established pursuant to section 14 of P.L.2013, c.74 (C.23:3-51.12), and shall be dedicated for the purposes of menhaden quota management, menhaden biological monitoring, and menhaden fisheries law enforcement.

h. Nothing in this section, in R.S.23:3-51, or in any other law, or rule or regulation adopted pursuant thereto, shall prohibit a person who does not possess a Menhaden Landing License from landing 100 pounds or less of menhaden, at any time, and on any trip or day, provided that the amount of landed menhaden does not exceed 10 percent, by weight, of the total weight of all species landed, sold, or bartered.

C.23:3-51.4 Extension of time to renew Menhaden Landing License.

6. a. A licensee who is eligible for renewal of their Menhaden Landing License may request an extension of time to renew their license in accordance with this section.

b. A licensee seeking a license renewal extension shall submit a written application therefor to the commissioner, on a form developed by the commissioner. The application shall include, at a minimum:

(1) the name of the licensee and licensed vessel, if any;

(2) the licensee's Menhaden Landing License number;

(3) a detailed explanation as to why the extension is needed, including a statement specifying the type and degree of hardship that prevented the timely renewal of the license, and the hardship that will result to the licensee if the license is not renewed; and

(4) any other appropriate documentation as may be necessary to support the application.

c. An application for license renewal extension shall be approved if the commissioner determines that:

(1) by reason of extraordinary hardship or exceptional situation or condition, the licensee was precluded from complying with the renewal requirements;

(2) strict compliance with the renewal requirements provided by law would result in exceptional and undue hardship to the licensee;

(3) the circumstances supporting the conclusions made in paragraphs (1) and (2) of this subsection were not created by the licensee or persons under the licensee's control; and

(4) approval of the extension will not unreasonably interfere with the orderly administration of the directed bait or whole frozen human food fishery for menhaden.

d. Within 30 days after receipt of an application for license renewal extension, the commissioner shall approve or deny the application, and shall provide written notice of this determination to the licensee. A licensee whose application for extension is denied may appeal the decision in accordance with the procedure for contested cases under the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.).

C.23:3-51.5 Transfer of license.

7. a. Upon application to, and approval by, the department, the holder of a Menhaden Purse Seine Fishing Vessel License, issued pursuant to R.S.23:3-51, or the holder of a Menhaden Landing License, issued pursuant to section 5 of P.L.2013, c.74 (C.23:3-51.3), may transfer their license as follows:

(1) To a replacement vessel when the vessel named in the license is replaced by the licensee; or

(2) To a new owner of the vessel named in the license when the vessel is sold or otherwise transferred to another person.

b. The following limitations shall apply to any license transfer undertaken pursuant to paragraph (1) of subsection a. of this section:

(1) a license shall only be transferrable to a replacement vessel that employs the same type of fishing gear identified in the original license;

(2) a license that is applicable to a purse seine catch vessel shall only be transferrable to a replacement purse seine catch vessel, and a license that is applicable to a purse seine carry vessel shall only be transferrable to a replacement purse seine carry vessel;

(3) a license that is applicable to a purse seine catch vessel or a purse seine carry vessel shall be transferrable to a replacement vessel only if the replacement vessel is not more than 10 percent larger in overall length than the originally licensed purse seine catch vessel or 10

percent larger in the hold capacity of the originally licensed purse seine carry vessel, as measured in cubic feet, and not more than 20 percent more powerful in terms of horsepower, than either originally licensed vessel.

c. A person who transfers a license pursuant to paragraph (2) of subsection a. of this section shall no longer be eligible to obtain a Menhaden Landing License based upon the landing history of the vessel being sold.

d. An applicant for a license transfer shall submit an application to the commissioner, on a form developed by the commissioner, and no license shall be transferred pursuant to this section without the prior approval of the commissioner.

e. A person shall not be eligible for transfer of their license pursuant to this section if: (1) their license is pending suspension or has been suspended pursuant to section 15 of P.L.2013, c.74 (C.23:3-51.13); or (2) the licensee is subject to court action for a violation of R.S.23:3-51 or P.L.2013, c.74 (C.23:3-51.2 et al.).

C.23:3-51.6 Monthly report by licensee to commissioner.

8. a. The holder of a Menhaden Landing License shall submit a monthly report to the commissioner, on a form developed by the commissioner. The licensee shall attest to the validity of the information contained in the monthly report, and shall electronically submit the report to the department using a method approved by the commissioner. If no landing, sale, or barter of menhaden occurred during the month, the licensee shall submit a report to that effect.

b. The monthly report shall include, at a minimum, the following information, which shall be reported on an individual trip basis:

(1) the name of the licensee and licensed vessel, if any;

(2) the licensee's Menhaden Landing License number;

(3) the name of the purse seine catch vessel, if any, which was used in conjunction with the licensed vessel;

(4) the total amount, in pounds, of menhaden landed by the licensee or licensed vessel;

(5) the total amount, in pounds, of menhaden discarded by the licensee or licensed vessel;

(6) the location of harvest;

(7) the type of gear used for harvest;

(8) the ports used for the landing of menhaden;

(9) the date on which, and the dealer to whom, any landed menhaden was sold or bartered by the licensee; and

(10) any other information required by the department.

c. (1) In addition to any other penalties provided by section 73 of P.L.1979, c.199 (C.23:2B-14), by P.L.2013, c.74 (C.23:3-51.2 et al.), or by any other law, any licensee who fails to submit a monthly report on or before the 10th day of the month following the month of record shall be subject to a fine of $50 for a first offense, $100 for a second offense, and $200 for any subsequent offense.

(2) Any fines collected pursuant to this subsection shall be deposited in the Marine Fisheries Management Account, established pursuant to section 14 of P.L.2013, c.74 (C.23:3-51.12), and shall be dedicated for the purposes of menhaden quota management, menhaden biological monitoring, and menhaden fisheries law enforcement.

C.23:3-51.7 Menhaden Dealer License.

9. a. No person shall purchase or barter for menhaden landed in the State, as the first point of sale, unless the person is in possession of a Menhaden Dealer License. No menhaden landed in the State shall be sold or traded to any person who is not licensed under this section.

b. (1) Any person who intends to purchase or barter for menhaden landed in the State shall submit to the commissioner an application for a Menhaden Dealer License.

(2) A Menhaden Dealer License issued pursuant to this subsection shall be valid only for the calendar year for which it is issued, and shall be renewed on an annual basis.

c. No person shall act as the point of sale for menhaden landed in the State unless the person is in possession of both a Menhaden Landing License, issued pursuant to section 5 of this act, and a Menhaden Dealer License, issued pursuant to this section. Any person in possession of a Menhaden Landing License and not selling menhaden to a licensed Menhaden dealer shall also possess a Menhaden Dealer License, and shall report any sales on a weekly basis, in accordance with the provisions of section 10 of this act.

d. The holder of a Menhaden Dealer License, issued pursuant to this section, shall not accept 100 pounds or more of menhaden per day from any person unless that person is in possession of a Menhaden Landing License issued pursuant to section 5 of P.L.2013, c.74 (C.23:3-51.3).

e. (1) A State resident who is licensed as a menhaden dealer pursuant to this section shall be required to pay an annual fee of $100.

(2) A non-resident of the State who is licensed as a menhaden dealer pursuant to this section shall be required to pay an annual fee of $500, or an amount equal to the non-resident fee charged to a menhaden dealer in the non-resident's state, whichever is greater.

(3) Any license fees collected pursuant to this subsection shall be deposited in the Marine Fisheries Management Account, established pursuant to section 14 of P.L.2013, c.74 (C.23:3-51.12), and shall be dedicated for the purposes of menhaden quota management, menhaden biological monitoring, and menhaden fisheries law enforcement.

C.23:3-51.8 Weekly report by holders of Menhaden Dealer License.

10. a. The holder of a Menhaden Dealer License shall submit a weekly report to the commissioner, on forms developed by the commissioner. The licensee shall attest to the validity of the information contained in the weekly report, and shall electronically submit the report to the department. If no purchase or trade of menhaden occurred during the week, the licensee shall submit a report to that effect. For the purposes of this section, a week shall begin on Sunday and end on Saturday.

b. The weekly report shall include, at a minimum, the following information:

(1) the name of the licensee;

(2) the licensee's Menhaden Dealer License number;

(3) the Menhaden Landing License number of each person selling or trading menhaden to the dealer during the preceding week;

(4) the total amount, in pounds, of menhaden purchased or traded during the preceding week;

(5) the location of harvest for menhaden purchased or traded during the preceding week;

(6) the type of gear used for the harvest of menhaden purchased or traded during the preceding week;

(7) the date of purchase or trade; and

(8) any other information required by the department.

c. (1) In addition to any other penalties provided by section 73 of P.L.1979, c.199 (C.23:2B-14), by P.L.2013, c.74 (C.23:3-51.2 et al.), or by any other law, if a licensed menhaden dealer fails to submit a weekly report, as required by this section, either on or before 12:00 p.m. on the Tuesday following the week of record, the licensee shall be subject to a fine of $50 for a first offense, $100 for a second offense, and $200 for any subsequent offense.

(2) Any fines collected pursuant to this subsection shall be deposited in the Marine Fisheries Management Account, established pursuant to section 14 of P.L.2013, c.74 (C.23:3-51.12), and shall be dedicated for the purposes of menhaden quota management, menhaden biological monitoring, and menhaden fisheries law enforcement.

C.23:3-51.9 Permitted removal of fish harvested.

11. Removal, from a purse seine, of fish harvested from the waters of the State shall be by brailing or dip net only. No fish pump shall be on board any vessel operating under a license, for the purpose of taking menhaden for bait or human food purposes, unless the pump is completely covered and securely fastened with a brightly colored tarp or other material, and the pump intake or hose is disconnected from the pump and is securely stowed away from the pump so that it is not readily available for use when the vessel is fishing in State waters.

C.23:3-51.10 Requirements for licensees relative to littering, cleanup.

12. a. The holder of a Menhaden Purse Seine Fishing Vessel License or a Menhaden Purse Seine Fishing Vessel Operator's License, issued pursuant to R.S.23:3-51, and the holder of a Menhaden Landing License, issued pursuant to section 5 of P.L.2013, c.74 (C.23:3-51.3) shall not throw overboard, or otherwise release from a vessel or its nets into the waters of the State: (1) any quantity of dead fish, except during the course of normal fishing operations; or (2) any refuse, litter, or garbage of any kind.

b. Whenever any fish, fish parts, refuse, litter, or garbage of any kind is released during, or as a result of, a menhaden fishing or landing operation, in violation of the provisions of subsection a. of this section, the holder of a Menhaden Purse Seine License or a Menhaden Landing License, as the case may be, shall report the release to the department as soon as possible and initiate a cleanup of the release within 24 hours thereof, at the licensee's expense, if the release is likely to impact the shoreline.

c. In the event that a licensee fails to initiate a cleanup, in accordance with the provisions of subsection b. of this section, within 24 hours after a release begins, the department may conduct or arrange for the cleanup of the release. However, the licensee shall be liable to pay all costs associated with the cleanup, including any administrative costs incurred by the department. Costs imposed pursuant to this subsection may include the costs associated with damages to, or the cleanup of, marine and estuarine waters of the State, or the State's beaches, shorelines, and marshes.

C.23:3-51.11 Annual State menhaden catch quota.

13. a. (1) The annual State menhaden catch quota shall be established by the Atlantic States Marine Fisheries Commission. The commissioner may request a quota transfer from other states or regions, in accordance with the administrative procedure outlined by the Atlantic States Marine Fisheries Commission.

(2) The commissioner shall divide and allocate the annual State menhaden catch quota as provided in this paragraph. The annual New Jersey menhaden bait quota shall be divided

among the various gear types, with the purse seine fishery being allocated 95 percent of the quota, and pound nets, gill nets, trawls, and bait nets being allocated the remaining five percent, combined. If the quota for any gear type is exceeded, the overharvested amount shall be deducted from the following year's quota.

b. The season for fishing and landing menhaden in the State shall be:

(1) January 1 to December 31 for licensees taking menhaden, or landing menhaden taken, by purse seine;

(2) January 1 to December 31 for licensees taking menhaden, or landing menhaden taken, by gill net;

(3) January 1 to December 31 for licensees taking menhaden, or landing menhaden taken, by pound net;

(4) January 1 to December 31 for licensees taking menhaden, or landing menhaden taken, by trawl; and

(5) January 1 to December 31 for licensees taking menhaden, or landing menhaden taken, by bait net.

c. No person who intends to take menhaden with a purse seine or shirred net shall fish for menhaden in the State:

(1) on a Saturday or Sunday;

(2) on the days on which a public holiday is officially observed by the State, as declared pursuant to R.S.36:1-1; or

(3) at any time, except during the hours from sunrise to sunset.

d. (1) The commissioner shall close the menhaden season in the State, for each respective gear type, by giving not less than two days' notice of the projected date that the year's quota for that gear type will be landed.

(2) If the menhaden season is closed prematurely, the commissioner may reopen the season for a specified period of time, upon no less than two days' notice.

(3) Any notice required pursuant to this subsection shall be made available for public viewing on the department's Internet website, and shall be issued electronically, via e-mail, to all the holders of a Menhaden Purse Seine Fishing Vessel License, a Menhaden Purse Seine Fishing Vessel Operator's License, a Menhaden Landing License, and a Menhaden Dealer License. Each such licensee shall be required, at the time of licensure, to provide the commissioner with their e-mail address, in order to facilitate the provision of notice pursuant to this section.

e. If the season for a particular gear type is closed because the quota amount allocated to that gear type has been harvested and landed: (1) the holder of a Menhaden Landing License for that gear type may continue to land an incidental catch of up to 6,000 pounds of menhaden per day; and (2) the holder of a Menhaden Dealer License may continue to accept from a Menhaden Landing License holder an incidental catch of not more than 6,000 pounds of menhaden per day. The incidental catch allowance authorized by this subsection shall not be applied to the annual menhaden catch quota established by the Atlantic States Marine Fisheries Commission.

C.23:3-51.12 "Marine Fisheries Management Account."

14. There is established within the General Fund, a separate, dedicated, and non-lapsing account to be known as the "Marine Fisheries Management Account." This account shall be credited with all revenues received from the issuance of Menhaden Purse Seine Fishing Vessel

Licenses and Menhaden Purse Seine Fishing Vessel Operator's Licenses pursuant to R.S.23:3-51 and R.S.23:3-52, and all revenues received from the issuance of Menhaden Landing Licenses and Menhaden Dealer Licenses pursuant to sections 5 and 9 of P.L.2013, c.74 (C.23:3-51.3 and C.23:3-51.7). The moneys in the Marine Fisheries Management Account shall be allocated to the Division of Fish and Wildlife, Marine Fisheries Administration within the Department of Environmental Protection, and shall be dedicated for quota management, biological monitoring, and fisheries law enforcement in connection with marine fisheries.

C.23:3-51.13 Violations, penalties.

15. a. A person who violates any provision of R.S.23:3-51, R.S.23:3-52, or P.L.2013, c.74 (C.23:3-51.2 et al.)shall be subject to the penalties prescribed in section 73 of P.L.1979, c.199 (C.23:2B-14). In addition to those penalties, if a licensee: (1) falsifies or misrepresents any information contained in a report submitted pursuant to section 8 of P.L.2013, c.74 (C.23:3-51.6) or section 10 of P.L.2013, c.74 (C.23:3-51.8); (2) fails to report a release as required by section 12 of P.L.2013, c.74 (C.23:3-51.10); or (3) fishes in, or allows a purse seine or shirred net to drift into, any restricted fishing area, as prohibited by subsection g. of R.S.23:3-51, the licensee shall be subject to the following periods of license suspension:

(1) a 30-day suspension of their license for a first offense;

(2) a 60-day suspension of their license for a second offense; and

(3) a 180-day suspension of their license for a third or subsequent offense.

b. (1) If a license is suspended pursuant to subsection a. of this section, and, for three years thereafter, the licensee does not commit another offense warranting suspension of their license, the initial offense warranting license suspension shall be removed from consideration in determining an applicable term of license suspension for any offense committed by the licensee after that three-year period.

(2) The forgiveness of prior offenses provided for by this subsection shall apply only to those determinations that pertain to the calculation of applicable license suspension periods. All prior offenses shall be taken into account in the calculation of any monetary penalties provided for by P P.L.2013, c.74 (C.23:3-51.2 et al.).

c. A license suspension imposed pursuant to this section shall be applicable to both the licensee and the licensed vessel, if any, and shall be carried out during the normal season of fishing operations, which extends from May 15 through October 15 of each year. If the duration of a license suspension period is not completed during the current year's normal season of fishing operations, the balance of the license suspension shall be made up during the following year's normal season of fishing operations.

C.23:3-51.14 Compliance with instructions, signals of law enforcement officer.

16. In order to facilitate enforcement of R.S.23:3-51 and P.L.2013, c.74 (C.23:3-51.2 et al.) the operator of, or any other person on board, a vessel that is subject to the provisions of R.S.23:3-51 or P.L.2013, c.74 (C.23:3-51.2 et al.), shall immediately comply with the instructions and signals of a law enforcement officer, and shall facilitate the officer's safe boarding, and the inspection by such officer of the vessel, its gear, equipment, catch, and any area where fish may be stored.

C.23:3-51.15 Modifications of requirements by commissioner.

17. The commissioner may, with the approval of the New Jersey Marine Fisheries Council, modify the requirements of R.S.23:3-51, R.S.23:3-52, and P.L.2013, c.74 (C.23:3-51.2 et al.) if such modifications are determined to be necessary either to provide for the optimal utilization of any quotas established for menhaden fishing, or to maintain consistency or State compliance with any menhaden fisheries management plan that has been approved by the Atlantic States Marine Fisheries Commission or any federal fishery management council and adopted by the National Marine Fisheries Service. In particular, upon authorization of the New Jersey Marine Fisheries Council, and in accordance with the provisions of this section, the commissioner may modify the following provisions of law:

a. the qualifications for licensure under R.S.23:3-51, or under section 5 or 9 of P.L.2013, c.74 (C.23:3-51.3 or C.23:3-51.7), including any fee amounts required for licensure under those sections;

b. the qualifications for the transfer of a license under section 7 of P.L.2013, c.74 (C.23:3-51.5);

c. the license suspension schedule established by section 15 of P.L.2013, c.74 (C.23:3-51.13);

d. the specifications applicable to vessel upgrades and replacements, as provided by R.S.23:3-51 or section 7 of P.L.2013, c.74 (C.23:3-51.5);

e. the reporting requirements established by section 8 or section 10 of P.L.2013, c.74 (C.23:3-51.6 or C.23:3-51.8);

f. the quota allocation formula established by subsection a. of section 13 of P.L.2013, c.74 (C.23:3-51.11);

g. the season for menhaden fishing established by subsection b. of section 13 of P.L.2013, c.74 (C.23:3-51.11); or

h. the incidental catch allowance provided by subsection e. of section 13 of P.L.2013, c.74 (C.23:3-51.11), or the allocation of that incidental catch allowance to the State’s annual quota.

18. This act shall take effect immediately.

Approved June 27, 2013.

Appendix 2
New Jersey Commercial Harvester Reporting Form

New Jersey Harvester Trip Report

Fishing year _____

Fisherman name _____

Gear ID _____

Vessel ID _____ OR ☐ I fished from shore

Vessel name _____

Did Not Fish (select all that apply)

☐ Jan ☐ Feb ☐ Mar ☐ Apr
☐ May ☐ Jun ☐ Jul ☐ Aug
☐ Sep ☐ Oct ☐ Nov ☐ Dec
☐ I am done fishing for the year

Chart area _____

Gear type _____

Gear quantity _____

Gear size _____

Mesh size _____

Trip date	# crew	# hauls	Soak time	Species	Kept lbs	Discards	Disposition	Buyer	County

I certify that the information provided on this form is true, complete and correct to the best of my knowledge, and made in good faith. I understand that if any of the information reported here is willfully false, I am subject to punishment.

Signature _____ Date _____

Submit completed forms by the 10th of the month following the month of reporting. Submit forms by fax to (609) 748-2032, or by mail to NJ Marine Fisheries Administration, PO Box 418, Port Republic, NJ 08241. Please be sure to keep a copy for your own records. Questions or comments, please call (609) 748-4334 or (609) 748-4344.

Form NJTRIP 2017-01

Atlantic Menhaden

Amendment #3 Implementation Plan for Calendar Year 2018

Commonwealth of Pennsylvania

Pennsylvania Fish and Boat Commission

1. Commercial Fishery Management Measures

    a. No commercial fishery for Atlantic Menhaden exists in Pennsylvania nor may Atlantic Menhaden be taken from the wild in Pennsylvania and sold, traded, exported, or otherwise offered for sale or barter whether dead or live. Menhaden only occur in the Delaware River Estuary with Pennsylvania.

2. Monitoring Requirements
    a. As no commercial fishery exists in Pennsylvania no monitoring is required.
    b. There are no other commercial fisheries in the Pennsylvania portion of the Delaware River Estuary so there is no opportunity for Atlantic menhaden to become bycatch.

3. Recreational Fishery

    a. Season: Open all year.
    b. No minimum length.
    c. Possession limit: 50 per day. Fish bait and baitfish dealers are authorized to have more than 50 Atlantic Menhaden in possession providing dealers have a “paper trail” documenting the receipt of Menhaden transported into the Commonwealth.
    d. Gear restrictions: Dip net or minnow seine not over four feet square or in diameter. Snagging hooks may not be used or possessed while in the act of fishing.
    e. Estimate of recreational harvest by season: Not available.

State of Delaware
Atlantic Menhaden Amendment 3 Compliance Plan

December 10, 2017

1. Commercial Fishery Management Measures

a) Delaware's Total Allowable Catch (TAC) of Atlantic menhaden for 2018 is 0.51% of the total TAC or 2,423,520 lbs. Delaware has regulations (below) that give the Division of Fish and Wildlife (the Division) authority to close Atlantic menhaden fisheries once the TAC has been reached. Delaware has sent dated closure notices to the Atlantic States Marine Fisheries Commission (ASMFC) when Delaware's TAC was reached in previous years under Amendment 2 provisions. However, Delaware's Amendment 3 TAC is so much greater than its landings in any previous year that Delaware is unlikely to close its menhaden fisheries under Amendment 3.

b) Delaware has menhaden regulations that allow its TAC to be changed whenever required under Amendment 3.

c) Delaware anticipates having unused TAC. The 2018 TAC is approximately 1,500% of 2017 landings. Delaware relinquished 2,000,000 lbs. of its 2018 TAC, but may still have unused TAC. Delaware has transferred quota in other fisheries and does not anticipate having any difficulty in transferring Atlantic menhaden TAC in 2018 should Delaware be able to fulfill such a request for unused TAC.

d) Delaware will not have a TAC overage in 2018.

e) The only fisheries in Delaware that regularly catch Atlantic menhaden are the gill net fisheries. The gill net fisheries in Delaware do not target Atlantic menhaden. None of Delaware's gill net permit holders have the holding capacity on their boats to exceed the 6,000 lb. daily bycatch limit.

f) Delaware will not opt in to the episodic event fishery.

2. Monitoring Requirements

a) Delaware has an Interactive Voice Response (IVR) system for landings reports. Harvesters are required to call in their Atlantic menhaden landings of menhaden within 24 hours of weigh out of their landings. Harvesters are required to submit monthly landings of all fish on a trip level basis and the reports include the following:
    1. Date
    2. Vessel Registration Number
    3. Fisherman ID
    4. Trip ID
    5. Species
    6. Pounds landed
    7. Disposition
    8. Landing Port
    9. Gear
    10. Amount of gear
    11. Number of sets
    12. Area fished
b) The IVR system for landings reports will be used for bycatch reporting, should there be any bycatch.
c) Delaware will collect the required biological samples. Delaware will be required to collect one 10-fish sample based on 2016 landings.
d) Delaware does not have a pound net fishery.

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Division of Fish and Wildlife

3500 Tidal Finfish

Atlantic Menhaden

3588 Atlantic Menhaden

1.0 Atlantic Menhaden Quota

1.1 The annual quota for Atlantic menhaden shall be determined in accordance with the Atlantic States Marine Fisheries Commission's Interstate Fishery Management Plan for Atlantic Menhaden and its subsequent amendments and addenda.

1.2 Any person who has been issued a valid commercial food fishing license may take and reduce to possession Atlantic menhaden during the period beginning at 12:01 AM January 1 and ending when the Department has determined that the annual Atlantic menhaden quota has been landed. The Department shall establish, based on recent fishery performance and landings, a date and time to order the directed fishery closed.

2.0 Atlantic Menhaden Bycatch Allowance

2.1 It is unlawful for any person who has been issued a valid commercial food fishing license to take and reduce to possession more than 6,000 pounds of Atlantic menhaden during any one day once the Department has determined that the Atlantic menhaden fishery is closed.

2.2 It shall be unlawful for any person who has been issued a valid commercial food fishing license or any vessel, regardless of the number of licensed commercial fisherman onboard that vessel, to possess or land more than 6,000 pounds of Atlantic menhaden in any one (1) day once the Department has determined the annual Atlantic menhaden fishery is closed.

3.0 Atlantic Menhaden Reporting Requirements

3.1 It is unlawful for any person who has been issued a valid commercial food fishing license to not accurately and completely report their Atlantic menhaden landings to the Department, via the interactive voice phone reporting system, within 24 hours of landing.
3.2 In addition to the requirement to phone in daily landing reports, it is unlawful for any person who has been issued a valid commercial food fishing license to not accurately and completely compile and file monthly log sheets detailing their daily landings of Atlantic menhaden on forms supplied by the Department. These forms must be submitted by the 10th of the month next ensuing. Failure to submit these monthly reports on a timely basis may be cause for revocation or non-renewal of their commercial food fishing license.

4.0 Atlantic Menhaden Landing Restrictions

It is unlawful for any person who has been issued a valid commercial food fishing license to offload Atlantic menhaden to any other vessel or means of conveyance prior to landing.

17 DE Reg. 648 (12/01/13)

Maryland's Implementation Plan for Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden

December 13, 2017

1. **Commercial Fishery Management Measures**

a) A mechanism to close the directed commercial fisheries in Maryland is already in place, and can be found in section C(2) of the current regulation (see below).
b) A mechanism to adjust Maryland's yearly quota as required by ASMFC is already in place, and can be found in section A (1) of the current regulation (see below).
c) A mechanism to enable the transfer of unused quota between states, if warranted, and the ability to adjust Maryland's quota as it relates to the transfer of quota is in place through section A (1) of the current regulation (see below).
d) A mechanism allowing pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of Maryland's current year quota is already in place, and can be found in section A(2) of the current regulation (see below).
e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of Maryland's quota and closure of the directed fisheries are already in place. The closure and bycatch limits would be announced through a public notice as established in sections B and F of the attached regulation (see below). The landing limits by gear in i. through iv. below will be established via public notice if Maryland's quota is met.

i. Maryland will allow pound net fishermen to apply for a Menhaden Bycatch Landing Permit, which will allow the harvest of up to 6,000 pounds per day. Details of requirements and limitations of the permit are set forth in section D of current regulation (see below). All other gear, and non-permitted pound net fishermen, will be restricted to a 1,500 pound per day limit after the open season closes. All gear currently being used for menhaden in Maryland are in either the small scale or non-directed category (purse seining is not legal in Maryland).

ii. Only multiple fishermen with a Menhaden Bycatch Landing permit harvesting from one vessel will be allowed to utilize the 12,000 pound limit prevision, and only pound net fishermen may apply for the permit.

iii. During the bycatch period harvesters will be limited to landing menhaden once per day or trip, whichever is longer.

v. The use of multiple carrier vessels to land more than the established limits by one harvester will not be permitted.

f) Maryland is not eligible to participate in the episodic events set aside program, which sets aside 1% of the coast wide TAC for the New England states (Maine - New York) because they have sporadic availability of menhaden in their waters. This allows access to the fish in years when fish are present.
g) The Chesapeake Bay reduction fishery harvest cap only applies to Virginia, since Maryland does not have a reduction fishery.

2. Monitoring Requirements

a) Maryland currently has a timely reporting system for monitoring the quota in place through section E within the current regulation (see below).
b) Maryland currently has a timely reporting system for monitoring the bycatch fishery in place through section E within the current regulation (see below).
c) Maryland will continue to collect age and length samples through the existing Maryland Onboard Pound Net Survey, and supplement this sampling with fish dealer sampling when necessary to meet the one 10 fish sample per 200 metric tons of menhaden landed requirement.
d) Maryland will continue to require pound net fishermen to report the number of nets fished and the pounds of menhaden landed per day

Maryland's current Atlantic Menhaden Regulation

08.02.05.07**.**07 Atlantic Menhaden.
A. Quota.
(1) The annual total allowable landings of Atlantic menhaden for the commercial fishery is set by the Atlantic States Marine Fisheries Commission and shall be published through a public notice issued in accordance with §F of this regulation.
(2) Any annual overages of the quota will be deducted from the subsequent year's quota.
B. Seasons. A public notice shall be issued in accordance with §F of this regulation when the quota and season are approved by the Atlantic State Marine Fisheries Commission.
C. Commercial Catch Limits.
(1) Prior to the State quota in §A of this regulation being met or exceeded, there is no catch limit for Atlantic menhaden.
(2) Upon the State quota being met or exceeded, the catch limit for Atlantic menhaden and the harvest rate at which an Atlantic menhaden bycatch allowance landing permit is required shall be established and may be modified through a public notice issued in accordance with §F of this regulation.
D. Atlantic Menhaden Bycatch Allowance Landing Permits.
(1) An individual may apply for an Atlantic menhaden bycatch allowance landing permit if, as of February 18, 2013, the individual had a pound net site registered with the Department.
(2) An individual may be issued only one Atlantic menhaden bycatch allowance landing permit.
(3) A permittee shall have in possession the Atlantic menhaden bycatch allowance landing permit when engaged in permitted activities.

(4) Operators.
(a) An operator means an individual who is not a permittee and acts as an agent of a permittee.
(b) The only person a permittee may use as the operator of their Atlantic menhaden bycatch allowance landing permit is the individual the permittee has designated as the authorized user of the permittee's commercial fishing license in accordance with Natural Resources Article, §4-701(k)(7), Annotated Code of Maryland.
(c) An operator may only fish the pound nets that the permittee has:
(i) Registered in the permittee's name; and
(ii) Notified the Department as being active in accordance with Regulation .01C of this chapter.
(d) When engaged in permitted activities, an operator shall be:
(i) In possession of the permittee's tidal fish license and Atlantic menhaden bycatch allowance landing permit; and
(ii) On the vessel named on the permittee's tidal fish license.
(5) Atlantic menhaden bycatch allowance landing permits may not be transferred and are valid only for the named individual on the permit card or their operator as described in §D(4) of this regulation.
(6) A permittee or a permittee's operator shall be on board any boat harvesting Atlantic menhaden under an Atlantic menhaden bycatch allowance landing permit.
E. Reporting.
(1) Reporting Requirements. In addition to the requirements of Natural Resources Article, §4-206, Annotated Code of Maryland:
(a) Any Atlantic menhaden harvested from a pound net must be reported on the day of harvest in the manner specified by the Department; and
(b) An Atlantic menhaden bycatch allowance landing permittee shall report in the manner specified by the Department.
(2) Reporting Penalties.
(a) The Department may suspend the holder of an Atlantic menhaden bycatch allowance landing permit from participation in the menhaden fishery for up to 90 days per violation for failing to comply with §E(1)(b) of this regulation.
(b) In addition to any other penalty, the Department may deny an application for an Atlantic menhaden bycatch allowance landing permit for failing to comply with §E(1) of this regulation during the previous season.
(c) Prior to suspending a permit under this regulation or denying an application for a permit, the Department shall give the licensee notice of its intended action and an opportunity to appear at a hearing conducted in accordance with the contested case procedures set forth in State Government Article, Title 10, Subtitle 2, Annotated Code of Maryland, and COMAR 08.01.14.
F. General.
(1) When the menhaden quota, established by the Atlantic States Marine Fisheries Commission, has been met, the Secretary may issue a public notice on the Fisheries Service website to modify the season and catch limits in compliance with the Atlantic States Marine Fisheries Commission Interstate Fishery Management Plan.
(2) The Secretary shall make a reasonable effort to disseminate a public notice issued under this section through various other media so that an affected individual has a reasonable opportunity to be informed.
(3) A violation of the restrictions set by the Secretary in accordance with section is a violation of this regulation.

MARYLAND - VIRGINIA
"Potomac River Compact of 1958"

Potomac River Fisheries Commission
222 Taylor Street
P.O. BOX 9
Colonial Beach, Virginia 22443
TELEPHONE: (804) 224-7148 · (800) 266-3904 · FAX: (804) 224-2712
www.prfc..us prfc@verizon.net

Atlantic Menhaden Implementation Plan

January 2018

The Potomac River Fisheries Commission's (PRFC) Atlantic menhaden allocation for 2018 was determined by the ASMFC to be 1.07 percent of the coastwide TAC (2,709,809 lbs.).

1. Commercial Fishery Management Measures

a) The PRFC will maintain the daily harvester reporting on a weekly basis. We will be closely tracking the menhaden commercial harvest from the Potomac River in 2018. Since the pound net fishery accounts for 99 percent of the menhaden harvest, pound net fishermen will be required to call-in their weekly total menhaden harvest when 70 percent of the catch limit is projected to be landed. All pound net fishermen and significant buyers will be notified by phone when 90 percent of the catch limit is reached and when the fishery shall be closed. A closure notice will be mailed to all PRFC licensed fishermen.

b) The PRFC adopted Order #2017-08 which declared and ordered the catch limit of menhaden for 2018 for the Potomac River. In the event that the ASMFC needs to adjust the allocation for the Potomac, the PRFC can revise this Order and it will become effective ten days after its adoption.

c) TAC transfers, if any, will be on a case by case basis as needed. The ASMFC will be notified as to the date, amount, the transferor and the transferee of any such transactions.

d) Any overage of the 2018 PRFC allocation of the TAC will be subtracted from the 2019 PRFC allocation of the TAC.

e) The PRFC adopted Order #2017-08 which declared and ordered when the PRFC Atlantic menhaden catch limit is reached, all commercial fisheries shall be closed to all gear types.

i, ii, iii,and iv) PRFC Order #2017-08 declared and ordered when the commercial fisheries for Atlantic menhaden are closed, subject to the provisions of the ASMFC Amendment 2 and Addendum I to the IFMP for Atlantic Menhaden, PRFC commercial fishermen using stationary multi-species gear are permitted to possess and/or land no more than 6,000 pounds of Atlantic menhaden for a single vessel per day, which must be harvested by the licensee from his licensed net(s). In this case, stationary multi-species gears are defined as pound nets, anchored/staked gill nets, and fyke nets. Exception – a single vessel may land/possess no more than 12,000 pounds of Atlantic menhaden per day when there are two PRFC pound net

licensees physically on board who each have at least one of their pound nets set and fishing and prior to the fishery being closed and the bycatch provisions being implemented, no more than 6,000 pounds of Atlantic menhaden are harvested from either of the licensees nets. Notwithstanding the provisions of Order #2017-08, the PRFC reserves the right to modify Order #2017-08 to be equivalent to any other state's ASMFC approved by-catch provision.

iv) PRFC Regulation II, Section 5 requires that every person licensed by the Commission to harvest seafood must keep accurate and complete daily account of their catch and submit these reports to the PRFC on a weekly basis. These reports include the required data elements.

f) N/A

g) N/A

2. Monitoring Requirements

a) (i) For the Potomac River, harvesters are required to submit daily harvest reports on a weekly basis.

ii) The PRFC requires trip level reporting by the harvester for each gear type, and the harvest report includes the data reporting elements as required by the ACCSP.

iii) N/A – No purse nets and/or snapper rigs are allowed to fish in the Potomac River.

iv) For the Potomac River, harvesters are required to submit daily harvest reports on a weekly basis.

b) During the closed season, only pound net, gill net and fyke net licensees will be permitted to land the by-catch allowance of up to 6,000 pounds of menhaden for a single vessel per day. These fishermen will be required to continue to submit daily harvest reports on a weekly basis. All menhaden reported by pound nets, gill nets and fyke nets after the season is closed to harvest will be tabulated and reported as by-catch.

c) The PRFC has been participating in a menhaden biological sampling program since 2010 by collecting 10-fish samples from pound net fishermen on a monthly basis. The PRFC will continue this biological sampling program in 2018.

d) The PRFC compiles catch and effort data from the mandatory daily harvest reports for the pound net fishery, including total pounds landed per day and number of pound nets fished per day. For sampling, see 2(c) above.

3. *De minimis* – N/A

POTOMAC RIVER FISHERIES COMMISSION

O R D E R #2013-08

COMMERCIAL ATLANTIC MENHADEN CATCH LIMITS AND RESTRICTIONS

THE POTOMAC RIVER FISHERIES COMMISSION, having found it necessary to comply with certain provisions of the Atlantic States Marine Fisheries Commission (ASMFC) Amendment 2 and Addendum I to the Interstate Fishery Management Plan (IFMP) for Atlantic Menhaden and the provisions of Regulation I, Section 7(a)(2):

HEREBY DECLARES AND ORDERS: the catch limit for Atlantic menhaden provided for in Regulation III, Section 10(a) shall be 2,709,809 pounds. A weekly menhaden harvest call-in program will be imposed when 70 percent of the catch limit is projected to be landed. When the PRFC Atlantic menhaden catch limit is reached, all commercial fisheries shall be closed to all gear types.

BE IT FURTHER DECLARED AND ORDERED: When the commercial fisheries for Atlantic menhaden are closed, subject to the provisions of the ASMFC Amendment 2 and Addendum I to the IFMP for Atlantic Menhaden, PRFC commercial fishermen using stationary multi-species gear are permitted to possess and/or land no more than 6,000 pounds of Atlantic menhaden for a single vessel per day, which must be harvested by the licensee from his licensed net(s). In this case, stationary multi-species gears are defined as pound nets, anchored/staked gill nets, and fyke nets. Exception – a single vessel may land/possess no more than 12,000 pounds of Atlantic menhaden per day when there are two PRFC pound net licensees physically on board who each have at least one of their pound nets set and fishing and prior to the fishery being closed and the by-catch provisions being implemented, no more than 6,000 pounds of Atlantic menhaden are harvested from either of the licensees nets.

AND IT IS FURTHER DECLARED AND ORDERED: this Order #2017-08 shall become effective June 10, 2017 shall supersede and repeal 2016-10 “Revised”, and remain in effect until June 1, 2018.

This Order was duly adopted by the Potomac River Fisheries Commission on June 1, 2017.

Note: the Potomac River Fisheries Commission will meet at their next quarterly meeting on March 2, 2018. At this meeting, an Order will be adopted that will bring the PRFC into compliance with Amendment 3 to the IFMP for Atlantic Menhaden.

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Molly Joseph Ward
Secretary of Natural Resources

John M.R. Bull
Commissioner

December 28, 2017

Max Appleman
FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 North Highland Street
Suite 200 A-N
Arlington, VA 22201

Dear Mr. Appleman,

Enclosed is the Commonwealth of Virginia's Implementation Plan to comply with Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden.

If you or your staff have any questions, please contact Robert L. O'Reilly, Chief of the Fisheries Management Division, or Joe Cimino, Deputy Chief of the Fisheries Management Division.

Sincerely,

John M.R. Bull

cc: Robert L. O'Reilly
Joe Cimino

Atlantic Menhaden Implementation Plan for Virginia
A Report to the Atlantic States Marine Resources Commission

December 28, 2017

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached. If your jurisdiction includes its yearly menhaden quota in its regulations, please include that language below.

- Virginia's menhaden commercial fishery management measures, including the annual quota is set by legislation in the Code of Virginia. It is also established by regulation. The language for both are included below.

§ 28.2-400.4. Administration of the menhaden management program.

A. Closure of the menhaden fishery shall occur when the Commissioner projects and announces that 100 percent of the total allowable landings have been taken. The Commissioner shall monitor the mandatory daily landings reports required to be submitted under § 28.2-400.5 by the:

1. Purse seine menhaden reduction sector and promptly announce the date of closure when the portion of the total allowable landings allocated to the purse seine menhaden reduction sector under § 28.2-400.3 are projected to be taken. The Commissioner shall also notify the operators of any qualified menhaden processing factory of the date of closure by the most convenient and expeditious means available;

2. Purse seine menhaden bait sector and promptly announce the date of closure when the portion of total allowable landings allocated to the purse seine fishery for bait under § 28.2-400.3 is projected to be taken. The Commissioner shall also notify the purse seine menhaden bait sector of the date of closure by the most convenient and expeditious means available; and

3. Non-purse seine menhaden bait sector and promptly announce the date of closure when the portion of total allowable landings allocated to the non-purse seine fishery for bait under § 28.2-400.3 is projected to be taken. The Commissioner shall also notify the operators of the non-purse seine bait fishery of the date of closure by the most convenient and expeditious means available. Once this closure is announced, any person licensed in the non-purse seine menhaden bait sector may possess and land up to 6,000 pounds of menhaden per day, provided that such person is fishing in accordance with all laws and regulations.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

- A bill will need to be passed by the General Assembly to set the annual quota. Bills are typically ratified by the Governor in March and made effective July 1.

c) A mechanism to enable the transfer of unused quota between states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

§ 28.2-400.2. Total allowable landings for menhaden.

C. The Commissioner may request a transfer of menhaden landings from any other state that is a member of the Atlantic States Marine Fisheries Commission. If the Commonwealth receives a transfer of menhaden in any year from another state, the total allowable landings for only that year shall increase by the amount of transferred landings. The Commissioner may transfer menhaden to another state only if there are unused landings after December 15.

d) A mechanism pound-for-pound pay back to reduce the subsequent year's quota to account for any overharvest of your jurisdiction's quota.

4 VAC 20-1270-30. Total allowable landings for menhaden; allocation, accountability, and overages.

B. If the total allowable landings specified in subsection A of this section are exceeded in any year, the total allowable landings for the subsequent year will be reduced by the amount of the overage. Such overage shall be deducted from the sector of the menhaden fishery that exceeded the allocation specified in subsection A of this section

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

i. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, 2 trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

VAC 20-1270-50. Nonpurse seine menhaden bait sector quota; allocation and bycatch provisions.

B. Pursuant to § 28.2-400.4 of the Code of Virginia, once the Commissioner announces the date of closure for the nonpurse seine bait fishery, any person licensed in the nonpurse seine menhaden bait sector may possess and land up to 6,000 pounds of menhaden per day.

ii. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

Since 2013, the daily bycatch allowance (6,000 pounds) has restricted harvest beyond the bycatch allowance for the non-purse seine menhaden bait sector. Any harvest that has exceeded the bycatch allowance typically occurs within a few days after the closure has been announced. Virginia regulations do not allow two authorized individuals to work together and land up to 12,000 pounds from a single vessel.

iii. Prohibit a vessel from making multiple trips in one day.

All regulations prohibit the individual commercial fisherman licensee (authorized individuals) from making multiple trips in one day. All authorized individuals are held to 6,000 pounds of menhaden per day which is monitored through daily mandatory reporting.

4 VAC 20-1270-60. Reporting requirements by menhaden fishery sector.

B. The nonpurse seine menhaden commercial bait sector shall submit daily reports according to the schedule and reporting requirements established by 4 VAC 20-610-10, "Pertaining to Commercial Fishing and Mandatory Harvest Reporting".

iv. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

All regulations prohibit the individual commercial fisherman licensee from offloading catch exceeding 6,000 pounds.

f) For Maine through New York, a mechanism to adjust a state's quota and effort controls if opting into the episodic events set aside program. As a reminder, to be eligible to participate in the episodic events set aside, a state must implement three provisions:

i. Daily trip level harvester reporting

ii. Episodic events harvest and landings be restricted to state waters of the jurisdiction

iii. Maximum daily trip limit no greater than 120,000 pounds per vessel.

g) For Virginia, a Chesapeake Bay Reduction Fishery Harvest Cap with the following provisions:

i. Prohibit harvest for reduction purposes within the Chesapeake Bay when 100% of the 51,000 metric tons is harvested from the Bay.

§ 28.2-1000.2. Annual closure of the Chesapeake Bay purse seine fishery for Atlantic menhaden.

B. Upon a determination that the purse seine fishery for Atlantic menhaden meets the annual menhaden harvest cap in the Chesapeake Bay, the Commissioner shall promptly publish a notice in the Virginia Register announcing the date of closure. The Commissioner shall also notify the operators of the purse seine fishery for Atlantic menhaden by the most convenient and expeditious means available. The date of closure shall be based on mandatory daily landings reports required to be submitted under § 28.2-400.5 by the purse seine fishery for Atlantic menhaden.

ii. A repayment mechanism to reduce the subsequent year's harvest cap to account for an over-harvest of the cap on a pound-for-pound basis.

§ 28.2-1000.2. Annual closure of the Chesapeake Bay purse seine fishery for Atlantic menhaden.

D. If the harvest of the purse seine fishery for Atlantic menhaden does not exceed 87,216 metric tons in any year to which the harvest cap applies, then the difference between the actual harvest and the harvest cap shall be applied as a credit applicable to the allowable harvest for the purse seine fishery for Atlantic menhaden for the following year. The credit may be used only for the subsequent annual harvest and shall not be spread over multiple years. Any annual harvest in excess of the harvest cap shall be deducted from the harvest cap, as modified pursuant to this subsection and subsection C for the subsequent annual harvest.

iii. No rollover of unused cap into the subsequent year.

A bill will need to be passed by the General Assembly to set the Chesapeake Bay Cap at 51,000 metric tons with no annual roll over. To date, no rollovers have occurred.

2. Monitoring Requirements

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

4 VAC 20-1270-60. Reporting requirements by menhaden fishery sector.

A. Each licensee of any purse seine vessel that harvests menhaden must submit a Captain's Daily Fishing Report to the Commission on each nonweekend or nonholiday day that either purse seine sector is open for harvest. The Captain's Daily Fishing report is produced by the National Marine Fisheries Service and provides preliminary estimates

of harvest. Pursuant to § 28.2-204 of the Code of Virginia, those same licensees must submit to the Commission actual weekly harvest reports that include vessel name and exact weight of menhaden landed, in pounds, by Wednesday of the following week. Once ninety-seven percent of either purse seine sector's quota is projected and announced to have been met, each licensee of that purse seine sector must provide daily harvest totals to the Commission's Interactive Voice Recording System.

B. The nonpurse seine menhaden commercial bait sector shall submit daily reports according to the schedule and reporting requirements established by 4 VAC 20-610-10, "Pertaining to Commercial Fishing and Mandatory Harvest Reporting".

C. When the Commissioner announces that 90 percent of the nonpurse seine menhaden bait quota has been reached, each harvester of this sector is required to report his previous 10 days of landings to the Commission's Interactive Voice Recording System and must continue to report his additional landings every 10 days until it is announced that the nonpurse seine bait quota has been attained. More frequent reporting is permissible. The Commission may also implement other harvest conservation measures such as trip limits.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

- See regulation 4 VAC 20-1270-60 above

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.

ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

4VAC20-610-60. Mandatory harvest reporting.

J. Registered commercial fishermen, seafood landing licensees and licensed seafood buyers shall allow those authorized by the commission to sample harvest and seafood products to obtain biological information for scientific and management purposes only. Such sampling shall be conducted in a manner that does not hinder normal business operations.

§ 28.2-400.6. Biological sampling program and adult abundance index.

A. The Commission shall:

1. Establish a biological sampling program to collect one 10-fish sample per 200 landed metric tons for length and weight-at-age data from the commercial menhaden harvest; and

2. Initiate a program to add Atlantic menhaden to the Virginia Marine Resources Commission's finfish biological sampling program in order to develop an adult menhaden survey index from Virginia pound nets.

B. By no later than December 1, 2013, the Commission shall submit a report to the General Assembly and the Governor that (i) describes progress in establishing the biological sampling program and development of the adult menhaden survey index called for by this section, (ii) discusses any difficulties in implementing the requirements of this section, including a lack of resources to properly implement the program, and (iii) provides a list of resources the Commission believes are necessary to properly implement the sampling program and index, with detailed justification, including an estimate of the cost of each item requested.

d.) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i.) total pounds (lbs) landed a day
ii.) number of pound nets fished a day

4VAC20-610-60. Mandatory harvest reporting.

F. The monthly harvest report requirements shall be as follows:

1. Registered commercial fishermen shall be responsible for providing monthly harvest report and daily harvest records that include the name and signature of the registered commercial fisherman and his commercial fisherman's registration license number; the name and license registration number of any agent, if used; the license registration number of no more than five helpers who were not serving as agents; any buyer or private sale information; the date of any harvest; the city or county of landing that harvest; the water body fished, gear type, and amount of gear used for that harvest; the number of hours any gear was fished and the number of hours the registered commercial fisherman fished; the number of crew on board, including captain; species harvested; market category; live weight or processed weight of species harvested; and vessel identification (Coast Guard documentation number, Virginia license number, or hull/VIN number). Any information on the price paid for the harvest may be provided voluntarily.

NORTH CAROLINA REPORT FOR THE IMPLEMENTATION OF AMENDMENT 3 TO THE INTERSTATE FISHERY MANAGMENT PLAN FOR ATLANTIC MENHADEN

January 1, 2018

Introduction

This report details the implementation plan for North Carolina to meet the Atlantic States Marine Fisheries Commission (ASMFC) requirements of Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden. Amendment 3 required each state to submit implementation plans by January 1, 2018 and are required to implement the provisions of Amendment 3 by April 15, 2018. At a minimum, states are required to maintain their timely quota monitoring system implemented under Amendment 2 in order to cap menhaden directed harvest within the total allowable catch (TAC) and minimize the potential for overages. Amendment 3 will be fully implemented on April 15, 2018 however all menhaden landings for the 2018 calendar year will count toward the quota allocation beginning January 1, 2018. The TAC will be managed on a state basis. The quota allocation for North Carolina is 2,044.49 mt (4,507,320 lb) and makes up 0.96 percent of the total coastwide TAC of 216,000 mt.

1.Commercial Fishery Management Measures

a) The mechanism to close the directed commercial bait fishery is through the rule 15A NCAC 03M .0512 which will be used to close (via proclamation) once 90% of the quota allocation is reached. A notice of closure will be submitted to the ASMFC at the time of closure and will be a part of the North Carolina annual compliance report.

15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS

(a) In order to comply with management requirements incorporated in Federal Fishery Management Council Management Plans or Atlantic States Marine Fisheries Commission Management Plans or to implement state management measures, the Fisheries Director may, by proclamation, take any or all of the following actions for species listed in the Interjurisdictional Fisheries Management Plan:
    (1) Specify size;
    (2) Specify seasons;
    (3) Specify areas:
    (4) Specify quantity;
    (5) Specify means and methods; and
    (6) Require submission of statistical and biological data.

(b) Proclamations issued under this Rule shall be subject to approval, cancellation, or modification by the Marine Fisheries Commission at its next regularly scheduled meeting or an emergency meeting held pursuant to G.S. 113-221.1.

History Note: Authority G.S. 113-134; 113-182; 113-221; 113-221.1; 143B-289.52;
Eff. March 1, 1996;
Amended Eff. October 1, 2008.

b) The mechanism to adjust North Carolina's quota allocation as required by the ASMFC will be to issue a proclamation through rule 15A NCAC 03M .0512 (above) at the beginning of the fishing year noting any changes in the annual quota.

c) The mechanism to enable transfer of unused quota allocation between North Carolina and another member state, if warranted, will be through a letter confirming the transfer to

or from the state transferring and to the ASMFC. The quota allocation will then be adjusted to reflect that transfer. ASMFC will be notified of any transfer activity by North Carolina.

d) The mechanism to repay any over-harvest of quota will be through a letter confirming the over-harvest poundage and new adjusted quota allocation for that year. ASMFC will be notified by North Carolina of any overage. Adjustments will be through rule 15A NCAC 03M.0512 at the beginning of the fishing year noting any changes due to overages.

e) The mechanism to manage for a 6,000 lb limit per calendar day for non-directed and small-scale fisheries following the harvest of the state's quota allocation and closure of directed fisheries will be through proclamation authority from 15A NCAC 03M .0512 that will allow the director to set a trip limit per fishing operation per day including authorization of two individuals, working stationary multispecies gear from the same vessel, to work together and land a 12,000 lb limit per calendar day. It will be made clear in this proclamation that the vessel is part of the operation and it is unlawful to make multiple trips in one calendar day. Multiple carrier vessels with purse seines are unlawful in North Carolina coastal waters. The 6,000 lb trip limit will also be applied through 15A NCAC 03M .0512 for operations of the haul seine fishery that does employ carrier vessels.

f) Not applicable

g) Not applicable

2. Monitoring Requirements

a) Catch Reporting Plan

Catch reporting will be through the North Carolina Trip Ticket Program. This program is a dealer based program where trip level landings are reported monthly to the division. North Carolina does not have the authority through the North Carolina Trip Ticket Program to implement the collection of weekly data at this time. State statute requires monthly dealer reporting; more frequent reporting requires implementation of a dealer permit for a particular species. The current number of dealer permits for other quota-managed species, the large number of dealers purchasing menhaden, and existing staffing limitations prohibit implementation of a menhaden dealer permit at this time. Therefore, North Carolina proposes to monitor the state quota allocation on a monthly basis. Based on 2014-2016 data there are 68-80 dealers reporting menhaden with 66-85 percent reported by e-dealers. The majority of landings during this timeframe were from anchored gill nets. The remainder of the landings are by pound nets, cast net, etc. Data elements include trip start date, trip end date, vessel identifier, individual fisherman identifier, dealer identification, species and quantity, units of measurement, water body fished, gear, and number of crew. Purse seines operated with mother ships and carrier vessels are not allowed in North Carolina coastal fishing waters, therefore there will be no Captain Daily Fishing Reports submitted. Should a purse seine be used without a mother ship or carrier vessel, the landings will be reported through the trip ticket program.

b) The mechanism for timely reporting of bycatch allowance landings from non-directed fisheries will be the same as in 2a.

c) Biological sampling to collect age and length data from the commercial bait harvest was implemented in 2013. Age and length data from the sciaenid pound net fishery, the estuarine and ocean gill net fisheries, and the winter trawl fisheries will be collected in one 10-fish sample per trip sampled.

d) Catch data from the pound net fishery will be monitored monthly through the North Carolina Trip Ticket Program. Data elements will be the same as stated in 2a. Number of pound nets fished per day or per trip are not collected through the trip ticket program, but a proxy may be able to be provided from existing required pound net set permits on an annual basis. This proxy may include data variables (such as location of pound net sets, number of pound nets, etc.) collected on these permits held by participants in the pound net fishery who show landings of menhaden in the trip ticket program. As noted in 2c, 10-fish samples will be collected from pound net trips.

From:
To:
Cc:
Subject:
Date: 1 2 1

Good afternoon Max,

Just following up on your email below regarding the Implementation Plans for Amendment 3 to the Atlantic Menhaden ISFMP.

Since South Carolina does not have an actual commercial fishery for menhaden and has no real likelihood of seeing one established in the near future, I have provided our input regarding implementation of Amendment 3 in a very simplified version of your template. Please let me know if this meets your requirements for the January 1, 2018 due date.

Thanks, and have a great Christmas and New Year.

mb

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South Carolina Implementation Plan for Atlantic Menhaden ISFMP Amendment 3

1. **Commercial Fishery Management Measures**

South Carolina has no directed commercial fishery for Atlantic Menhaden, other than occasional landings reported as bait. South Carolina would be classified as a De Minimis state regarding this fishery.

Commercial landings for any reason would require appropriate licensing for participating individuals through the SCDNR's Marine Licensing and Permitting Office.

2. **Monitoring Measures**

South Carolina has the ability to track any commercial landings of Atlantic menhaden through one of two existing reporting mechanisms. The last commercial landings reported through our Wholesale Dealer Reporting System were in 1997. In 2015, 281 pounds of menhaden captured for bait were reported through our Wholesale Bait Dealer Reporting System, with none in 2016 or 2017. The SCDNR will continue to closely monitor and annually report any landings of Atlantic menhaden occurring in state waters, or any harvest from federal waters where fish are landed in South Carolina.

****

Mel Bell
Director,
Office of Fisheries Management
SCDNR, Marine Resources Division

P.O. Box 12559
Charleston, SC 29422-2559
Office: (843) 953-9007
Fax: (843) 953-9386

bellm@dnr.sc.gov

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From: Max Appelman <mappelman@asmfc.org>
Date: Monday, December 18, 2017 at 10:20 AM
To: ATLANTIC MENHADEN BOARD <atlmen_bd@asmfc.org>
Subject: RE: Menhaden - Revised Preliminary 2018 Quota Allocations and Amendment 3 Implementation Plan Template

Hello Atlantic Menhaden Board,

This is a reminder that the deadline to submit state implementation plans for Amendment 3 is **Monday, January 1**. An implementation plan template is attached. Also, Amendment 3 is now posted to the ASMFC Website on the Atlantic Menhaden species webpage under "Management Plans & FMP Reviews."

Please let me know if you have any questions.

Best,
Max

Max H. Appelman
Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200A-N
Arlington, VA 22201
mappelman@asmfc.org
phone: (703) 842-0740

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION
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COASTALGADNR.ORG

MARK WILLIAMS
COMMISSIONER

DOUG HAYMANS
DIRECTOR

December 30, 2017

Formatted:

Max Appelman
Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200A-N
Arlington, VA 22201

Max:

The State of Georgia is submitting this letter in recognition of the Atlantic Menhaden Amendment 3 Implementation Plan. During the 2018 fishing year Georgia has elected to relinguish its state specific allocation back to the general ~~redistribute all of the jurisdictions~~ coastwide allocation~~s~~. Future allocations may be considered for redistribution, so long as a fishery is not established in the state of Georgia.

Currently in the State of Georgia there are no directed commercial fisheries, no reduction processing capabilities, and no commercial landings of Atlantic menhaden. We are presently in *de minimus* status. Under Amendment 3 mechanisms and management are required to participate in the menhaden fishery. In the future, if a fishery arises in Georgia an updated implementation plan outlining all mechanisms and management will be submitted to the Atlantic Menhaden Board for consideration.

Coastal Resources Division, will continue monitoring commercially harvested species through the ACCSP standardized trip ticket reporting system. If commercial landings of Atlantic menhaden do occur, Georgia will report them through this system. Georgia's current reporting structure is a single trip ticket with dealer and harvester information reported monthly.

Please contact me if you or the Management Board require further information.

Sincerely,

Lindsey A. Aubart

Lindsey Aubart
Marine Biologist

cc: Doug Haymans
Pat Geer
Carolyn Belcher

Georgia's Atlantic Menhaden Amendment 3 Implementation Plan

1. Commercial Fishery Management Measures

a) A mechanism to close the directed commercial fisheries in your state once your jurisdiction's percentage of the TAC has been reached.

Georgia, currently, does not have a commercial fishery and has chosen to redistribute its allocation for the 2018 fishing year. However, should a commercial fishery become established in the future, Georgia will create an appropriate mechanism to close the fishery upon reaching Georgia's percentage of the TAC.

b) A mechanism to adjust a jurisdiction's yearly quota as required by ASMFC.

Georgia will continue to adjust its yearly quota as required by ASMFC.

c) A mechanism to enable the transfer of unused quota between states, if warranted, and the ability to adjust a jurisdiction's quota as it relates to the transfer of quota.

Georgia will enact a transfer of unused quota to other states when it deems appropriate for the state's portion of the allocation.

d) A mechanism pound-for-pound pay back to reduce the subsequent years quota to account for any overharvest of your jurisdiction's quota.

Georgia will establish a pound-for-pound pay back if a menhaden fishery is ever ~~upon the~~ establishment in the state in the future. ~~a menhaden fishery~~

e) A mechanism for an incidental catch and small-scale fishery provision following the harvest of your jurisdiction's quota and closure of the directed fisheries.

I. 6,000 pounds trip limit per day for non-directed and small-scale gears. Under Amendment 3, small-scale gears include: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathom long and 8 fathom deep. Non-directed gears include: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.
II. Two authorized individuals, working from the same vessel fishing stationary multi-species gears, are permitted to work together and land up to 12,000 pounds from a single vessel, limited to one vessel trip per day.

Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.
III. Prohibit a vessel from making multiple trips in one day.
IV. Prohibit the use of multiple carrier vessels to offload catch exceeding 6,000 pounds.

Georgia will incorporate the above regulations as a mechanism for managing incidental catch and small-scale fishery provisions following the harvest of Georgia's quota and the closure of the directed fisheries if one develops in the future.

2. ***Monitoring Requirements***

a) A catch reporting system to enable timely monitoring of a jurisdiction's quota. As a reminder, purse seine vessels and snapper rigs are required to submit trip level reports. The states of New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring, but still must report annually via annual compliance reporting process.

Georgia is exempt from timely quota monitoring but will continue to report annual landing via the annual compliance report.

b) A mechanism to require timely reporting of bycatch allowance landings by non-directed fisheries through a reporting system approved by the Board in Section 2a of this template.

Georgia currently does not have any non-directed fisheries for menhaden, however any possible landings are reported through the monthly trip ticket reports.

c) A mandatory biological sampling program to collect age and length data from the commercial bait sector. De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery. States are required to collect the following:

i. One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware.
ii. One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia and North Carolina

Georgia is a de minimis state and therefore not required to conduct fishery-dependent biological sampling.

d) A mandatory monitoring/sampling program that requires all states with a pound net fishery collect catch and effort data elements. Mandatory data elements include:

i. total pounds (lbs) landed per day
ii. number of pound nets fished per day

Georgia does not have a pound net fishery.

MEMORANDUM

To: Max Appleman
From: Jim Estes
Date: 1/11/2018
Re: Florida Implementation Plan for Amendment 3 of the Interstate Fishery Management Plan for Atlantic Menhaden

a) **Commercial Fishery Management Measures**

a) Mechanism to close directed commercial fishery once state's percentage of TAC is met-
In Florida, fisheries are opened and closed by executive order for emergency measures and by the Florida Administrative Code (FAC) as a matter of rule. The Florida Fish and Wildlife Conservation Commission, acting under the authority of Article IV, Section 9 of the Florida Constitution delegates authority to its Executive Director to manage or regulate fish and wildlife in exigent circumstances.

The menhaden commercial fishery will be closed by executive order when the commercial harvest is projected to reach the annual quota (2,442,500 lbs, currently), considering any quota transfers. A copy of the Executive order closing the fishery, should it be necessary to be closed will be submitted as part of Florida's compliance report.

b) Adjustment of a state's TAC-
Florida can adjust its TAC by referring to the Atlantic States Marine Fisheries Commission (ASMFC) annual TAC and Florida's percentage of the coastwide TAC.

c) Transfer of unused TAC-
Transfers of menhaden TAC will be done pursuant to a letter signed by the Florida Director of Marine Fisheries Management and sent to the appropriate ASMFC staff.

d) *Quota Payback-*
Repayment will be considered when monitoring against annual TAC.

e) *Bycatch Allowance-*
When quota is met and fishery is closed, there will not be any bycatch allowed.

f) *Episodic event set aside-*
Florida does not intend to opt into the episodic event set aside. Therefore, no plans are being made to account for changes in TAC due to these set asides.

g) *Chesapeake Bay Reduction Fishery Harvest Cap-*
N/A

2. Monitoring Requirements

a) Catch Reporting System-
The current reporting requirements for Florida's commercial fisheries are found in Florida Statute 379.362 (see Appendix1) and FAC (Appendix 2). Florida Statute only

requires reporting of the sale of saltwater products on a monthly basis, but 65-E FAC allows for instant electronic. Florida's plan for timely monitoring of menhaden landings will be a two step process. Currently, Florida requires dealers to submit trip level information monthly. Reports are either supplied on paper trip tickets or through electronic reporting. Additional time is required to input the data provided via paper copy. Because of the potential delay in availability of the data, the quota could be overshot if this was the only method to monitor the landings. Therefore, when landings are within 75%, weekly monitoring by telephoning dealers who have been reporting menhaden landings will be made until 90% of the quota is reached. The fishery will then be closed by executive order when 90% of the quota is reached.

b) *Bycatch Monitoring-*
Bycatch of menhaden after season closes will not be allowed.

c) *Biological Sampling Reporting-*

b) Approval of Florida's request for *de minimis* status will exempt Florida from biological sampling requirements.

Appendix 1

Florida Constitution Article IV, Section 9

SECTION 9. Fish and wildlife conservation commission.—There shall be a fish and wildlife conservation commission, composed of seven members appointed by the governor, subject to confirmation by the senate for staggered terms of five years. The commission shall exercise the regulatory and executive powers of the state with respect to wild animal life and fresh water aquatic life, and shall also exercise regulatory and executive powers of the state with respect to marine life, except that all license fees for taking wild animal life, fresh water aquatic life, and marine life and penalties for violating regulations of the commission shall be prescribed by general law. The commission shall establish procedures to ensure adequate due process in the exercise of its regulatory and executive functions. The legislature may enact laws in aid of the commission, not inconsistent with this section, except that there shall be no special law or general law of local application pertaining to hunting or fishing. The commission's exercise of executive powers in the area of planning, budgeting, personnel management, and purchasing shall be as provided by law. Revenue derived from license fees for the taking of wild animal life and fresh water aquatic life shall be appropriated to the commission by the legislature for the purposes of management, protection, and conservation of wild animal life and fresh water aquatic life. Revenue derived from license fees relating to marine life shall be appropriated by the legislature for the purposes of management, protection, and conservation of marine life as provided by law. The commission shall not be a unit of any other state agency and shall have its own staff, which includes management, research, and enforcement. Unless provided by general law, the commission shall have no authority to regulate matters relating to air and water pollution.

Appendix 2

The 2012 Florida Statutes

120.81(5): (5) Hunting and Fishing Regulation.
Agency action which has the effect of altering established hunting or fishing seasons, or altering established annual harvest limits for saltwater fishing if the procedure for altering such harvest limits is set out by rule of the Fish and Wildlife Conservation Commission, is not a rule as defined by this chapter, provided such action is adequately noticed in the area affected through publishing in a newspaper of general circulation or through notice by broadcasting by electronic media.

379.362 (6) RECORDS TO BE KEPT ON SALTWATER PRODUCTS.—
Wholesale dealers shall be required by the commission to make and preserve a record of the names and addresses of persons from whom or to whom saltwater products are purchased or sold, the quantity so purchased or sold from or to each vendor or purchaser, and the date of each such transaction. Retail dealers shall be required to make and preserve a record from whom all saltwater products are purchased. Such record shall be open to inspection at all times by the commission. A report covering the sale of saltwater products shall be made monthly or as often as required by rule to the commission by each wholesale dealer. All reports required under this subsection are confidential and shall be exempt from the provisions of s. 119.07(1) except that, pursuant to authority related to interstate fishery compacts as provided by ss. 379.2253(3) and 379.2254(3), reports may be shared with another state if that state is a member of an interstate fisheries compact, and if that state has signed a Memorandum of Agreement or a similar instrument agreeing to preserve confidentiality as established by Florida law.

Appendix 3

Florida Administrative Code

68E-5.001 Introduction, Scope, and Definitions.

(1) The Fish and Wildlife Conservation Commission is charged with the promulgation of rules to conserve and manage the marine fishery resources of Florida. These rules must be consistent with certain standards as prescribed by law to include: concern for the continued health and abundance of the resource; measures based upon the best information available, including biological, sociological, economic, and other information deemed relevant; reasonable means and quantities for annual harvest, consistent with maximum practical sustainable stock abundance on a continuing basis; management of stocks of fish as a biological unit as possible and practical; proper quality control of marine resources that enter commerce; management decisions that are fair and equitable to all the people of the state. The Fish and Wildlife Conservation Commission, through its Divisions of Marine Fisheries and Law Enforcement must maintain a marine fisheries information system that can provide the data necessary to apply the above standards to management decisions. As part of these responsibilities, the Commission requires that licensed wholesale dealers maintain records of each purchase of saltwater fish, saltwater products, bait, or marine life from a producer in such detail as required by implementation and administration of this chapter. This chapter sets out the requirements for record keeping, the detail of such records, forms to be used, submission of records to the Commission, penalties for noncompliance, and other requirements.

(2) For the purpose of this chapter, the definitions contained in Sections 379.101, 379.362, F.S., and the following definitions apply:

(a) “Marine Life” – any saltwater fish, saltwater products, or shellfish collected for the purpose of supplying live specimens for public, educational, or hobby aquaria or preserved specimens for scientific or educational institutions.

(b) “Bait” – any saltwater fish, saltwater products, or shellfish used as a lure, attractant, or enticement for the purpose of catching other fish or shellfish.

(c) “Person” – includes individuals, children, firms, associations, joint ventures, partnerships, estates, trusts, business trusts, syndicates, fiduciaries, corporations, and all other groups or combinations.

(d) “Producer” – any person who catches and lands saltwater fish, saltwater products, bait, or marine life from any waters of the State of Florida, contiguous saltwaters of the Exclusive Economic Zone, or international waters.

(e) “Production” – catching or otherwise obtaining saltwater fish, saltwater products, bait, or marine life from the waters of the State of Florida, contiguous waters of the Exclusive Economic Zone, or international waters, for the purpose of sale, barter, exchange or distribution.

(f) “Marine Fisheries Trip Ticket” – The multiple-part form (FWC 33-610, which is hereby incorporated by reference) provided by the Commission to wholesale dealers and others who are required to report the purchase or production of saltwater fish, saltwater products, bait, or marine life pursuant to Section 379.362, F.S., and this chapter.

Specific Authority Article IV, Section 9, Fla. Const. Law Implemented 379.361, 379.362 FS. History–New 10-17-84, Formerly 16B-45.01, 16B-45.001, 16R-13.001, Amended 12-31-89, Formerly 16R-5.001, 62R-5.001.

68E-5.002 Reporting Requirements.
(1) Fisheries statistical information on the production of saltwater fish, saltwater products, bait, and marine life shall be reported to the Commission whenever the product is sold, exchanged, bartered, distributed, or landed for the first time. Records of subsequent sales between wholesale dealers or brokers are not required by this rule.
(2) The following persons shall report fisheries statistical information as described in Section 68E-5.003, F.A.C.
(a) Wholesale dealers who purchase or receive saltwater fish, saltwater products, bait, or marine life from a producer shall report.
(b) Wholesale or retail dealers who own, rent or lease vessel(s) intended for the production of saltwater fish, saltwater products, bait, or marine life shall report, except when the product is sold directly to another wholesale dealer. In such cases the purchasing wholesale dealer shall report.
(c) Producers who catch and land saltwater fish, saltwater products, bait, or marine life for sale direct to the consumer or interstate shipment shall report.
(d) Each producer who sells or otherwise provides saltwater fish, saltwater products, bait, or marine life to a wholesale dealer shall provide to the dealer, at the time of sale, accurate information about such production as required by this chapter.
(3) Fisheries statistical information shall be recorded on marine fisheries trip tickets supplied by the Commission or on approved alternate forms.
(4) Trip tickets, or approved alternate forms, must be maintained by the producer, wholesale dealer or retail dealer for a period not less than three (3) years from the date of the recorded transaction.
(5) An alternate form designed by wholesale dealers for their own use requires approval by the Commission and may be substituted for the marine fisheries trip ticket provided the following procedures are met and complied with:
(a) All requests for approval of an alternate form must be submitted to the Commission's Marine Research Institute, Fisheries Statistics Section, in writing prior to use. A copy of the proposed alternate form must be attached to or included with the request.
(b) The alternate form must provide identical information, follow the same format, be sequentially numbered and provide the same number of copies as the Commission’s marine fisheries trip ticket to facilitate data processing and compliance with reporting distribution requirements, as listed in paragraph (7) below and in Section 379.361, F.S.
(c) Upon receipt of a request for approval of an alternate form, the Commission will review the form for the required information, verify species information and assign a unique prefix to be placed before the dealer's invoice number (e.g., TS0000001) within five (5) work days of receipt of the request.
(d) The dealer must provide the final "proof" of the alternate trip ticket form, obtained from the printer, to the Commission for final review and approval prior to printing.
(e) The Commission will review and approve (if in compliance) and return the proof within five (5) work days to the dealer for printing.

(f) The dealer must continue to provide the Commission with the required trip ticket information on the Commission's form (FWC Form #33-610) during the review and approval process as required in paragraph (7) below.
(g) All persons that use an approved alternate form shall be responsible for all costs associated with the printing and use of such forms.
(6) Dealers may elect to submit and/or report trip ticket data on diskette via a computer program, provided that the output is compatible with the Commission's trip ticket system. A printed copy of the reported trip ticket information must be made available to the fisherman by the dealer and a printed copy must be kept on file by the dealer for inspection by the Commission pursuant to Section 379.362(6), F.S. Any computer-generated output to be used by a dealer must be reviewed for format and compatibility and approved by the Commission prior to use following the same procedures outlined in paragraph (5) above.
(7) Two copies of each marine fisheries trip ticket or approved alternate form must be received by the Commission as specified below:
(a) Wholesale dealers, who purchase or produce annually 5,000 pounds or more of species for which seasonal harvest limits or quotas have been set, or for which season closures linked to regional federal limits or quotas have been set, by rule of Fish and Wildlife Commission, or by statute must submit all marine fisheries trip tickets or approved alternate forms weekly. Dealers may choose the day of the week to begin. Marine fisheries trip tickets or approved alternate forms must be received by the Commission not later than five (5) work days after the end of that week. These wholesale dealers shall also be required to notify the Commission, prior to the harvest season, of intent to purchase or produce the quantities specified above and to provide summary landings totals on a weekly or daily basis by phone when catch totals for those time periods are likely to exceed the remaining harvest under the quota.
(b) Wholesale dealers who do not handle quantities of species as specified in paragraph (7)(a), above must submit all marine fisheries trip tickets or approved alternate forms at least monthly and not later than ten (10) work days after the end of the month for which the reports are due.
(c) Self addressed mailing envelopes shall be provided upon request to those who must report.
(d) The mailing address for all correspondence, requests for forms, envelopes, county codes, species codes, area codes, gear codes, or information, and for submission of marine fisheries trip tickets or approved alternate forms is:
Fish and Wildlife Research Institute
Florida Marine Research Institute
Fisheries Statistics Section
100 Eighth Avenue, S. E.
St. Petersburg, FL 33701-5095
Specific AuthorityArticle IV, Section 9, Fla. Const. Law Implemented 379.361, 379.362 FS. History–New 10-17-84, Formerly 16B-45.02, 16B-45.002, 16R-13.002, Amended 12-31-89, Formerly 16R-5.002, Amended 1-5-95, 6-11-95, Formerly 62R-5.002.

68E-5.003 Record Content and Description.
(1) Information required on each marine fisheries trip ticket or approved alternate form shall be recorded by persons set forth in subsection 68E-5.002(2), F.A.C. and shall include the following:
(a) Saltwater Products License Number – record the seller's saltwater products license number.
(b) Wholesale Dealer License Number – record the wholesale dealer's license number.
(c) Date – record the date that the saltwater products were sold, exchanged, bartered, distributed, or landed.
(d) Time Fished – record the total amount of time (duration) of the fishing trip. Time is recorded as the time away from the dock either in hours or days. If recorded in days, put the letter D before or after the number of days. Example: 10D or D10 equals 10 days.
(e) County Landed – record the county code in which the saltwater fish, saltwater products, bait, or marine life was landed. Codes are provided to each new dealer, and as requested by mail; the address is provided in paragraph 68E-5.002(7)(d), F.A.C.
(f) Species Code – record the species code from the list of species names and their code numbers. Codes are provided to each new dealer, on the back of marine fisheries trip ticket, and as requested by mail; the address is provided in paragraph 68E-5.002(7)(d), F.A.C.
(g) Amount of Catch – record the amount of saltwater fish, saltwater products, bait, or marine life received using the appropriate species code to identify the unit of measure.
(h) Gear – indicate the gear used to catch the saltwater fish, saltwater products, bait, or marine life listed on the ticket, by checking the appropriate box or recording the gear code. Codes are provided to each new dealer, and as requested by mail; the address is provided in paragraph 68E-5.002(7)(d), F.A.C.
(i) Number of Sets – for net and longline fisheries – record the number of times fishing gear (trawls, long-lines, gill nets, purse seines) was used.
(j) Traps Pulled and Soak Time – for trap fisheries – record the number of traps pulled and the number of days since traps were last pulled.
(k) Area Fished – record the area, as defined by the Department, where the saltwater fish, saltwater products, bait, or marine life was caught. If the product was caught over more than one area, record the area where most of the product was caught. The areas and their respective codes are provided to each new dealer. They are also available upon request to the address as provided in paragraph 68E-5.002(7)(d), F.A.C.
(l) Depth – record the approximate depth where the saltwater fish, saltwater products, bait, or marine life was caught, in either feet or tens of fathoms. If recorded in tens of fathoms put the letter F before or after the number of fathoms. Example: 40F or F40 equals 400 fathoms.
(m) Price per pound – record the price paid either per pound or per unit of measure used on the dealer and Commission copies of the trip ticket.
Specific Authority Article IV, Section 9, Fla. Const. Law Implemented 379.361, 379.362 FS. History–New 10-17-84, Formerly 16B-45.03, 16B-45.003, Amended 3-30-87, Formerly 16R-13.003, Amended 12-31-89, Formerly 16R-5.003, Amended 1-5-95, Formerly 62R-5.003.

68E-5.004 Data Management.
(1) All data received by the Commission pursuant to the requirements of Chapter 68E-5, F.A.C., shall be edited by Commission staff for accuracy and stored in the marine fisheries information system.
(2) Due to the editorial and computerization process, accurate trip ticket data will not be available for access or inquiries for at least 60 days following the month for which it is reported.
(3) Trip ticket data shall be summarized for publication as monthly and annual fishery landings bulletins. Bulletins will be available upon request to all interested parties.
(4) All requests for other than fishery landings bulletins must be submitted in writing to the Executive Director of the Commission or his designee for approval.
(5) Dealers are subject to being audited by the Commission pursuant to Section 379.362(6), F.S., for compliance with the landing reporting requirements.

68E-5.005 Penalties.
(1) The Commission may revoke, suspend or deny the renewal of the license of any wholesale or retail dealer for failure to make required reports, for failure or refusal to permit the examination of required records, or for falsifying any such record pursuant to Section 379.362, F.S.
(2) Any person violating or otherwise failing to comply with Chapter 68E-5, F.A.C., or its sections shall be guilty of a misdemeanor of the second degree, punishable as provided in Section 775.082, 775.083, or 775.084, F.S.
Specific Authority Article IV, Section 9 Fla. Const., 379.407, 379.414 FS. Law Implemented 379.407, 379.414 FS. History–New 10-17-84, Formerly 16B-45.05, 16B-45.005, 16R-13.005, Amended 12-31-89, Formerly 16R-5.005, 62R-5.005.

Atlantic States Marine Fisheries Commission

American Lobster Management Board

May 2, 2018
1:15 – 3:15 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(S. Train)* 1:15 p.m.

2. Board Consent 1:15 p.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2018

3. Public Comment 1:20 p.m.

4. Lobster Conservation Management Team (LCMT) Proposals to Reduce Latent Effort **Potential Action** 1:30 p.m.
   - Review Board Task Regarding Latent Effort *(M. Ware)*
   - Review LCMT Proposals
   - Discuss Board Goals and Objectives Regarding Task
   - Consider Board Action in Response to Proposals

5. Law Enforcement Committee Report *(R. Cloutier)* 2:45 p.m.
   - Enforceability of Ropeless Fishing

6. Plan Development Team Update on Lobster Draft Addendum XXVII *(M. Ware)* 3:10 p.m.

7. Other Business/Adjourn 3:15 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

American Lobster Management Board Meeting
May 2, 2018
1:15 – 3:15 p.m.
Arlington, Virginia

Chair: Stephen Train (ME) Assumed Chairmanship: 02/18	Technical Committee Chair: Kathleen Reardon (ME)	Law Enforcement Committee Representative: Rene Cloutier (ME)
Vice Chair: Dan McKiernan (MA)	Advisory Panel Chair: Grant Moore (MA)	Previous Board Meeting: February 6, 2018
Voting Members: ME, NH, MA, RI, CT, NY, NJ, DE, MD, VA, NMFS, NEFMC (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. LCMT Proposals to Reduce Latent Effort (1:30-2:45 p.m.) Potential Action

Background

- In October 2017, the Board tasked the LCMTs with developing proposals to assess and reduce latent effort in their respective fishing area. This was prompted by a memo from the SNE Working Group, which recommended the Board investigate latent effort in the fishery after the Board did not approve Addendum XXV.
- As the Board reviews the submitted proposals, it is important for the Board to discuss the goals and objectives for this tasking.

Presentations

- Review of Board task regarding latent effort by M. Ware
- Review of LCMT Proposals **(Briefing Materials)**

Board actions for consideration at this meeting

- Consider Board action in response to the proposals received.

5. Law Enforcement Committee Report (2:45-3:10 p.m.)

Background

- In February, the Board tasked the LEC with reviewing the enforceability of ropeless fishing in the lobster fishery. This discussion was prompted by the recent decline in the right whale population and subsequent discussion regarding ropeless fishing.
- The LEC is scheduled to discuss the enforceability of ropeless fishing at its May 1st in-person meeting.

Presentations

- Law Enforcement Committee Report by R. Cloutier

6. Update on Development of Draft Addendum XXVII (3:10-3:15 p.m.)

Background

- The Board initiated Draft Addendum XXVII to increase the resiliency of the GOM/GBK stock.
- The PDT has begun work to draft the Addendum; the TC is conducting analysis to understand the biological impacts of standardizing various management measures.

Presentations

- PDT Update by M. Ware

7. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

AMERICAN LOBSTER MANAGEMENT BOARD

The Westin Crystal City
Arlington, Virginia
February 6, 2018

TABLE OF CONTENTS

INDEX OF MOTIONS

11. **Move to amend to add "if a state waters commercial harvester landed less than 1,000 pounds of lobster and Jonah crabs in the previous year, that individual can submit a monthly summary of landings data rather than then the trip level reports** (Page 29). Motion by Doug Grout; second by Emerson Hasbrouck. Motion carried (Page 29).

    Main motion as amended: Motion to approve Issue 1 Option B, maintain current harvester reporting effort and allocate reporting through an optimal approach; 100 percent harvester reporting will be required through electronic or paper reporting within 5 years. If a state waters commercial harvester landed less than 1,000 pounds of lobster and Jonah crabs in the previous year, that individual can submit a monthly summary of landings data rather than then trip level reports. Motion carried (Page 30).

12. **Move to approve Addendum XXVI to the American Lobster FMP/Addendum II to the Jonah crab FMP as amended today** (Page 32). Motion by Doug Grout; second by David Borden. Motion carried (Roll call vote) (Page 34).

13. **Move to include the following TOR: Evaluate the implications of habitat expansion or contraction on population productivity. Review evidence for stock boundaries and associated stock structure, and confirm the current stock units are appropriate** (Page 38). Motion by Pat Keliher; second by Joe Cimino. Motion carried (Page 39).

14. **Move to accept the Terms of Reference for the 2020 American Lobster Benchmark Stock Assessment**. Motion carried (Page 39).

15. **Move to elect Dan McKiernan as Vice-Chair of the American Lobster Management Board** (Page 39). Motion by Doug Grout; second by Pat Keliher. Motion carried (Page 39).

16. **Motion to adjourn** by Consent (Page 39).

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Sen. Brian Langley, ME (LA)
Douglas Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
G. Ritchie White, NH (GA)
Raymond Kane, MA (GA)
Dan McKiernan, MA, proxy for D. Pierce (AA)
Rep. Sarah Peake, MA (LA)
Jay McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Sen. Craig Miner, CT (LA)
Mark Alexander, CT (AA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Jeff Brust, NJ, proxy for L. Herrighty (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
John Clark, DE, proxy for D. Saveikis (AA)
Rachel Dean, MD (GA)
Mike Luisi, MD, proxy for D. Blazer (AA)
Joe Cimino, VA, proxy for J. Bull (AA)
Peter Burns, NMFS

AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Rene Cloutier, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Jeff Kipp
Geoff White
Megan Ware

Guests

Rachel Baker, NOAA
Purcie Bennett-Nickerson, PEW
Colleen Giannini, CT DEEP
Zack Greenberg, PEW
Earl Gwinn, Ocean City, MD
Marin Hawk, MSC
Arnold Leo, E. Hampton, NY
Chip Lynch, NOAA
Allison Murphy, NMFS
Derek Orner, NMFS
Cheri Patterson, NH F&G
Jeffrey Pierce, Alewife Harvesters
Terry Stockwell, NEFMC
Mike Thalhauser, Center for Coastal Fisheries, ME
Darrell Young, MEFA
Chris Wright, NMFS

The American Lobster Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; February 6, 2018, and was called to order at 9:30 o'clock a.m. by Chairman Stephen Train.

CALL TO ORDER

CHAIRMAN STEPHEN TRAIN: Hello everybody; my name is Steve Train. I'm the Governor's Appointee from the state of Maine; and I'm the new Chair of the Lobster Board. I would like to welcome everybody to the meeting today. We happen to be the first meeting of the winter meeting this year; so I would like to welcome everybody to our winter meeting.

APPROVAL OF AGENDA

CHAIRMAN TRAIN: I assume everybody got the paperwork in the mail or the electronic paperwork, or whatever you want to call it. The first item on our agenda is board consent for the agenda. Is there any opposition to the agenda as sent to you? Seeing none; it's approved with consent.

APPROVAL OF PROCEEDINGS

CHAIRMAN TRAIN: Does everybody have the proceedings from the October meeting?

Are there any additions, deletions, corrections? If not we'll consider that approved with consent. Seeing no opposition we'll call that approved.

PUBLIC COMMENT

CHAIRMAN TRAIN: We have nobody signed up for public comment. If somebody missed an opportunity to sign up and they have something to comment on that is not on the agenda, please raise your hand, come up and introduce yourself. This is going fast. Okay now before we get into the guts of the agenda I have one thing.

There seems to be a lot of whale discussion driving management in the lobster industry right now; or at least impending management. We have a whale discussion coming on the Policy Board later. I would like to try as much as possible to keep it out of the discussion in today's meeting; it's not a direct agenda item. If possible withhold whale comments that aren't actually pertinent to what we're doing. Pat.

MR. PATRICK C. KELIHER: Thank you Mr. Chairman, but I do have a comment and possibly a pending motion as it relates to whales and the Law Enforcement Committee that I would like to address prior to the completion of the meeting.

CHAIRMAN TRAIN: It's pertinent to Law Enforcement then and we'll bring it in then; thank you.

AMERICAN LOBSTER ADDENDUM XXVI AND ADDENDUM III FOR JONAH CRAB FOR FINAL APPROVAL

CHAIRMAN TRAIN: Okay, it's time to get started. We have Addendum XXVI for Lobster and Addendum III for Jonah Crab; it's a final action, and we're going to be started off with summaries from Megan Ware. Megan.

MS. MEGAN WARE: We'll just wait for the presentation to get pulled up; but just an overview of what we're going to talk about today. I'll open up with the problem statement. I will quickly review the management options; and then I'll review the public comment that we received on this document. Then that will be followed by a Law Enforcement Committee report, as well as an AP report. Just as a reminder; there are two primary concerns that this Addendum is trying to address. The first is that current harvester reporting requirements do not provide the level of information needed to respond to management issues. More specifically, the spatial information we're collecting is too coarse to respond to management actions. There is a lack of information on the depth of the fishery coastwide, and then not all harvesters are

required to report. The second concern is that the as the lobster fishery is moving further offshore, and the Jonah crab fishery is expanding in federal waters.

This is a concern because the majority of our biological sampling is occurring inshore or nearshore. As a reminder, the Technical Committee in their report commented that many of the statistical areas are not meeting the three-sample-per-season baseline, which is in the stock assessment, which means that we need to be borrowing data from different statistical areas and that our greatest data gaps are in offshore Georges Bank.

REVIEW OPTIONS AND PUBLIC COMMENT SUMMARY

MS. WARE: Then before getting into the management options, I thought I would just review the TC analysis on the percent harvester reporting in Maine. As a reminder, the Board did task the TC with investigating a statistically valid sample of harvester reporting. There were three primary conclusions from that TC report.

The first is that overall the TC is recommending 100 percent harvester reporting; to accurately account for all trap halls and the spatial extent of effort. However, in the interim the current 10 percent harvester reporting in Maine is sufficiently precise; in large part due to the size of the fishery.

What this means is that that 10 percent harvester reporting is resulting in a low coefficient of variation for metrics such as trap hauls and landings. The TC also had a recommendation to improve the current 10 percent reporting; by focusing on active permit classes, which contain a large number of vessels and have a high variance of landings.

Focusing on active permit holders as opposed to latent permits and that is going to be Option B on the next slide. Issue 1 is the percent harvester reporting; and there are three options here. Option A is status quo, so we maintain the minimum of 10 percent harvester reporting with an expectation of 100 percent reporting over time.

If a state is at 100 percent reporting it maintains that percentage. Option B is maintaining the current effort associated with reporting; so if a state is at 100 percent reporting they maintain that percentage. If a state is at less than 100 percent harvester reporting, they maintain their current level of effort but they redistribute their current sampling through that optimal approach; which is again from the TC report.

For this option there is an expectation of 100 percent reporting over time through the use of electronic reporting. Finally, Option C is 100 percent harvester reporting; and there are two sub-options here. Sub-option 1 is a straight 100 percent trip level reporting. Under Sub-option 2, there is an exception for commercial harvesters who land less than 1,000 pounds of lobster and Jonah crab annually. They can submit monthly landing reports.

Then since electronic reporting is mentioned in one of the options, I just remind everyone that electronic reporting is highly encouraged by the Plan Development Team and the TC; given it is a cost effective method to increase reporting and there is flexibility to collect expanded data elements. The Addendum is recommending the use of eTrips or eTrips/Mobile, given it can be implemented at little to no cost to states. It's approved by GARFO for EVTRs, and there is a well-established relationship between ACCSP and ASMFC. However, states can use a different platform for electronic reporting; but it must be API compatible, which just means it has to allow data to be consolidated from other sources.

Issue 2 is asking what data components harvesters are required to report; under Option A, again status quo. Right now the plan requires things like statistical area, number of traps hauled, the species, and the pounds. Options B and C provide ways to expand upon

that. Under Option B, the plan would also require depth, bait type, and soak time.

Under Option C it would require number of traps per trawl and number of buoy lines. Again, these are the minimum baselines for all the states. Some states are already collecting some of this information; but it would just codify it in the plan. For this issue, you can think of this issue as building blocks.

The Board can choose Option B, they can choose Option C, or they can choose both. Finally, the third question is asking about the spatial resolution at which we collect data. There are five options here. Option A is statistical area; so that is our status quo. Option B is statistical area and LCMA.

Option C is statistical area and distance from shore; so we have 0-3 miles would be our inshore region, 3-12 miles would be our nearshore region, and greater than 12 miles would be our offshore region. Option D is 10 minute squares, which are what are shown coastwide in the figure on this slide.

This is basically breaking down the statistical areas into smaller boxes. Then Option E is for an electronic tracking pilot program. As a reminder, this is a one-year pilot program to test electronic tracking devices in the fishery. To do this we would put together a subcommittee of Board, Plan Development Team, Industry and Law Enforcement members.

They would be charged with designing the pilot program; as well as selecting the technologies. At the end of that one year the technologies would be evaluated, based on compliance, ability to determine trap hauling from steaming, industry feedback, and cost. At the end of that one year the Board has three options.

They can choose to end the program and not pursue electronic tracking. They can extend the program for one year to test new technologies or test them in different areas; or they could pursue the implementation of tracking in the lobster fishery. Then just to wrap up some of the other changes that are included in the Addendum.

In terms of biological sampling, there is still a requirement for non de minimis states to conduct either a ventless trap survey, a settlement survey, or a trawl survey. However, this addendum would set a minimum baseline for biological sampling; so states would be required to conduct a minimum of ten sea or port sampling trips in the lobster/Jonah crab fishery.

If a state comprises more than 10 percent of coastwide landings in either of the lobster or Jonah crab fishery, they would be asked to do additional trips. Finally, there are three recommendations for federal waters. The first is to establish a harvester reporting requirement for that lobster-only-federal permit. The second is to create a fixed-gear VTR, and the third is to implement a targeted lobster sampling program in federal waters. Moving on to the public comment we received.

There were eight hearings held in seven states; with about 130 individuals attending those. Then we received 13 written comments. Most of those were from organizations; including NGOs, industry associations, and the New England Council. Then the remaining was from individuals. Just to orient everyone.

These are going to be the graphs I show for the three issues. On the left column on the top is the written comments; split out by individual versus organization, and then the public hearings are split out by state. Then on the top are the different options. Again, this is Issue 1; Percent Harvester Reporting.

Overall the greatest support was for maintaining the current harvester reporting effort; but allocating this through an optimal approach, so that Option B or that 10 percent modified on the screen. Much of the support

for this option came from the Maine public hearings; as well as individual letters from Maine residents, and several industry organizations.

Comments in favor of this option included, it is the best use of Maine's time and money, 10 percent harvester reporting is statistically valid, and harvester reporting should focus on active permit holders. The 100 percent reporting, which is Option C, was the second most supported option; with much of the comments coming from the New Hampshire and New York hearings, letters from NGOs, as well as the New England Council.

Those who favored this option commented that all fishermen should be treated the same; and be required to report. A hundred percent reporting should be required from Maine; which comprises 83 percent of the fishery. A hundred percent reporting is needed to address data gaps and understand the offshore movement of the fishery.

In particular, several NGOs recommended immediate adoption of 100 percent reporting; rather than the five-year-phase-in approach that is outlined in the addendum. Finally, for Option A, which is status quo, those who supported this option again commented that the 10 percent reporting is statistically valid, that 100 percent reporting is redundant given there is 100 percent dealer reporting, and it's a better use of Maine's budget to focus on biological sampling as opposed to harvester reporting.

The next issue is the data elements. Again, we have status quo and then Option B was to add in effort and location elements; and Option C were the gear elements. The greatest support was for status quo. At almost every hearing, participants commented that their state is collecting more data elements than what is required under the plan. They are already exceeding the plan requirements.

However, there was resistance to requiring additional data elements in the plan; as participants generally commented that they're already providing enough data. In particular there was little support for requiring bait type; and there were concerns with depth, given that a single trawl can cover a wide depth range. Those who supported the addition of data elements included NGOs, a few individuals at hearings, as well as the New England Council. They supported the additional data elements; particularly those gear elements, given the ongoing discussions regarding protected resources. Finally, Issue 3 was the spatial resolution of data. Overall, greatest support was for distance from shore; which is Option C, as well as statistical area Option A.

Much of the support came from the Maine public hearings; where fishermen are already reporting statistical area and distance from shore, so Options A and C would not add additional requirements for those fishermen. The addition of 10 minute squares, Option D, got moderate support at several hearings, as well as from several industry organizations, the New England Council, and NGOs.

These participants commented that a greater spatial resolution of data is needed; to show a history of where the lobster and Jonah crab fisheries are taking place. Importantly, many participants commented that fishermen should not be required to fill out a new trip report for every square fished; since this would significantly increase the burden on fishermen.

Finally, several NGOs recommended immediate adoption of electronic tracking in the lobster fishery. Just to wrap up with some of the additional comments. In regards to the federal recommendations, there were 16 comments in support of 100 percent harvester reporting for federally permitted vessels, 7 comments in support of the fixed gear VTR, and then 3 comments in support of a targeted biological sampling program.

Others did caution against increased observer coverage. Regarding protected resources, several NGOs recommended subsequent action to address the right whale deaths. Then at the New Jersey and Connecticut hearings, fishermen highlighted the economic impacts of the current season closures. In particular they both talked about the requirement to remove gear; as that extends the length of the closure, and prevent them from fishing for other species. I will now pass it off for the LEC report.

LAW ENFORCEMENT COMMITTEE REPORT

MR RENE CLOUTIER: The Law Enforcement Committee did not have any specific recommendations for addressing the level of harvester reporting; or the types of additional data that might be desirable or mandatory. The LEC supports efforts to collect as much data as possible; but offered the view that as reporting requirements become more complex, with additional data needs, it would be unreasonable to expect strict enforcement of incomplete or incorrect reporting.

Regulatory enforcement standards for non-reporting are in place and effective. The LEC supports the development and improvement of vessel tracking as statistical area reporting as a means to enhanced enforcement and management of the lobster fishery as a whole.

While the usefulness of additional data collection for enforcement purposes may vary from state to state, there may be ancillary utility in having additional information at hand, such as water depths, bait types, and gear soak times. The LEC welcomes the opportunity to provide enforcement advice; regarding the development of tracking and harvester reporting systems for the American lobster fishery.

ADVISORY PANEL REPORT

MS. WARE: Thanks Rene, and then I will just wrap up with the Advisory Panel report. I'm presenting this on behalf of the AP. The AP met via conference call on January 17, to review the management options, review the public comment that had been received to date, and then also provide recommendations to the Board. On Issue Number 1, five AP members supported 100 percent reporting in federal waters. There were comments that as the lobster fishery moves offshore the data gaps in federal waters are becoming exasperated.

Of those five individuals, two AP members were comfortable with 10 percent harvester reporting in state waters; but the 100 percent reporting in federal waters. Two separate AP members supported maintaining the current 10 percent harvester reporting requirement. There were comments that 10 percent harvester reporting is statistically valid; that Maine cannot handle 100 percent reporting, given the number of trips, and that again 100 percent reporting would be redundant.

One of these individuals did support Option B; which is redistributing that 10 percent to focus on active permits. Then one AP member suggested either an optional or additional reporting program for recreational fishermen; so that they can provide their knowledge and information to managers.

For Issue Number 2, four AP members supported the redesign of the federal VTR to encompass data needs of the lobster fishery; with comments that the current form is not presented in a logical order, and that different fishermen are interpreting the data elements differently. On Option B, which is the additional elements in regard to location and effort, one AP member supported inclusion of soak time, but did not see a need for bait type.

Another AP member expressed concern about depth; again given a trawl can span such a wide range of depths. Then for Option C, which are the gear configuration elements. One AP member supported inclusion of these, given it is pertinent to the ongoing protected resources discussions.

Finally for Issue 3, so regarding the electronic tracking pilot program, five AP members did not support this, commenting that eventually the cost will fall on fishermen, and it's not appropriate for the inshore fishery. One AP member did support the exploration of electronic tracking for federal vessels; especially given increases in the Jonah crab fishery.

Regarding the 10 minute squares, two AP members supported the use of the 10 minute squares; as long as fishermen don't have to fill out a separate form for each square, with comments that this will help the fishery in the long run, because it will provide a history of where the effort is taking place.

Then one AP member supported stat area and LCMA, and one AP member did not support distance from shore; given Long Island Sound is all in state waters. Then just some additional comments, one AP member overall supported greater sampling of the whole fishery. One AP member highlighted the importance of reporting being fishermen friendly; so logical and simple. Then one AP member cautioned the Board against moving towards requirements that are found in the groundfish fishery. With that we'll take any questions.

CHAIRMAN TRAIN: Do we have any questions? David Borden.

MR. DAVID V. BORDEN: I just note first off, congratulations on being the Chairman. It's really refreshing to be over on the side of the table through this meeting. I have a question for the NOAA staff. A number of the points that are made both in the public hearings and in the document, talk about revisions to the VTR.

I know that NOAA staff routinely does small revisions to the VTR system. I'm just wondering how much flexibility there is to adjust the VTR language to try to address some of these concerns. If someone from NOAA could speak to that I think it would be beneficial.

CHAIRMAN TRAIN: Peter, I had to ask who it was. You were a shadow. Peter Burns, go ahead and answer, please.

MR. PETER BURNS: Good, I hope you can see me a little bit better Mr. Chairman, thank you. As far as the flexibility, I mean the forms are set up. I imagine over time if we wanted to revise these forms, one of the options here, the recommendations is to go forward with a fixed-gear reporting form.

But right now if we were going to go forward with some more electronic reporting, there may be some more flexibility that way. Those are systems that we're trying to develop and working on. But right now we would have to go through and change those forms. We would have to go through a process to evaluate the burdens and things like that; and go through significant administrative process to change the forms the way they are now.

CHAIRMAN TRAIN: Follow up, David?

MR. BORDEN: Yes just a quick question. Peter, in the past we've talked about having a fixed gear VTR system; and if my memory is correct, that always triggered some type of OMB requirement or review, which was not seen as being terribly probable. Is that still the case?

CHAIRMAN TRAIN: Peter, go ahead.

MR. BURNS: Thanks for the question, David. Well yes, anytime we go through any types of changes that require changes in the burdens to the public and to the federal government to provide information, we have to go through a process. Yes we would have to go through and revise these forms.

We would have to give the rationale and the appropriate adjusted burdens and things like that; and we would have to get approval from OMB to go through and actually implement these types of things. Big or small, any kinds of changes are going to have to require updated

adjustments, updated evaluations of the burden, and we would have to get approval of that up the line.

CHAIRMAN TRAIN: Ritchie White. No? Do we have no other questions? Mark Alexander.

MR. MARK ALEXANDER: Just to follow up on some reporting questions, not on VTRs, but with state reporting. I think it's wise that the Addendum takes the direction of looking toward electronic reporting. But in that regard, has there been any communication with or feedback from ACCSP on these additional data elements; because some of them are not part of the present program design? I would guess that that might involve some of the various committees in incorporating those state elements into the design; and then subsequently have them translate into the electronic application itself. I was just wondering if there was any idea how long that may take.

MS. WARE: Yes, so a member of ACCSP was on the Plan Development Team for this Addendum for that reason. I again checked in with them on Friday, and they expressed to me their confidence to be able to implement whatever is chosen in this Addendum, including the data elements, so I think that they are confident that they can do it.

MR. ALEXANDER: Did they indicate a timeline?

MS. WARE: I'll use a menhaden phrase, cautiously optimistic for next fishing year.

CHAIRMAN TRAIN: Does anybody have anything else? Yes.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Just a follow up on the ACCSP question. Geoff White I think is on his way over from the office; so if he gets here you guys can ask him some of the more detailed questions. He might be able to help out. But he'll be here hopefully soon.

CHAIRMAN TRAIN: Trying to stay on task here. We've got reports, we've got reviews and we're into final approval; and yet we may need more information.

EXECUTIVE DIRECTOR BEAL: If folks want to dig in deeper to the questions that were just posed to Megan. If they were concerned about her responses or we needed more detail of data elements or timing and those sorts of things; Geoff may be able to do that. If folks around the table are satisfied, I think then you're ready to go full steam ahead.

CHAIRMAN TRAIN: We're at the point where we have to consider final action; unless people would like to wait for more information. I don't see anyone raising their hand to make a motion. Dan McKiernan.

MR. DANIEL McKIERNAN: Can I recommend that we take these, one issue at a time?

CHAIRMAN TRAIN: That's fine. Pat Keliher.

MR. KELIHER: I'm not sure we're going in order. Maybe the best approach from trying to determine. There is obviously going to be a lot of direction towards the state of Maine on our willingness to go beyond anything, beyond 10 percent. There are both fiscal issues within the state of Maine that I think the Board is aware of. I think we have an option here in front of us that start to improve on Maine's already utilization of 10 percent harvester reporting; with a strong emphasis on the further development of electronic reporting.

It would be good to have an ACCSP representative here; I think as we get into the finer details of electronic reporting, because my staff continues to express concerns with me about the current eTrips, and how it would have to have a lot of modification I think, to work for the state of Maine because of the size of our fishery. But if it will help move things along, I will be happy to put a motion on the board and we can go from there. **If you will Mr.**

Chairman, I would make a motion to move Option B; maintain current harvester reporting efforts, and allocate reporting through the optimal approach. If I get a second I will give further justification.

CHAIRMAN TRAIN: We have a motion; is there a second? We have a second from Jim Gilmore. Further discussion, go ahead Pat.

MR. KELIHER: There has been a lot of talk over the years, for many years in regards to Maine's harvester reporting. Maine's fishery has nearly 6,000 commercial license holders that make up both the state and federal portion of our fisheries. Last year there were 265,000 trips taken in that year or 292,000 trips in 2016.

With our current 10 percent, our landings program selects 650 to 700 licensed harvesters a year to report. This 10 percent is chosen from each zone and each license class category. We currently enter about 30,000 lobster records a year; and I believe that exceeds all the rest of the jurisdictions put together with our 10 percent.

The TC has determined that Maine's current 10 percent harvester reporting provides statistically representative data; because of the large scale of our fishery. The CV, which is less than 5 percent, equates to a 95 percent confidence interval with the data associated with 10 percent reporting. It is a very marginal benefit to increase to 100 percent at this time.

The appropriate stratification of license class and zones could be worked upon; and we could deal specifically with making sure that we're sampling both active license holders, and we could also take out the recreational component from that. I think what the TC has recommended is to continue to further develop the electronic reporting.

Maine is very, very supportive of that approach. I think we have a very good track record in the state of Maine; as far as being leaders associated with electronic reporting. The elver fishery is a prime example of that; and I think something that should be looked at, as it relates to this type of reporting.

Something that can be simplified, everybody is carrying these damn things around, these smart phones around now that could be utilized for this type of reporting associated with daily landings. With that Mr. Chairman, I'll stop there. But I do know Senator Langley has some much greater detail as it pertains to the financial resources within the state of Maine, and how anything beyond 10 percent could affect us. It may be worthwhile hearing from the Senator.

CHAIRMAN TRAIN: Senator Langley

SENATOR BRIAN LANGLEY: You know I have just been in contact with our Chair of our Appropriations Committee this morning; just to make sure that my figures are correct. Our last economic forecast predicted about a 12 million dollar surplus that we would go into this year to fund what is on the table, our appropriations table that were carried over from last session.

I think the "asks" are probably ten times what the money is. Our state has had to come up with 2 million additional outside of the budget last year for the Medicaid expansion voted in by the voters, another million plus for implementing ranks choice voting that's come in. We're extremely challenged in this; and every rock will be turned over to try to meet those needs. I don't know what it's like in your states; but for legislators that are off the coast, you know there is probably not as much interest in what happens on the water, those of us that live on the coast. Then as a perspective, less than 1 percent of the budget in Maine is from the Department of Marine Resources. All natural resources departments are less than 3 percent of the budget; and it's very, very tightly watched.

The Department also has some increases within that they have to absorb with increased prices for trap tags and such. The extra $500,000 I don't see would be coming to the Department; and if they had to increase the reporting mechanism it would be at the sacrifice of some other, I would say more worthy endeavors.

Then the other thing that I might suggest is that one item to take a look at, if statistically speaking you know 10 percent at some point doesn't become valued, then you would trigger it and maybe go to 15, or whatever you needed to, to be statistically accurate. That wouldn't be as difficult to swallow. Thank you for your time and your patience.

CHAIRMAN TRAIN: Thank you, Senator, anybody else? Peter Burns.

MR. BURNS: Just a question really about the structure of the document. Later on in Section 5, there are some specific recommendations for National Marine Fisheries Service; and one of them is the percentage of reporting, and it says that it would be the percentage that's determined by the Board. Now in this particular section that is specific to the state's reporting, it talks about the states.

We've got an option on the table right now that allows states to be able to optimize how they sample; so that they ensure that they get a representative sample of harvester reporting. Now would that apply to the National Marine Fisheries Service as well? Is this the point where the Board is going to determine how that translates into federal reporting; or is that a separate decision?

MS. WARE: I might suggest that it's a little bit separate. There hasn't been that analysis for the federal side on what that optimal reporting percentage is; so I can't give a percentages to what that is. But I think that would be a discussion under Section 5; if the Board is comfortable with that.

CHAIRMAN TRAIN: Are you good, Peter? No follow up?

MR. BURNS: You've got to have standards for state reporting and then separate standards for federal reporting? Is that what I'm understanding?

MS. WARE: Not necessarily different or separate; but my understanding from a comment before was to take each issue one at a time. That is where I was going with that. But if you guys want to change it up that is the Board's decision.

CHAIRMAN TRAIN: David Borden.

MR. BORDEN: Megan, is this recommendation consistent with the guidance we got from the Technical Committee; or have they commented on this specific option?

MS. WARE: Just to clarify, you mean for state or for federal waters for on the motion?

MR. BORDEN: For state.

MR. JEFF KIPP: Yes, the Technical Committee does recommend going to 100 percent; but then in the interim the 10 percent is reasonable.

CHAIRMAN TRAIN: Dennis Abbott:

MR. DENNIS ABBOTT: Senator Langley spoke about Maine's budgetary issues. I think the issues in Maine I'm sure are no different than they are in any other state. But from my point of view, I look at Maine's large lobster industry, and I look at how many trap tags they must issue, in the millions, 6,000 licenses.

It seems like that money should be used for lobster management of some portion of it; rather than going into the general fund to support things in inland Maine, or whatever. It's hard for me to swallow the fact that we can't do appropriate management measures

based on the state of Maine's budget diverting lobster income to other things.

CHAIRMAN TRAIN: I have Dan McKiernan next; but if there is a direct answer to Dennis, I'll take Pat out of order; you're also on the list. Pat Keliher.

MR. KELIHER: Just to be clear. I think Senator Langley's reference is to whether we could make up the difference for $500,000.00. Our license money and our trap tag money go directly to our Lobster Management Fund; they are not diverted to the general fund. In this case, coming up though with $500,000.00 on top of a $270,000 hit that we just took because the price of our trap tags have just recently increased from, I think .03 to 11 cents.

We're already in a deficit of $270,000.00; and to add potentially a $500,000.00 component or bill to that deficit. We would not be able to cover that cost. We would have to go to the Legislature. The Legislature would have to then appropriate additional funds to the Department of Marine Resources.

I think to Senator Langley's point, it is not going to happen, especially when fishermen are going to say wait a minute, it's a 95 percent confidence interval. Why do we have to do more? This leads us into a political discussion; but I think Senator Langley's reading of the political tea leaves, as it comes to the Maine Legislature is quite accurate.

CHAIRMAN TRAIN: Briefly Dennis, and then Dan is next.

MR. ABBOTT: Thank you Pat for that clarification. That's a little different understanding that I had. I was under the impression that your trap tags was gaining a lot more revenue than what I thought.

MR. KELIHER: They use to.

MR. ABBOTT: It used to.

MR. KELIHER: They used to until this year.

MR. ABBOTT: Thank you.

CHAIRMAN TRAIN: Dan McKiernan.

MR. McKIERNAN: I plan to oppose the motion; and I just want to give the Board a brief thumbnail sketch of the Massachusetts program. We have over 7,400 fishermen who are reporting trip level; all the way from the most small scale clammer up to an offshore lobster boat. We have 6,200 reports that come into us as trip level reporters at the state level.

Another 1,200 fill out VTRs; so in Massachusetts if you're filling out a VTR, you don't have to fill out a state trip level report. We have a program right now that is comparable to what Maine is fearing; in terms of the number of participants. I don't think it costs us a half million dollars. I have been looking at the Rhode Island model; where they put a surcharge on the fishermen, if the fisherman chooses to submit paper, which puts burden on the state to keypunch those records.

I think if I'm not wrong it is a $50.00 surcharge; and they have a 54 percent electronic reporting rate, which clearly reduces the burden on the state. I think that's a great model; and it's something that we want to look at in Massachusetts. I am sympathetic to the plight of the Maine Legislature and the Agency; but this really needs to be borne by the industry, and the industry members to submit these catch reports.

The reason we didn't get a lot of comments south of Maine at the public hearings is because by and large, people accept this and they can't believe that we don't have it now. My last comment is, I won't go into all the gore, but one of the most painful professional experiences for me was the debates over the monument proposals that were occurring last year or a year and a half ago.

At the end of the Obama administration, when folks were trying to understand the impacts to these fisheries in the southern Georges Bank area, and all we could produce is huge stat area summaries that were not suitable for us to sort of fight back, or explain the impacts to these fisheries. I think we owe it to our successors, those who are going to inherit lobster management 5, 10, and 15 years from now, to really bring this up into modern standards. Ten years ago we enacted Addendum X, and the expectation was to eventually go to 100 percent.

Massachusetts went from 10 to 20 to 100 in the span of three years; because our staff told us, why would we make all this investment with the fisherman in year one and have him go away in year two? I mean once they've done the electronic reporting or the trip level reporting, they were in favor of it. That is why I'm going to vote against the motion.

CHAIRMAN TRAIN: Doug Grout.

MR. DOUGLAS E. GROUT: You know I believe this is a very important Addendum; particularly as we start having to deal with in our next addendum potentially some impacts to climate change, and trying to build some resiliency into this fishery. I am certainly sympathetic to the budgetary issues that Maine has brought forward with this. The concern I have with the motion on the Board is that it doesn't start moving towards the 100 percent reporting that the TC has put forward as a recommendation in the long term. I see the optimization as being a good step forward; but it's optimization with 10 percent. I also, one of the things that I think is very important as we move on into the future here, is to get a better idea of the spatial extent of the fishery.

I am concerned that at 10 percent we're not going to get that. You know the TC recommended back in October that 100 percent harvester reporting in the lobster and Jonah crab fishery to accurately account for all trap hauls and the spatial extent of the effort. I understand the TC saying that from a catch estimate standpoint that 10 percent is statistically viable.

I believe I certainly understand the analysis they did, and I think that's a good way to go. But I think at some point we've got to start moving forward both in state waters and federal waters towards 100 percent. If this had some mechanism to start moving; even incrementally forward, I would be willing to support this. But at this point I can't support this unless there is some movement to something that we put forward over ten years ago as a need for this fishery.

CHAIRMAN TRAIN: Pat Keliher.

MR. KELIHER: Maine has 20,000 license holders. Dan's comment on regarding all the license holders in Massachusetts equates to 7,500. We deal with 30,000 reports alone with 10 percent harvester reporting. Then we have all of our other fisheries associated with it. I just want to make sure it's clear to the Board that Maine's landings program is significant in size and stature; dealing with all of our harvesters and all of our dealers across all of the fisheries.

The point around corals and monuments, I agree Dan. I mean having better data associated with those is important. Maine was successful pulling together very detailed information from a financial and effort standpoint, in regards to the coral conversations of the state of Maine, and we were successful utilizing that information through the New England Council approach to minimize the financial impact to the state of Maine.

To Doug's point in regards to this motion, Option B, the language within Option B, under this option states maintain 100 percent harvester reporting unless they have less, and in the case of Maine is obviously 10 percent. The

language within the document goes on to say it is expected that the states will work towards 100 percent harvester reporting over time through the use of electronic reporting.

That is specified within Option B. I am fully supportive of that. There are some problems associated with eTrips within the state of Maine. There are six or seven data points that we require that eTrips does not capture. If eTrips is the tool that we need to use to go forward that's fantastic; but my staff continues to show great concerns, and tell me about their concerns that relates to eTrips.

I think we need to roll up our sleeves and develop a system across states and with the federal government that is specific to 100 percent reporting electronically, but is also user friendly and not clumsy, to use a term that my staff uses in regards to eTrips. If you want more explicit language within the motion; I'm certainly willing to consider it. But to have the motion reflect anything other than 10 percent in some incremental fashion moving forward, when the TC has said it is of marginal benefit. I would rather spend my money on things that are frankly more important at this time, while we focus on electronic reporting development.

CHAIRMAN TRAIN: David Borden and I haven't seen any others so we're going to have to move forward after this. Oh, I'm sorry, Terry.

MR. BORDEN: I guess following up on Pat's point and Doug's point. How long would it take us to review the electronic reporting issue and basically make the types of changes that Pat is requesting? It seems to me, going back to the point that Doug made and Pat has made. What we need is we need a timeline in this motion that is on the table.

It sounds like it would be acceptable if we had a timeline and a path to revise the electronic reporting form. How long is it going to take us to do that? I don't know the technical nuances of that as well as I should. Can somebody address that? I don't know whether Geoff is here.

CHAIRMAN TRAIN: Thank you Geoff.

MR. GEOFF WHITE: No problem. I'm sorry for arriving a little bit late. Can you just catch me up on what changes to the electronic reporting piece you would be asking for?

CHAIRMAN TRAIN: Pat, you were the one that said it was lacking, I believe. Can you explain what you would like?

MR. KELIHER: In conversations with my staff, and Geoff thanks for being here, because I think it's important. When I talk about electronic reporting based on the concerns within the state of Maine. I'm not sure that eTrips is frankly the right way to go. It was not developed for this. It could be modified and it could work for this; and I'm certainly open to that conversation.

But I think there are other technologies out there that might get us to the same point, in a way that is more user friendly from the industry. I got an e-mail from my staff in regards to this. I asked them to pull together their concerns. We're getting a lot of feedback here. I'm not sure. Is that a little better? Okay. That's great. This is purely intentional on my part. I don't think it's my microphone.

CHAIRMAN TRAIN: Pat, if you don't mind I will let Terry go and then when they get your microphone straightened out you can answer that question. Terry, would you like to go? Oh, now you can't. Go ahead, Terry.

MR. TERRY STOCKWELL: I'm here on behalf of the New England Council; and overall the Council appreciates the Commissions work on this Addendum and supports measures that will improve monitoring in federal waters. However, the Council does not support the motion on the board.

As the lobster and crab fisheries continue to shift operations further offshore, they are going to increasingly interact with other federally managed fisheries, the species targeting those fisheries, habitats, corals and protected resources. In addition there are a number of offshore wind and other energy projects currently being proposed. It's important that we all understand the patterns of effort so we can better estimate the bycatch and consider other overlaps between these fisheries and the other federal fisheries and habitats that the Council manages. I'm hoping that this motion will be amended and the Council can then provide some support.

CHAIRMAN TRAIN: I'm going to go to Peter Burns since they're still playing with plugs, Pat, and then I'll get back to you.

MR. BURNS: You know this gets back to my earlier question about whether we're going to determine the level of federal reporting within this motion or in this section of the document or later on; and it sounds like there are going to be two separate decisions. Given that this does have implications on the federal side; because if the Board was to approve this motion here, and then my thinking is that if there is going to be any increased request for increased federal reporting later on.

Any of the spatial data gaps that result from only a 10 percent harvester reporting in Maine are going to fall in the lap of federal permit holders and on the federal government to cover that gap. I thought Doug made a good point; which is you know the robustness of the TCs analysis of Maine's sampling program talks about trap hauls and landings.

But it doesn't really talk about or get to the issue of the spatial representation of harvester reporting coastwide. We know we have a big black hole in reporting somewhere in the Gulf of Maine and into Georges Bank. We've got a situation where the federal government wouldn't necessarily fall into this optimal situation; where we could try to adjust our reporting requirements to get a better geographical resolution.

If we were required to report at a higher level we would have these much higher administrative costs and things like that. We do have electronic reporting is something that we're working on. It's come a long way. But it's not completely done yet, and so any kind of immediate reporting requirement would have to come under the existing budgets and things like that that we have. We don't have the fee structure or the trap tags or any of these other types of revenues that can help offset those costs.

We don't charge federal permit holders anything. My concern is that although I can appreciate the TCs analysis, and I can certainly appreciate Maine's budgetary situation. I don't think that this gets to the spatial need for data offshore. I'm just concerned that this would just become the responsibility of the federal government to pick up the slack here; and so I can't support this motion.

CHAIRMAN TRAIN: Is your microphone working yet, Pat?

MR. KELIHER: How's this, better? Just to an earlier point from a numbers perspective. Maine does 100,000 harvester reports and nearly 500,000 dealer reports; to give you a size of our current landings program. But to the point in regards to eTrips, these are the concerns expressed from my staff.

Program does not have great intuitive flow to the process. Harvesters continue to be very frustrated with the program. It only works on Android platforms, unless changes have been made that we're not aware of. It interfaces with SAFIS not the Maine Licensing System database. There are very few checks and balances. Fields have no validation at time of data entry. Areas fished selection needs major revisions; zone and distance from shore using

current data elements. Too many pages to scroll through, and with issues around functionality more customer service needs to be the focus. Just from an element standpoint, Maine regulations require additional information beyond the eTrips, including number of sets, time of sets, total gear in the water, depth, Maine's lobster license, Maine home zone information, distance from shore and then sea time.

There is a lot within eTrips that is not captured, for what the state of Maine's needs are. I think as we look at this are we looking, I guess to back up. We had a data reporting workshop, where we spent a lot of time focused on electronic reporting. The state of Maine continues to be very supportive of electronic reporting.

I think potentially if we can fix the electronic reporting in a way that satisfies all jurisdictions, including the comments by Peter Burns today, then we can get to a point where we're dealing with the spatial resolutions within this fishery that people are so concerned about. I think we need to put our efforts in that basket.

We need to start really focusing on the development of a good, useable platform from an electronic monitoring standpoint. This 10 percent allocates or optimized, was supported by the TC; but the TC wants more. They want 100 percent. To get to that 100 percent based on Option B, is to really start focusing on electronic reporting. With that Mr. Chairman, I'll shut up.

CHAIRMAN TRAIN: Geoff, did you get what you needed?

MR. G. WHITE: Yes, thank you. A couple of things, number one ACCSP eTrips and eTrips/Mobile do support third party Apps that submit the data through an API. It's becoming a lot less of a conversation over, you know eTrips is certainly available, and we support the use of it. But if there is another tool that an agency wants to use that can still submit it via the API that means it still lands in the SAFIS database every evening, and everybody can use it for accessibility for management.

That's a big plus. I think in the point of 100,000 fishermen reports per year, I believe that is. The technology and the servers that ACCSP have will have no issues handling that data volume. It's of course the issues of compliance tracking and the work on the other end. The question was what is the timeline schedule to address the concerns raised by Maine; in terms of area fished, number of sets, and time of sets, the sea time, distance from shore?

I know that there has been a lot of discussion about making some adjustments to those fields for the South Atlantic; so some of those are already in progress. It would be hard to say exactly how much time it would take to incorporate your list of requested changes. But a lot of those are in process. I don't know exactly the timeline of what you wanted this motion to apply to; in terms of what reporting period.

Certainly these are all things that we're working on within this year. The dataflow is something that in the overall SAFIS redesign is an ongoing process. But some of those points that you brought up, which fields are available, when can they be incorporated, can the servers handle the volume. Those are in process and would go through pretty much the normal Information Systems Committee change management process.

CHAIRMAN TRAIN: I've got Mark Alexander and then Dennis Abbott.

MR. ALEXANDER: Coming from a fiscally challenged state; I certainly sympathize with Pat Keliher's point of view. I believe really we should be focusing on electronic reporting. I think once that's established and adopted by all the states, then a lot of the spatial challenges and the percent participation challenges will help solve themselves.

I do think that it might be good for the Lobster Technical Committee and the ACCSP Commercial Technical Committee maybe to have a joint meeting. The Lobster TC has a good feeling for what's needed to better manage the fishery; and I think the Commercial Technical Committee will have a better idea about how best to implement that in the ACCSP standards, and subsequently in whatever reporting applications come out of that.

They may be even able to recommend whether it's worthwhile to actually put a lobster specific skin on the reporting application; to make it easier and more user-friendly for fishermen. But I don't think us forcing Maine into an escalating percentage of reporting over the next five years, or whatever some of the other alternatives mentioned is really going to be productive here. I think focusing on electronic reporting I think will in the end achieve what it is set out to do in this Addendum.

CHAIRMAN TRAIN: I have Dennis and then Adam Nowalsky.

MR. ABBOTT: My recollection is many years ago when George LaPointe was in Pat's seat that when we instituted 10 percent there was an understanding that the percentage was going to increase. But more specifically my question is, Pat mentioned and I think I'm quoting him correctly is "that the Technical Committee stated that it would be of marginal value if we increased from 10 percent."

If that is the case then why are we going through this exercise? But I would appreciate a comment from the Technical Committee. Does the Technical Committee think that increasing from 10 percent is marginal? Could we have a comment from the Technical Committee?

MR. KIPP: Over the range evaluated of sampling up to 40 percent, I think it was in the report; the increase in precision was marginal over those values. I think that is what the Technical Committee was referring to, as far as a marginal improvement by increasing percentage between 10 percent and 100 percent.

CHAIRMAN TRAIN: Follow up Dennis.

MR. ABBOTT: It seems persuasive that there is no need to go up from 10 percent; even though I think it's a good idea.

CHAIRMAN TRAIN: Adam and Jim will be next.

MR. ADAM NOWALSKY: We've heard a number of concerns with this motion, primarily from the state of Maine. We've heard concerns with regards to some other motion from the state of Maine. We've heard concerns from the Service about a gap that would occur if we don't get to 100 percent. We've heard concerns that the TC would like to see an increase in reporting. I've heard a number of people indicate that they would support the increase in electronic reporting. I'm going to make an effort here to try to move this forward and bridge this gap; and **I'm going to move to amend the motion to add 100 percent harvester reporting will be required through electronic reporting within five years.** If there is a second to that I will provide a little more support.

CHAIRMAN TRAIN: Do we have a second? Second from Ritchie.

CHAIRMAN TRAIN: Go ahead.

MR. NOWALSKY: I think what this accomplishes is the Option C that we have in here sets out specific increases that we need to see as soon as next year. This essentially gives the state of Maine, ACCSP, and any other management bodies, reporting bodies that need to be involved, gives us five years to work them out, but gives us all as we leave here today a finite deadline to work towards, and that would be my reason for making this motion.

CHAIRMAN TRAIN: I have one question and that is, as fast as electronic and computer stuff

moves it probably will be, but if it is not ready satisfactorily in five years and this passes, where are we left?

MR. NOWALSKY: I would see this management body having to have to take some subsequent action at that time.

CHAIRMAN TRAIN: Adam, would you look at what's up there and make sure that was what you said?

MR. NOWALSKY: Yes that is correct.

CHAIRMAN TRAIN: Discussion, David Borden.

MR. BORDEN: I support the concept of what Adam has put forth. But I would go back to the point that Mark made, which I thought was a good point that if we get two of our committees together, they basically can look at this issue, examine all the points that Pat has raised, the concerns that the Maine staff have raised, and then come back to us and actually give us a timeline of what is reasonable, a reasonable expectation in terms of trying to revise the existing system.

I mean the way I understood Pat is he's willing to go to 100 percent electronic reporting; but the system has to change. What we lack here is some calendar that is based on estimates by the technical people that know the issue the best, to come back to us with a deadline. It's almost like we should approve some kind of motion here with a timeline; but then refer it to the technical people and ask them to report at the next meeting as to how long it's going to take us to transition to the new system, and then set the deadline.

I don't think anybody here at the table would support five years if it's going to take ten years to get there. But on the other hand, if it's going to take two years to get there, I think a lot of the people around the table would want two years in this motion. We won't know that until they have that technical discussion. In my case, I could vote for this but I probably want to table the entire motion until the next meeting; and get the type of input that Mark described.

CHAIRMAN TRAIN: Next on my list is Jim Gilmore; but Jim, you wanted to speak to the main motion. Do you want to speak to the amendment or shall I go on to amendment people?

MR. JAMES J. GILMORE: I'll try to speak to both. I'm not helping you Pat here. I'll pass, because I'm not going to be able to do this. My microphone doesn't work either.

CHAIRMAN TRAIN: I have Ritchie White and then Doug.

MR. G. RITCHIE WHITE: I seconded this motion for two reasons; one is I think the five years is reasonable, and speaking to David's concerns. If this doesn't happen as Adam said, we're going to have to take another action. At least this puts something in place that pushes us ahead on electronic reporting number one. Number two; it gives the state of Maine time to address this financially. They have plenty of time to talk to the Legislature, explain to them the importance of this that the data that we're desperately going to need that now is not coming in.

I think that clearly has shown the need for additional information; with the questions that are being raised about the fishery moving offshore into federal and deeper waters, and the issues with recruitment. Maine is clearly going to need more information to understand what's happening with this resource. I think five years is fine. We can always take action in the future if we have to adjust that; and I support the motion.

CHAIRMAN TRAIN: Doug Grout.

MR. GROUT: I would support this amendment; because it does get at one of my major concerns. One thing that I am a little bit

concerned about is that as brought up by David Borden. He suggested maybe we should get the Lobster Technical Committee and the ACCSP Commercial Technical Committee together to try and figure out what the appropriate timeframe would be.

To try and avoid us having to go through an entire addendum again if this passes, I might offer up some modified language to this that would allow the Board to adjust the timeframe by a Board vote instead of having to go through another addendum to adjust that timeframe. If the maker and the second.

I can either make a motion to amend the motion, which may be the amendment, which may be kind of cumbersome. I might offer up a suggestion to the maker and seconder if they would be willing to accept it that the timeframe may be changed or modified by Board vote.

CHAIRMAN TRAIN: Modified would allow it to go either way.

MR. GROUT: Yes.

CHAIRMAN TRAIN: Would the maker of the motion be satisfied with that?

MR. NOWALSKY: I appreciate the intent here; but I'm not going to view it as friendly for two reasons. The first reason is I specifically chose the use of the word within for the purpose of if we get input that we can achieve this in three years, we should do it. The second reason is that five years, you know one of the concerns I'm hearing is the time to develop this electronically.

Five years in the world of software is an eternity. I would sincerely hope that we would be able to have the resources to move this forward within that timeline, and I can't see going beyond that. I think that gets away from anything in this document. Nothing in this document contemplated a timeline beyond that. I appreciate the intent; but I wouldn't support it as a friendly amendment.

CHAIRMAN TRAIN: Doug, you're left with either making it an amendment to the amendment or letting it go.

MR. GROUT: You know I'm going to withdraw this concept at this point. I'll just leave it at that. I think Adam made some good points.

MS. WARE: I just wanted to clarify one thing to make sure everyone is on the same page. When I read this motion, I just want to make sure that everyone knows that this doesn't say Maine anywhere in it, so the 100 percent reporting through electronic reporting to me is applying to every state in this motion. I just want to make sure every state is comfortable with that; unless I'm reading this wrong. Within five years every state has to be doing 100 percent electronic reporting. If you are uncomfortable with this, now would be the time to speak up.

MR. McKIERNAN: Yes obviously if we want to accommodate some percentage of harvesters who prefer paper, I think we should have that opportunity to do that. I think the motion is flawed.

CHAIRMAN TRAIN: Anybody else? Dave.

MR. BORDEN: This is one of those moments, Mr. Chairman where I think we need a little bit of time to work on the language here; rather than try to forge our way through this. I'm going to make a motion to table this. The intent is to deal with some of these other issues, and then we'll come back to it after a break. I would hope that some of the suggestions around the table have been written down, so that we can revise this at that time**. I'm going to make a motion to table.**

CHAIRMAN TRAIN: Go ahead, Bob.

EXECUTIVE DIRECTOR BEAL: Mr. Borden, are you just tabling the motion to amend or are you trying to sort of set both of these motions aside for a while and to a time specific within this meeting?

MR. BORDEN: My intent is to set them aside for a while and allow us to deal with some of the other issues; and hopefully recraft this rather than try to do it the way we're doing it right now. That would take place at this meeting in other words, before we break to reconsider.

CHAIRMAN TRAIN: It's clearly a motion to table. We'll pick it back up later at the same meeting. Is there a second? Yes, Senator **Langley, okay we have a motion on the floor to table this until later in the meeting. Is there any opposition to that? All right, we'll move on to our next item.**

MS. WARE: There are still two more issues in the document regarding the data elements; and then the spatial resolution of the data.

CHAIRMAN TRAIN: Doug Grout.

MR. GROUT: Yes, I would move under Issue 2, Harvest Reporting Data Components that we select Option C, expanded data elements regarding gear configuration (number of traps per trawl, number of buoy lines).

CHAIRMAN TRAIN: Do we have a second; David Borden, discussion Pat Keliher?

MR. KELIHER: This is a question for NOAA, Mr. Chairman. Is it likely that Protected Resources is going to require an annual recall survey of gear? Do you know if that's in the cards? Is that going forward, or is that outside of your purview?

CHAIRMAN TRAIN: Peter.

MR. BURNS: Thanks for the question, Pat. I think I am probably speaking out of school a little bit. I think that the intent of the agency is to improve its reporting with respect to getting better information to help the situation with the large whales and things like that. I don't know specifically if there is a movement underway to do that.

But I think some of that might be contingent upon what happens here today and what happens with this Addendum. If we can get that kind of information through an expanded reporting requirement this way; then that might alleviate some of the burden on the government to try to get that information some other way.

I think what you're hinting at is this going to be redundant information? I think if there is something that comes from this Board today that requires expanded reporting, we could work internally to try to make sure that fishermen are trying to provide that information in as efficient way as possible.

CHAIRMAN TRAIN: Are there any other questions about the motion, comments? Okay. We don't need a roll call until the final, right? Peter.

MR. BURNS: I'm sorry to stop the progress here; but I just wanted to clarify that this pertains to the states as well right. It's not state and federal reporting.

MS. WARE: We always include in the addendums that the recommendation for federal waters to enact regulations that are complementary or mirror the regulations in state waters. I assume that is how we would deal with these two data elements for federal waters.

CHAIRMAN TRAIN: Dan McKiernan.

MR. McKIERNAN: But to Peter's question. You wouldn't want a redundant report; and so if the states are collecting that information, which we do now and an annual recall, there wouldn't be

requirement for the fishermen to fill out a complementary federal report.

MS. WARE: Correct. I think the question was towards the VTR. If that needs to be added to the VTR; not necessarily an annual recall, but maybe Peter can clarify that.

CHAIRMAN TRAINS: Go ahead, Peter Burns.

MR. BURNS: That sort of did get to my question; because I think that we can do some expanded data elements as we move forward with electronic reporting. But to try to fold those now into something in our existing paper forms, as I mentioned earlier, we've got to go through a whole process to change these forms and to get that all squared away. Any kind of expansion in the data elements likely would come through an expanded electronic reporting requirement moving forward.

CHAIRMAN TRAIN: Before I ask any more questions. We're on a second item in this topic and we keep running into a similar situation; where we don't have the ability to collect what we need to report, yet we're trying to drive this car down the road. It seems like we've missed something here, in my opinion.

I don't know whether it's we haven't got the horse in front of the cart yet or not. Am I missing the point here that everything we've tried to do, we're missing the fact that we can't collect the data or we can't report the data, or we're not ready to assimilate the data? Have we gotten out ahead of ourselves; anybody? Doug.

MR. GROUT: You know with this particular motion, I don't think it's really getting out ahead. Many of the states already collect this information. We were able to add this into the ACCSP database. I mean we had no problem doing that. I don't see that this should be a major lift for anybody on this. I mean we did it very simply.

CHAIRMAN TRAIN: **Okay then, any other discussion on this motion? Seeing none, we don't need a roll call; can I do this by consensus? Is there any opposition to the motion? No opposition; the motion is approved. David Borden.**

MR. BORDEN: On Issue 3, I'll make a motion to approve Option D; 10 minute squares, plus LCMA.

CHAIRMAN TRAIN: Is there a second? Doug Grout. Discussion, David would you like to explain your motion?

MR. BORDEN: Yes, and I'll make this quick. I go back to the point that Dan and others around the table had made. We've gone through a whole series of issue here. The Coral Amendment particularly as it pertained to the areas off of Maine, wind towers where we needed better spatial and temporal resolution of the data.

We've looked at the guy on my immediate right and I have agonized over the issue of the Monument impacts with others. We need better resolution; in terms of the data that we're collecting. I know that there has been some resistance from some parties on this; but we need the data in order to defend the lobster industry from some of these types of activities. I think 10 minute squares is reasonable. The Council looked at this. I don't know whether Terry wants to comment on it; but 10 minute squares are a reasonable type of intensity so that we can draw valid conclusions from it. I think that is probably kind of as good as we can get it.

CHAIRMAN TRAIN: Doug, you seconded it. Would you like to speak?

MR. GROUT: Nothing more than what Dave had indicated.

CHAIRMAN TRAIN: Terry Stockwell.

MR. STOCKWELL: Yes to follow up on Dave and Doug. The Council did support Option D as the most comprehensive way to gather the information possible; that we need to better manage all the issues on our plate in front of us.

CHAIRMAN TRAIN: Mark Alexander.

MR. ALEXANDER: I just want to make two points. The first is that I think 10 minute squares would dramatically help the collection of data in the offshore fishery. I'm not sure, especially in the case of Long Island Sound that 10 minute squares would be particularly informative. If you look at the map in Appendix 4, it just doesn't gain you much beyond the statistical subareas that we presently use.

I don't know how other states feel about states waters or nearshore waters, whether the 10 minute squares are helpful or appropriate. I wouldn't mind hearing from other people if they think otherwise. But that is where I'm thinking. The second is a point was raised at our public hearings that fishermen wouldn't mind reporting by 10 minute squares; as long as they don't have to fill out a separate report for each 10 minute square.

I think one of them even suggested he envisioned, you know if you're using electronic reporting in a mobile application that you just be able to highlight the particular 10 minute squares that you're fishing in on that trip, on a map on the screen instead of having to enter a square number or anything like that. I think that's a good idea.

That might cause a little bit of complication to the person reporting more than one 10 minute square; but it certainly a lot finer resolution than broad statistical areas. I would like that to at least be taken into consideration; especially if we're going to convene the TC and the Commercial Technical Committee together to talk about this. I would like that to be an option on the table.

CHAIRMAN TRAIN: Emerson.

MR. EMERSON C. HASBROUCK: I'm wondering currently, the eTrips App. Does that allow for 10 minute square reporting? Can that accommodate that? That is part one of the question. The other part is whether or not it can or cannot accommodate 10 minute square reporting, the fishermen indicates lat/long down to at least minutes, if not minutes and seconds for lat/long. Can the program just interpolate that and put it in a 10 minute square?

CHAIRMAN TRAIN: I don't know if Geoff can answer that or not, but I'm assuming within the timeline we're setting up it could be accommodated, if that first issue comes back around. Maybe he can answer now; 10 minute squares?

MR. G. WHITE: There is technology. Part of the application already works; where you can look at a grid and actually put your finger on it on the tablet, which grabs a lat/long. That can fit in with the 10 minute grid squares or the distance from shore issues. The 10 minute grid squares, as long as the codes are developed, it's actually not that difficult to get the program to make it work.

CHAIRMAN TRAIN: Dan McKiernan.

MR. McKIERNAN: I would like to follow up on a point that Mark Alexander made; that within the states fisheries some of us have statistical reporting areas that are already smaller than 10 minute squares. I would like to be able to retain those for historical purposes; even though they don't line up exactly with 10 minutes, but they are clearly more refined. I don't know if I need an amendment or just on the record that states with their own statistical reporting areas within their state can retain those.

CHAIRMAN TRAIN: Pat, do you have an answer to that or another question?

MR. KELIHER: I've got an answer for everything, Mr. Chairman. No actually I agree with Dan. I think in that case you're just being more conservative; and I think the states need to be able to retain that type of reporting for their own uses and needs. It may be a very good question to roll in with any development. If we're going to have a subcommittee looking at electronic reporting that question should just be rolled into it. I personally don't see a need to be made part of the motion.

CHAIRMAN TRAIN: My only question for both of you; before we kind of move past that is do these subareas sometimes overlay two squares?

MR. KELIHER: Not in the state of Maine's case. I mean we're reporting 0 to 3, 3 to 12, and then 12 and beyond. But if it does, thinking out loud. If there is the tablet approach that Geoff just spoke of, and you're just tapping on that line and the lat/long pops up. Then that may actually get it to what Dan is talking about through the development of the electronic application.

CHAIRMAN TRAIN: Geoff White, you've got your hand up.

MR. G. WHITE: I just wanted to clarify. The ACCSP standard has three levels of area codes. There is the grand statistical area. Below that is the subarea which the 10 minute grid cells can be mapped to. Then below that there is a local area. The local areas have been used currently for shellfish areas.

But those local areas would be where the areas smaller than a 10 minute grid cell could be defined by the state and therefore entered by the fishermen. The fields exist. The codes might need some development or completion; so they're consistent up and down the coast. But the capability is already there.

CHAIRMAN TRAIN: David, you made the motion. I have a question. Would you consider the subgroups that are smaller than the 10 minutes squares, but may overlap one in a violation of the rule we are putting in place in this motion, or is it small enough and good?

MR. BORDEN: No, I think it is actually consistent. The lobster plan has a provision that allows states to be more restrictive. I think this is consistent with it. I would say it is consistent with my intent; if Doug agrees with that.

MR. GROUT: Thank you I do. I totally agree with that. In fact I can see several instances where a fisherman may be fishing in multiple 10 minutes squares in a single day; and so they would be filling out multiple squares. They would also be filling out the local state codes in the same manner.

CHAIRMAN TRAIN: Yes, Mark.

MR. ALEXANDER: Yes in the case of Long Island Sound, the subareas that Geoff referred to do not align with 10 minute squares. The lines are, I would say as a rule, are not drawn exactly horizontal or vertical. They are at the orientation of Long Island Sound. They help define the boundary line between Connecticut and New York state waters.

Unfortunately we don't have a graph of sufficient resolution to actually see where those 10 minute squares lie in relation to the subareas. But my guess is that each subarea probably contains more than one 10 minute squares, and each 10 minute square may contain more than one subarea.

CHAIRMAN TRAIN: Are there any other questions? Before I actually ask for a vote on this, I am very uncomfortable with part of this; because we are basically saying we know we said 10 minute squares, but we don't care if you're in more than one, as long as it's a subgroup.

I don't know if having that in the minutes is satisfactory to not have a fisherman who has to fill out a logbook be in violation; because he didn't write three of the 10 minute squares down. Do we need to amend this; or is having this in the minutes enough that the intent of the motion is that the subgroup satisfies the intent? Dan, go ahead.

MR. McKIERNAN: I think it's probably better to create an exemption for states within their state waters to maintain their existing statistical reporting areas. That would make sense to me just for clarity.

CHAIRMAN TRAIN: David, would you be willing to amend your motion; correct whatever you need to do to that motion to make that work, so we don't have to wonder?

MR. BORDEN: That is acceptable to me if it's acceptable to Doug.

CHAIRMAN TRAIN: Dan, do you have language for them that they could use to amend their own motion or correct their own motion?

MR. McKIERNAN: I make a motion to amend to allow states to retain their within-state statistical reporting areas.

CHAIRMAN TRAIN: That was deemed a friendly by both the maker and the seconder; so it is automatically added as I understand, is that correct? Okay, is there any other discussion?

MS. WARE: Dan, could we just maybe clarify that the state statistical reporting areas are finer scale than what's required in the plan?

MR. McKIERNAN: Actually, I have one statistical reporting area that is bigger than a 10 minute square in southeastern Cape Cod Bay. I can't say with any integrity that all of our statistical reporting areas are smaller than a 10 minute square; but they are all within state waters and they're historic, and we've worked out a long term historical record with all of our gear types. I don't think the Technical Committee when they were trying to wrestle with data, really had any issue with what was going on within the state waters. The biggest gap is in the federal zone.

CHAIRMAN TRAIN: Pat Keliher.

MR. KELIHER: Just a quick question for Dan. Dan, are your statistical areas, are they similar to what we would refer to as our zones within the state? I mean you're just using them for management areas?

MR. McKIERNAN: No Pat. Our statistical areas go back about 50 years, and many of them do line up with the federal statistical areas. But historically we've always had statistical reporting areas for the federal zone. In other words, we have one area that is 521 or 537.

But within Massachusetts we have like Buzzards Bay as its own statistical reporting area. You know Vineyard Sound is another, Nantucket Sound is a third. It really like similar to what Mark was describing, in a lot of cases these used points of land and just historical fishing behaviors to capture these areas.

CHAIRMAN TRAIN: Adam Nowalsky.

MR. NOWALSKY: Just as a matter of clarification. The motion as it's up there on the board continues to call this Issue 3, Option D. I don't think this is Option D anymore. Option D specified 10 minute squares and the ability to provide more fine scale data. Where we're at now is we have 10 minute squares, LCMAs, which were actually part of Option B, and the ability to maintain state statistical reporting, which we've now heard on the record may not be more fine scale. I don't know what the best way to handle that is; but it's a hybrid of a number of things, but I'm not sure it's Option D anymore.

CHAIRMAN TRAIN: Adam, if I can try to answer this, because I understand it when we go out to

public hearing, when we come back we can actually cherry pick anything within the range of anything we went out to public hearing on. You are probably right that it's not Option D. But everything up there has gone out to public hearing individually. If we remove Option D and left the rest, or used the text from Option D, everything up there is still in the range of what went out to public hearing.

MR. NOWALSKY: I'm not objecting to any of the elements that we've put in here; in fact I was reinforcing that fact. I'm just saying I don't think we're voting on Option D anymore, and it would probably be good to remove that from this motion specifically.

CHAIRMAN TRAIN: Let me ask staff. If we remove Option D and just leave what is up there, is it too vague or does it give us the same thing?

EXECUTIVE DIRECTOR BEAL: I think it is fine; since it spells out 10 minute squares, LCMAs and allow, I think that all the elements are in there. Just taking out the Option D and the two commas around it; you're all set.

CHAIRMAN TRAIN: Of course that does change the motion; Ritchie.

MR. R. WHITE: You could just add as modified, Issue 3, Option D as modified.

CHAIRMAN TRAIN: Dave Borden.

MR. BORDEN: This is why you never want to watch government in action. Let me just make the point that Adam's point is correct. I would have no objections to taking out the word Option D; because I think the rest is consistent with the intent. I would also make the point that we're getting into some of the fine details here. I think where we're going to end up at the end of this meeting is we're going to have an approved addendum.

But some of the details are going to have to be worked out between the Technical Committee and the ACCSP staff. I think we're going to benefit from that type of dialogue going forward. We may have to consider some minute changes at some point, I hear at the spring meeting. On the suggestion, if it's all right with Doug Grout, I would say remove Option D and then maybe we can move on with a vote.

CHAIRMAN TRAIN: Doug; we have an okay from Doug. Peter Burns.

MR. BURNS: At the risk of hopefully not going further into the weeds, I just had a question for David Borden; as sort of our in-house expert on the offshore fishery. I know you've recommended this David, the 10 minutes squares. I just wanted to get an idea; just so that I can get a better understanding of how the burden on us on the federal side of getting more vessel trip reports potentially, and what the burden on the industry would be if somebody in the offshore fishery had to fill out a vessel trip report that had this information in it. Can you give us just a general idea of what the change would be?

MR. BORDEN: The change, at least my view of this is what we have to do is we have to move in the direction that Pat Keliher is trying to push this, which is electronic reporting. If we do that then reporting in multiple 10 minute squares will be easier; because you will be able to do that with simply the way it has been characterized here, just touching a box.

The offshore boats, just so everyone is clear. The offshore boat will fish in multiple 10 minute squares on every trip. It is that issue and how you solve that short of having them fill out a separate page of a VTR; which no one does. I would point out that there are trawlers during the whole coral discussion that would move 150 miles on a trip, fishing in different areas. They are not complying with the requirement to fill out a different page of a VTR. We need to solve

that problem; and the way to solve the problem is to do electronic reporting, and make it easy.

CHAIRMAN TRAIN: Are you satisfied, Peter? Okay any other questions, or shall we call this vote? No other questions, is there anybody opposed to the motion on the table**? Do you need time to caucus or anything? I see no opposition; the motion passes by consensus.** We're back to Issue 1. David Borden.

MR. BORDEN: I would like to first deal with the Pilot Program. I kept that out of the motion intentionally**. I would like to make a motion for the Commission to move forward with the development of a pilot electronic tracking program to be implemented in the next year.**

CHAIRMAN TRAIN: Is there a second for that? Pat Keliher. David.

MR. BORDEN: I mean the logic for doing this. I don't think we're ready to require electronic reporting at this stage. But I think given the experience of the Law Enforcement Committee, and Pat and I have gone before the Law Enforcement Committee on a number of occasions and talked about the need for better federal enforcement.

That whole dialogue has come up in about four different venues here recently; as recently as a whale meeting that a number of us attended. We need finer scale information. We need to know where some of these boats are fishing. One of the options do that with the electronic system that the Enforcement Committee has been doing some tests of.

That system is very similar to the urchin system that the state of Maine has been utilizing; and it's also very similar to the system that's been deployed on the enforcement boats in the state of Maine. I think what we need is a committee to look at this issue, look at the utility of it, deploy some of the units on more of a coastwide basis.

Then once we get all of that then we can have a policy decision about the pros and cons that are associated with it; but we'll have a much broader scale program to look at the results. Then we can make a determination whether or not we want to deploy it; whether or not we want to deploy it on a certain segment of the fleet, or in certain areas. This I think is really an informational gathering activity.

CHAIRMAN TRAIN: Pat.

MR. KELIHER: I agree with everything David just spoke of. With the experience that we've gained within the state of Maine regarding our urchin program, the utilization of these tracking programs, the experience we have with covert trackers, obviously much different than here.

But it directly links to the ability to enforce our laws in both state and federal waters. I think we need to go down this information finding road. I think, and this came up in the subcommittee that was established that looked into electronic reporting. The issue of tracking came up; and the ability to link both of those together needs to be part of this conversation as we move forward, because it can be potentially one tool. I think while Maine fishermen spoke out against the concept of tracking, other Maine fishermen who are very interested in establishing an offshore zone within Area 1, know that in order to be able to even think about implementing something like that trackers would have to be a part of that conversation. I think doing that here through this process is warranted.

CHAIRMAN TRAIN: Is there any other? Yes, David.

MR. BORDEN: I just want to quickly add to what Pat just said that the implications of this pilot will go far beyond lobster management. In other words, the Commission is, if you look at the rest of the agenda we're going to deal with here. They are going to be talking about climate change initiatives, how we make the

fleet more cost effective, how we reduce carbon impacts on the environment, and those types of things.

One of the options that are listed in one of the documents that we're going to consider over the next couple of days is talking about aggregate limits. One of the biggest problems with aggregate limits is how do you enforce them? Well this is a technology that we can bring to bear on those types of issues. We need more information and this is the way to get it.

CHAIRMAN TRAIN: **Anybody else? Does anybody oppose this motion? Does anyone need to caucus? No opposition; it passes by consensus.** We're back to Issue Number 1. Dennis Abbott, thank you.

MR. ABBOTT: I just make a move to remove the issues from the table.

CHAIRMAN TRAIN: Who seconded, Senator Langley? We've got a motion on the table to remove the tabled issues and bring them back to discussion. Do we need to vote on that? Is there any opposition to doing that? I bet there is, they're just not going to say it. **No opposition, all right we're back to Issue Number 1.** Adam Nowalsky.

MR. NOWALSKY: Just to take a moment to respond to a couple of the concerns I heard that resulted in this being tabled. First off let me offer that I believe that the combination of the amendment and the original motion would still include the distribution of reporting in an optimal manner as described under Option B in the document.

Nothing with that amendment in my opinion would change that. Secondly, with regards to the requirement of electronic reporting and accommodating those with paper reporting. In the Mid-Atlantic the for-hire sector effective next month recreationally, will no longer be able to report via paper. You will be required to effectively, March 12, report electronically, and electronically only.

It's clearly a direction we're moving towards. There are a number of accommodations that have been made, training, electronic devices being given out in some cases; to go ahead and accommodate that. I think that's a direction we're moving towards, and in another five years I think the concept of paper in any reporting will be nearing an archaic level.

Finally, with regards to concerns about states having to have to implement something electronic themselves, it's my belief, and our representatives from ACCSP can certainly provide input that eTrips or SAFIS could be the collection point for this electronic information. If the state needs that data, work would be done over the course of the next five years to build interfaces to get that data to the states. That would be the mechanism, I believe some of that data is already with VTR data is going back to the Service already directly. I would be confident that if we knew ahead of time this is a Spec for the electronic reporting project that that could be accommodated through technology.

CHAIRMAN TRAIN: Mike Cahall.

MR. MIKE CAHALL: Good morning. I could certainly comment to that point. The SAFIS eTrips/Mobile tool is indeed going to be deployed on March 12, to do the reporting requirements. We are already feeding data directly to the servers at GARFO, along with the SAFIS system; and those data are made immediately available to the state agencies that need it.

We're also working now with a couple of other third-party vendors to have their systems feed. There is no reason at all that the SAFIS eTrips tool could not be modified to transmit the data to whichever, many more than one server if needed. It could potentially go directly to SAFIS and potentially go directly to some state

system; if that is a requirement for any individual state.

CHAIRMAN TRAIN: Anybody else? Dan McKiernan.

MR. McKIERNAN: Just to answer a question we asked about 15 minutes ago. Is this suggesting that states won't allow fishermen to report on paper in five years?

MS. WARE: I think it needs to be clarified by the Board. I would say that this motion is unclear as to what this is saying. Just reading it I'm seeing electronic reporting; but I'm not seeing the word paper anywhere in there. If you want to add it, it might be a good idea.

CHAIRMAN TRAIN: Dan, do you want to add it?

MR. McKIERNAN**: Yes, motion to amend to allow a paper reporting option for participating states and NMFS; because the VTR currently is paper.** If we're still allowing paper for some subset of the fleet, so be it.

CHAIRMAN TRAIN: Is there a second? Pat Keliher. Do you feel you need to explain that more, Dan? Pat, do you have anything to say to that one?

MR. KELIHER: Yes. At dinner last night our waiter didn't know where the state of Maine was, and I think he thought we were part of Canada; and others at the table don't know where we are either, I guess. My point is that I think we have some challenges with the 100 percent electronic reporting.

I have to support this; because we've got some individuals who from a connectivity standpoint would have difficulty. While the intent is to drive to 100 percent electronic reporting, there are going to be instances where that probably won't be possible. The Senator just made a really good point; by waiver.

To ensure that we don't have just a large group that will say, well I'm not going to do that electronically, but force them into potentially a waiver position. But I don't think that needs to be caught up in this motion.

CHAIRMAN TRAIN: Peter Burns, you had your hands up?

MR. BURNS: Just a question. All the other options for this issue specifically say trip level reporting and Option B doesn't. I'm just making sure that this is speaking directly to it is a requirement for trip level reporting. Is that correct?

MS. WARE: Yes it's correct.

CHAIRMAN TRAIN: Doug Grout.

MR. GROUT: A couple of things. One, I might offer a more simplistic way to say this, and that is to move 100 percent harvester reporting to be required through electronic or paper reporting within five years. It just might be simpler. The other thing I'll let you know is if we approve this amendment.

I would like to offer another amendment to bring up that option that if a vessel lands less than 100 pounds in the previous year they would be exempted and be required to do monthly reporting. I'll bring in that wording after we do this; because I don't want to get into an amendment of an amendment of an amendment.

CHAIRMAN TRAIN: I have a concern on your last statement that it doesn't follow the intent of the motion or the second that basically says this won't go forward until the electronic reporting is up to speed or acceptable to all sides. The way your statement there reads, in five years if we're not doing electronic we're going to probably have to do paper. Do I read that wrong?

MR. GROUT: The motion to amend says allow paper reporting option for participating states and NMFS. What I was just trying to get at with, we can leave it at that **but I was just offering to the maker of the motion and the seconder that a simpler way would be motion to amend that would say 100 percent harvester reporting be required through electronic or paper reporting.** It's just adding two words opposed to. I see at least the maker, Dan and Pat. We can leave it the other way, but it just seemed like it was simpler just to say and paper in the original. No?

CHAIRMAN TRAIN: I have Sarah Peake, I had Adam's hand up and then I had Mark again.

REPRESENTATIVE SARAH PEAKE: Mine is a quick question on the last line there; the way I read it 100 percent harvester reporting to be required through electronic and paper reporting. That says to me you have to submit it electronically and with paper. I don't think that is the intent of the maker of the motion.

CHAIRMAN TRAIN: Adam, I have you next. You're all set? Okay, Mark.

MR. ALEXANDER: I totally support this. No matter how much you try there is always going to be some people that will not be able to report electronically. I think once you establish electronic reporting it's in the interest of the state to fold in as many people as they possibly can. There is just a built-in incentive there. The second thing is I just want to clarify that all we're talking about here is commercial reporting, not recreational or personal use lobster activity, correct?

CHAIRMAN TRAIN: I believe currently this is for the commercial section of the plan. We do have reporting in the recreational sector some, and some not. It depends on where it's sent or who is collecting it. Pat Keliher.

MR. KELIHER: I can support Doug's language, as long as it's clear that the intent. As long as it's clear that the intent is to drive as many as possible to 100 percent reporting, and that there is an option available for people who don't have that ability; not to give them an option to say let's just keep status quo on the table.

CHAIRMAN TRAIN: I'm sorry the discussion we were just having is the position that Doug brought forward should be considered a friendly amendment to Dan's amendment to clarify it that it allows a paper option, essentially. Is there a language that makes that clearer so we can vote?

MS. WARE: I think we're basically just adding the "or paper" into the amended motion. If everyone is okay with that we'll take it as a friendly, and then we can vote on the amended motion.

CHAIRMAN TRAIN: The maker and the seconder are happy with that as a friendly. Okay so that is in there. Are we ready to vote on the amendment? **I see no opposition to voting on the amendment. All those in favor, well I can do it by consensus. Is anyone opposed to the amendment? I see no hands up. Okay, so now the main motion as amended.** Let's get that up there. Dave, we know what it's going to say, do you have a comment?

MR. BORDEN: I'm going to make a suggestion, and the suggestion is we take a five minute break and try to rewrite this motion. All the elements are up there; we just need to rewrite the motion and not deal. I don't want to see the new Chair get off on the wrong foot of motion.

CHAIRMAN TRAIN: I'm with you. We'll take a five minute break and wait for this to get up there.

(Whereupon a recess occurred.)

CHAIRMAN TRAIN: If everybody is ready to start, we have the amended motion at the bottom of the screen. I don't want to rush anyone here, give everyone a chance to read it. Mark, go ahead.

MR. ALEXANDER: Just for clarification, Mr. Chair. This amended motion is going to be an amendment to the main motion or a replacement for it?

MS. WARE: We'll first vote on that bottom part, the amended motion. Then we'll put those two sections together in a single motion, and that will become the main motion.

MR. ALEXANDER: This is a motion to amend, not really an amended motion then, right?

CHAIRMAN TRAIN: You're right. Is there any opposition to the (to word it properly) motion to amend? Okay so that passes by consensus. Now to deal with the motion as amended, it now becomes the main motion. They're going to pull that up. Doug, what do you have?

MR. GROUT: I have another motion to amend, and they're putting it together but I will read it at this point. The motion to amend is if a commercial harvester landed less than 1,000 pounds of lobster and Jonah crabs in the previous year that individual can submit a monthly summary of landings data rather than then the trip level reports. If I get a second I'll speak to it.

CHAIRMAN TRAIN: Is there a second? Any second, Emerson.

MR. GROUT: This was a concept that was in Option C, Sub-option 2 in the amendment. The reason I put this in there is because it would help alleviate some of the reporting burden on a lot of very small harvesters; the state reporting burden. We have implemented this in our state for a number of years. These individuals that land less than 1,000 pounds per year amount to about 5 percent of our total harvest. The trip level guys are reporting on 95 percent of our harvest, yet these people make up more than 50 percent of our lobstermen in our state. What I think this could provide a state with a little bit more cost effective way of getting at the majority of the landings information that we use; and it would still provide a very high level trip level reporting for the full-time harvesters.

CHAIRMAN TRAIN: Emerson, do you have any comments as seconder?

MR. HASBROUCK: No, Mr. Chairman.

CHAIRMAN TRAIN: Adam Nowalsky.

MR. NOWALSKY: To clarify what the landings summary or summary of landings data would entail, we had made motions about expanded data elements earlier for trips per trawl and number of buoy lines. We also made a motion on spatial resolution. Would those elements be excluded from these monthly summaries of landings, or is the goal to somehow incorporate that enhanced collection of data in that monthly summary?

MR. GROUT: I would like to see if we could incorporate some of that information, but on a monthly summary level.

CHAIRMAN TRAIN: Are you satisfied that that is in there, Adam?

MR. NOWALSKY: I just think it's important to the record and for the fishermen that are going to be impacted by this, what the expectation is going to be that they will be reporting on, on a monthly basis.

CHAIRMAN TRAIN: Dan McKiernan.

MR. McKIERNAN: My question has to do with the federal aspect of this. I think the intent is among folks like Doug and others, who have

small scale fishermen nearshore who are not fishing in the EEZ, to be eligible for this lower level of reporting. But I wonder if we should make it specific to state waters. I don't know if this would undermine any federal reporting standards.

MR. GROUT: I would have no problem with doing that. I'll have to admit I would assume that there would be very few, if any that with the federal permits that are using traps out in federal waters that would be landing less than 1,000 pounds. That would not be a very economically viable business out in federal waters.

CHAIRMAN TRAIN: Eric Reid.

MR. ERIC REID: My question is, is it 1,000 pounds of lobsters and 1,000 pounds of Jonah crabs or is it combined weight?

MR. GROUT: I would say either or. What I had in here, I pulled this out of the Addendum, and the way I took it was 1,000 pounds of lobsters and 1,000 pounds of Jonah, or but it says and Jonah crab. I guess the way it is written it's a combination. Correct?

MS. WARE: That's my interpretation, but I took those from the New Hampshire regulations, so that's what it says in there.

MR. GROUT: In our case that's lobster, at least within state waters. Let's leave it as is, 1,000 pounds of combination, just to make it simple.

CHAIRMAN TRAIN: Peter Burns.

MR. BURNS: I think Dan's comment was a good one. I think that if this pertains to state waters, I think it makes it a lot cleaner to be able to move forward with something like this. But if this starts to spread out into federal waters for a federal permit holder who fell under these criteria, I'm not sure we could support that on the federal side, with respect to how we require reporting with a vessel trip report.

CHAIRMAN TRAIN: Doug, would you like to specify that to state waters or not?

MR. GROUT: Sure, if the Chair would allow me I would just say if a state waters commercial harvester.

CHAIRMAN TRAIN: Is the seconder okay with the change?

MR. HASBROUCK: Yes, Mr. Chairman.

CHAIRMAN TRAIN: Okay the maker and seconder have amended their own amendment; anybody else? Okay, is there anybody opposed to Mr. Grout's amendment? Do you see anybody? **Okay we'll call that passed with consensus; now the main motion as amended, discussion.** David Borden.

MR. BORDEN: Not a motion to amend. I just want to make sure that the intent here is to allow, as I think Mark Alexander recommended some time ago, for the ACCSP staff to meet with the Technical staff and work through the Maine concerns, and then come back to us with a report on this. This is all subject to that type of qualifier. Is that correct? That is what the intent is.

CHAIRMAN TRAIN: Does everybody understand that to be the intent? Is there anyone that felt it wasn't? Speak now. Okay that is clear and on the record.

MR. BORDEN: Can I request that that report be submitted by the spring meeting then? Thank you.

CHAIRMAN TRAIN: It's been requested.

EXECUTIVE DIRECTOR BEAL: We'll work towards that I guess is the best answer, David. If it turns into something more cumbersome, and some of the elements of the electronic reporting, you know timeline, take more time than anticipated, we'll give you an update at a

minimum at the May meeting and see if we can bring the whole report to you.

CHAIRMAN TRAIN: If there are no other questions, we have to vote on the main motion; and I understand that needs to be read. I have to turn around to read it. **Move to approve Issue 1, Option B, maintain current harvester reporting effort and allocate reporting through an optimal approach; 100 percent harvester reporting to be required through electronic or paper reporting within five years.**

If a state waters commercial harvester landed less than 1,000 pounds of lobster and Jonah crab in the previous year, that individual can submit a monthly summary of landings rather than trip level reports. Adam Nowalsky, you have a question.

MR. NOWALSKY: I just had a minor grammatical correction. The 100 percent harvester reporting to be required either should become will be required or the period prior to 100 percent should become a comma and insert the word with; but right now as that stands, that second item isn't a sentence, I don't believe.

CHAIRMAN TRAIN: Is everyone satisfied that that was a grammatical correction and not substantive to the motion.

MR. NOWALSKY: The intent of the original motion was for that to be added with a comma with, but as it was put together I think will makes it work here; and I'll defer to the Chair for how to address it.

CHAIRMAN TRAIN: My take would be it's a grammatical correction to the wording that was posted and needed to be done. You think it's good the way it is?

MR. ABBOTT: My only question was who made this motion and who seconded it?

MS. WARE: The very first motion was made by Pat Keliher, seconded by Jim Gilmore.

CHAIRMAN TRAIN: I've been doing this by consensus, but this has been the one that has taken the most time, so I think we're going to have a vote on this one. I'll let everyone caucus and then we're going to vote**. All in favor of the motion behind me please raise your right hand; all opposed, I could have stuck with a consensus, abstentions, null votes. Thank you very much, the motion passes.** Dan, go ahead.

MR. McKIERNAN: I wanted that to pass so I didn't want to raise any issues to postpone that. However, I just want to point out that in NMFS letter to the Board, they have 50 percent reporting now; but I don't believe that that 50 percent is through an optimal approach. In fact I don't think there is any statistical design to that 50; it just happens to be that because of the requirements of other management plans, namely ground fish, scup, et cetera.

Any of those permit holders has to report on VTRs. But I still believe that there is a bias about the representation within the population of VTR reporters to the south, or to those harvesters who have that permit type. I don't know what recommendation we're going to make to NMFS, but I don't think they're going to do anything, in terms of an optimal approach.

I would urge NMFS to go to 100 percent reporting as soon as practical; because of all the other pressures that the Board and the industry is under, and 100 percent reporting by NMFS as soon as possible will solve, I think a lot of problems, in terms of the management challenges we're going to have.

CHAIRMAN TRAIN: I think you wanted that more on the record than actually a statement for me. Okay thank you. Now we have, I believe a roll call vote for this Amendment and Addendum on all of these assimilated. Well I have somebody's hand up, David Borden.

MR. BORDEN: Mr. Chairman, do we still have to do Section 5 recommendations for federal waters? If we do, I would be happy to make a motion.

MS. WARE: Yes, if there are any changes that people want to those recommendations, now would be the time to bring those up.

CHAIRMAN TRAIN: I have Adam Nowalsky and then Peter Burns. I don't have Adam, he already spoke. Peter.

MR. BURNS: I think my question has already been answered. I thought we were going to go through Section 5 as well, so I think I'm good right now, thank you.

CHAIRMAN TRAIN: Emerson, go ahead.

MR. HASBROUCK: Do we need to do anything about sampling, Section 3?

MS. WARE: Again, if the Board wants to make changes to those sections based on the public comment, you're welcome to. Now would be the time to do so. I think is kind of an opportunity to make additional changes to the addendum as it currently reads. I'll just remind everyone of the three federal recommendations.

They are for the creation of a fixed-gear VTR form, for the establishment of a harvester reporting requirement for the federal lobster permit holders, and for implementation of a targeted lobster sampling program in federal waters. Dan just mentioned the recommendation for 100 percent reporting as soon as practical; so if that is the statement that the Board wants to make, it seems like that is on the record. But maybe we can just get a nod that that is what everyone is in agreement about.

CHAIRMAN TRAIN: Peter Burns.

MR. BURNS: These are some very ambitious and expensive recommendations in Section 5. The National Marine Fisheries Service understands the need for the data and the need to make the required adjustments to the way we sample and require reporting. I'll probably abstain on this part of it, just because of the nature of the recommendations.

We had a very fruitful discussion about how to go about reporting; with that motion that's on the table that we just approved that pertains to the states. Dan made the point that we should implement 100 percent harvester reporting for the Feds as soon as possible, or as soon as practicable.

I think that since we're really in lockstep with the states through the ACCSP, with our own data programs here at NOAA Fisheries, that it makes sense to really move forward with this hand in hand. I think we could live with a similar approach that has been approved by the Board for the states on the federal side.

Then we can work together to develop the systems we need to do, and also have the option for some kind of an optimal program, if in the interim that makes sense. I don't know if it does; but that is something that we can look into, and a lot of these things we'll need to look into. The sampling that is a big jump from what we've got.

We don't have any additional funding to cover extended observer programs and things like that. If the Board does move forward with those recommendations, I hope that we can work with the states and with the industry to try to plug the gaps as needed, given the financial constraints on expanding an observer program. Thank you.

CHAIRMAN TRAIN: Pat Keliher.

MR. KELIHER: Has the Technical Committee looked at this issue as it pertains to statistical viability, I mean on the federal side on reporting? Are there any concerns that have

been raised on the Technical Committee side associated with the reporting?

MR. KIPP: Yes I don't believe that has been done. That can be done for the report that came to the Board in October. It was based on strictly looking at three samples per stat area quarter, year accommodations, so no. It has not been done.

CONSIDER FINAL APPROVAL OF ADDENDUMS XXVI/III

CHAIRMAN TRAIN: Once again, Section 3, Section 5, if we don't have any changes, recommended motions. Doug Grout.

MR. GROUT: I would like to make a motion to approve the Addendum as modified today.

CHAIRMAN TRAIN: Second by Dave Borden. Discussion, I think we've had plenty already. Okay this is a roll call vote. I'll give you three minutes, 30 seconds. Go ahead, Peter.

MR. BURNS: I guess getting back to my question. Maybe I lumped too many things into that last statement that I made. Right now it says in this Section 5 that NMFS will have to report at the level determined by the Commission. Since that previous motion that we just approved has to do with the states, is there something more explicit that the Board is going to say in this particular section to talk about the level of federal reporting? Is it something that we can do consistent with what has been approved for the states?

MS. WARE: My understanding, Peter is that right now the recommendation coming from the Board to GARFO is to implement 100 percent reporting, you know as soon as practicable for federal vessels, and that there is a clear indication that electronic reporting is where this fishery is moving.

CHAIRMAN TRAIN: Does that answer your question, Peter?

MR. BURNS: I don't think it's exactly clear in the document. I mean I understand it in concept, and those comments were made on the record. But Section 5 doesn't say that.

MS. WARE: Correct. Section 5 would have to be updated. Right now it says to the percentage approved by the Board or recommended by the Board; so I would fill that in as what the Board has said today, and then we'll send a letter to you guys with the specific statements.

CHAIRMAN TRAIN: Go ahead Peter, and then we've got a vote here.

MR. BURNS: It's been a long morning. I'm sorry, Mr. Chairman. I just have one more thing. I want to make sure we're all walking away with the same idea in mind. If NMFS moved forward in the manner that is consistent with what the states have been required to do now, in this last motion, is that amenable to the Board? Is that a reasonable approach, or am I missing something?

CHAIRMAN TRAIN: I will be corrected if I say this wrong. But I would think if you move forward in something that is under the guidelines we just set up; it would be acceptable to the Board. David Borden.

MR. BORDEN: In terms of the federal waters issue here. I think we've got to be clear and have this on the record. This is more and more becoming a federal waters fishery. All you have to do is look at the state of Maine, look at what is happening in southern New England and down in the Mid. The traditional inshore fisheries are evaporating.

The industry is moving offshore. I think there has to be a lot more focus on the part of the federal agencies and federal funding sources, to try to address this. I would urge them to go to 100 percent federal reporting as soon as possible. They certainly have the capabilities to

do that. I think we're talking about 1,000 boats that would potentially fall under that category.

As far as the data elements in this, in terms of the fishery dependent sampling and the port sampling and these types of activities. This information is critical from the assessment side of it. We need fiscal resources to be brought to bear on some of these problems. We're talking about a fishery that the dockside value is probably worth three-quarters of a billion dollars; and we have at least 10,000 boats licensed in the fishery.

It's the most valuable fishery on the coast; and yet we have, as our Technical Committee has pointed out. We have these huge data gaps in the stock assessment for federal waters. These have to be resolved. They can be resolved by our partners in the federal government doing the work. They can also be resolved by bringing some congressional funds into the mix; or having our federal partners fund activities similar to the foundation work, where the fishermen are collecting the information.

Delaying action on this is the wrong strategy; as far as I'm concerned. WE should accelerate implementation of this, if we can possibly do it. We need to fix these holes in the stock assessment; because the consequences are so great for the coastal communities. We have to get on with this.

CHAIRMAN TRAIN: Dan, and then we've got a vote on the table here, we were caucusing.

MR. McKIERNAN: I get that. Just briefly, my intent is not to have the states unload the burden of their federal reporting boats back to NMFS. I hope when NMFS assesses the cost of what it's going to take to comply with this, they don't think that that is the outcome. I think we can work cooperatively.

You know my state, Rhode Island, Connecticut, New Hampshire; we already have a mandatory trip level reporting for federal boats that don't fill out VTRs. I don't think any of us are looking to unload that burden in order to get 100 percent achieved. Maybe the states and NMFS can work cooperatively and they can cherry pick the missing boats; and then the cost would be far less.

MS. WARE: Not to delay this process further, but we need to choose an implementation date, so we've chosen the five-year timeline for the reporting percentage. But for the harvester reporting elements as well as the spatial resolution, it's the idea that that would also be with that five-year timeline or is it on a sooner timeline?

CHAIRMAN TRAIN: Is everyone ready to vote?

MS. WARE: I need an implementation deadline.

CHAIRMAN TRAIN: Oh, I'm sorry; I was caucusing while you were doing that. We do need an implementation deadline on the record for this vote. Adam's hand is up.

MR. NOWALSKY: An implementation deadline as I would expect it would work at this point; given we put a five-year backstop on the reporting, would mean that clock would begin, not today, but at whatever our implementation date is for this document, correct?

CHAIRMAN TRAIN: Yes. Doug Grout.

MR. GROUT: But the other concepts are the data elements; and also the optimization for states that have less than 100 percent, until such time as we get the electronic reporting 100 percent in place. **I'm going to throw commercial harvest out a date, and I'm more than willing to modify it; unless if the state of Maine feels this is too aggressive, or any other states. But I would say January 1, 2019.**

CHAIRMAN TRAIN: Okay so we have a date. Is there any opposition to the date? Good. Are we ready to vote, knowing the date? It looks

like it. We have consensus on the date, we'll consider that approved. On the roll call vote.

CHAIRMAN TRAIN: State of Maine.

MR. KELIHER: Yes.

CHAIRMAN TRAIN: New Hampshire.

MR. GROUT: Yes.

CHAIRMAN TRAIN: Massachusetts.

REPRESENTATIVE PEAKE: Yes.

CHAIRMAN TRAIN: Rhode Island.

MR. REID: Yes.

CHAIRMAN TRAIN: Connecticut.

MR. ALEXANDER: Yes.

CHAIRMAN TRAIN: New York.

MR. GILMORE: Yes.

CHAIRMAN TRAIN: New Jersey.

MR. CHRISTOPHER ZEMAN: Yes.

CHAIRMAN TRAIN: Delaware.

MR. JOHN CLARK: Yes.

CHAIRMAN TRAIN: Maryland.

MARYLAND: Yes.

CHAIRMAN TRAIN: Virginia.

MR. JOE CIMINO: Yes.

CHAIRMAN TRAIN: National Marine Fisheries Service.

MR. BURNS: Abstain.

CHAIRMAN TRAIN: The motion passes 10 in favor, 1 abstention.

MR. STOCKWELL: Eleven in favor.

SOUTHERN NEW ENGLAND WORKGROUP REPORT ON GOALS AND OBJECTIVES FOR SNE LOBSTER STOCK

CHAIRMAN TRAIN: Thank you Terry, we're back to Megan for Southern New England Workgroup.

MS. WARE: All right, so switching gears here to the Southern New England Workgroup. At Annual Meeting the Board tasked this workgroup with reviewing the goals and objectives by which the southern New England stock is managed. This was prompted by the Board's ongoing discussion regarding future management of the stock; and concerns that the southern New England stock may not be rebuilt to historic levels.

That workgroup met via conference call on January 22; to discuss the applicability of these current goals and objectives. Some of the questions that the group talked about are, are the current goals and objectives still applicable? Are there other or additional objectives that would be more applicable, and do we need separate objectives for the southern New England versus the Gulf of Maine/Georges Bank stocks?

In their review of the existing goals and objectives, the Workgroup found that some goals and objectives are still pertinent. As an example, one of the goals in the FMP is to ensure that changes in the geographic exploitation patterns do not undermine success of the management program. That is still a pertinent goal; but other objectives may no longer be germane, given the Board's concern over the ability to rebuild the southern New England stock, as an example the goal to minimize the risk of stock depletion and recruitment failure.

As a result the southern New England Workgroup concluded that the goals and objectives may need to be updated to address current issues in the fishery. In addition the Workgroup concluded that while it's valuable to have a set of overarching goals for the lobster fishery, it may also be appropriate to have further refined goals specific to the two biological stocks. I'm not going to read all of these objectives; given the time. But all of these objectives can be found in the memo from the southern New England Workgroup; and there are two sets of them.

There are ones that could be applicable to both stocks, and then there are ones that could be applicable just to the southern New England stock. Some of the themes here are looking at dynamics between the inshore/offshore stock, programs to reduce latent effort and manage active effort, promoting consistency of regulations and regulatory timelines, promoting sampling, investigating stock connectivity, and then switching to those that are more applicable to the southern New England stock. Given the apparent negative impacts of climate change enhancing the protection of spawning stock biomass for lobster, scaling the size of the southern New England fishery to the diminished size of the southern New England resource, managing the southern New England stock as a multi-species fishery, and evaluating the reference points for southern New England based on the current state of the environment.

Moving forward from this discussion, there are several things for the Board to consider. Changes to the goals and objectives in Amendment 3 will require an amendment. As a result, the Board needs to consider its desire to undertake such an action; keeping in mind that we do have an ongoing benchmark stock assessment. We have pending action on Draft Addendum XXVII, which is still being developed, as well as many discussions regarding protected resources. In addition, if the Board is considering changes to the goals and objectives in Amendment 3, it may be pertinent to include representatives from that Gulf of Maine/Georges Bank stock in future discussions.

CHAIRMAN TRAIN: Questions for Megan. Are we burnt out already? Do you see any hands? Does anybody have a motion based on what you just heard? We have no further tasking. On to Agenda Item 6, I'm sorry I did have a hand go up. David.

MR. BORDEN: Before we leave this item. I think that Committee has done its work on this. But I just remind everybody, as Megan just indicated. There are things that are ongoing that have a direct bearing on what we might ultimately include in an amendment. For instance, the last three lines on the board here, Addendum XXVII and the benchmark stock assessment.

When we get into the terms of reference for that stock assessment, it addresses some of the issues that have been raised by the Subcommittee. I think more importantly, we're going to have this whole discussion about resiliency on the Gulf of Maine and Georges Bank stock and how to beef up resilience there.

I think this is going to kind of unfold over like a period of a year, maybe. At that point we'll have I think some different suggestions for goals and objectives on the Gulf of Maine/Georges stock, which we could incorporate into this; and we'd also have more technical guidance as the benchmark stock assessment develops that we could fold into it.

Then at that point we decide to go forward with an addendum. My long term view is we have fundamental objectives that apply to all of the lobster stocks; and then kind of area specific objectives that can be tailor made to meet the requirements in the two areas.

CHAIRMAN TRAIN: Doug Grout.

MR. GROUT: With that being said, modification of the goals and objectives will require an amendment, but our Addendum XXVII to try and build resilience is an addendum. It sounded almost like you were describing that we should change the goals and objectives while we're doing Addendum XXVII. You're saying go through Addendum XXVII and then address changes to the goals and objective of the plan?

CHAIRMAN TRAIN: Go ahead, David.

MR. BORDEN: I think Addendum XXVII is going to shine some light on the issue of what we can do for resiliency; and that may have a direct bearing on what we would incorporate into an amendment. I'm thinking of this in sequence. I don't think we necessarily have the staff time and resources to go forward with another amendment at this point. It might be somewhat less than productive to do it now; as we need that input from these other discussions.

CHAIRMAN TRAIN: Joe Cimino.

MR. CIMINO: I agree with everything David just said. I was just wondering if the Working Group was kind of aware of that if they had any concerns that this might be on the other side of 2020 before we got to it.

MS. WARE: The Workgroup didn't specify a timeline for these future actions; so it's not something we necessarily discussed. But there is also no deadline that they suggested.

REVIEW AND CONSIDER APPROVAL OF 2020 AMERICAN LOBSTER STOCK ASSESSMENT

CHAIRMAN TRAIN: Here we go; Review and Consider Approval of 2020 American Lobster Stock assessment**.**

MR. KIPP: This is my first time addressing this Board. I'm Jeff Kipp; I'm the Commission's science staff that will be working on the upcoming lobster assessment, and so I'm here to present the TORs for that assessment for Board consideration and approval. I'll read through these rather quickly; they went out in meeting materials, so I'm in hopes that everyone has had a chance to look through these.

For the stock assessment, we have estimate catch and catch at length from all appropriate fishery dependent data sources, including commercial and potential discard data, provide descriptions of each data source, discuss data strengths and weaknesses and their potential effects on the assessment.

Justify inclusion or elimination of each data source. Explore improved methods for calculating catch-at-length matrix. Present the abundance data of being considered and/or used in the assessment; characterize uncertainty in these sources of data. Justify inclusion or elimination of each data source. Describe calculation or standardization of abundance indices.

Evaluate new information on life history; such as growth rates, size at maturation, natural mortality rate and migrations. Identify, describe and if possible quantify environmental climatic drivers. Use length-based models to estimate population parameters for each stock unit and analyze model performance.

Evaluate stability of model; perform and present model diagnostics. Perform sensitivity analyses to examine implications of important model assumptions; including but not limited to growth and natural mortality. Explain model strengths and limitations. Justify choices of CVs, effective sample sizes, or likelihood weighting schemes.

State assumptions made and explain the likely effects of assumption violations on synthesis of input data and model outputs. Conduct projections assuming uncertainty in current and future conditions for all stocks. Compare projections retrospectively with updated data. Update and develop simple empirical, indicator-

based trend analyses of reference abundance, effective exploitation, and develop environmental drivers for stock areas.

Update the current exploitation and abundance reference points. Explore and if possible develop alternative reference points and reference periods that may account for changing productivity regimes due to environmental effects. Characterize uncertainty of model estimates, reference points and stock status. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective patterns for uncertainty in population parameters and reference points. Report stock status as related to overfishing and depleted reference points; include simple description of the historical and current condition of the stock in laymen's terms. Address and incorporate to the extent possible recommendations from the 2015 benchmark peer review. Develop detailed short and long term prioritized lists of recommendations for future research, data collection and assessment methodology. Highlight improvements to be made by next benchmark review.

Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species. Now I'll move into the terms of reference for the Peer Review Panel. These are quite similar to what I just went through, but just for the Peer Review to evaluate the work done by the Stock Assessment Subcommittee and Technical Committee.

Evaluate thoroughness of data collection and presentation and treatment of fishery dependent and fishery independent data in the assessment; including the following but not limited to consideration of data strengths and weaknesses, justification for inclusion or elimination of available data sources, calculation of catch-at-length matrix, calculation and/or standardization of abundance indices.

Evaluate the methods and models used to estimate population parameters and reference points for each stock; including but not limited to, use of available life history information to parameterize the model, model parameterization and specification, the choice and justification of the preferred model, was it the most appropriate model used given available data and life history of the species?
Evaluate the identification and characterization of environmental climatic drivers. Evaluate the estimates of stock abundance and exploitation from the assessment for use in management. If necessary specify alternative estimation methods. Evaluate the methods used to characterize uncertainty and estimated parameters. Were the implications of uncertainty and technical conclusions clearly stated?

Evaluate the diagnostic analyses performed; including but not limited to sensitivity analyses to determine model stability and potential consequences of major model assumptions retrospective analysis. Evaluate the preparation and interpretation of indicator-based analyses for stocks and sub-stock areas.

Evaluate the current and recommended reference points in the methods used to estimate them. Recommend stock status determination from the assessment or specify alternative methods. Review the research, data collection and assessment methodology recommendations provided by the Technical Committee; and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

Review the recommended timing of the next benchmark assessment relative to the life history and current management of the species,

and prepare a Peer Review Panel TOR and Advisory Report summarizing the Panel's evaluation of the stock assessment in addressing each Peer Review term of reference. Develop the list of tasks to be completed following the workshop. Complete and submit the report within four weeks of workshop conclusion. Then up here I just have an abbreviated version of the assessment schedule, with the in-person meetings. We met in November, where we developed these TORs. Today we're presenting the terms of reference. Then we have three in-person workshops tentatively scheduled to invite researchers and review monitoring data. That has been scheduled for May 14 through the 17th.

We'll have a data and assessment workshop in January, 2019, and a final assessment workshop tentatively scheduled for September, 2019 with a Peer Review workshop anticipated in May of 2020. We anticipate presenting the results of that assessment and peer review to this Board in August, 2020. Any questions on the TORs or schedule, I can take those now.

CHAIRMAN TRAIN: Any questions for Jeff? If a hands up you're going to have to move it, because I can't see it. Pat, go ahead.

MR. KELIHER: Mr. Chairman, I don't have a question but I have a motion; if it's needed to be done in a motion for two inclusions into the terms of reference.

CHAIRMAN TRAIN: We're not sure it needs to be. Put them up, put them up.

MR. KELIHER: I'm probably the only one getting thousands of e-mails around menhaden today, so my computer was a little clogged. In talking with my staff, I think a couple of things that are missing. **One is evaluate the implications of habitat expansion or contraction on population productivity.** Certainly in southern New England lobster habitat likely is contracted and reduced the potential of lobster populations.

In the reverse within the Gulf of Maine we seem to have an expansion of habitat, based on warming waters. I think some exploration into that is certainly appropriate. **Then the second one would be to review evidence of stock boundaries and associated stock structures, and confirm the current stock units are appropriate.** I think hopefully that is self-evident. That would be completed in a motion.

CHAIRMAN TRAIN: Do we have a second to include that? Mr. Cimino. Pat, do you feel you need further explanation on that or shall I go to questions? Any questions, Jay go ahead.

MR. JASON McNAMEE: Just to state up front. I like both of these additions. My concern is having gone through the lobster stock assessment; it's an enormous amount of work. I'm concerned about them. The last time we did this it was, I don't know delayed because the committees kept getting tasked with additional things. I'm wondering if we should keep the terms of reference as Jeff presented them; because my fear in particular from number one.

That would be adding a work element that would take time away from getting the assessment completed. Number two, I think is already kind of implicit in one of the terms of reference, so I'm not as opposed to that one. But the first one I'm just concerned about adding work to an already enormous workload for this committee and delaying the outcome of the assessment, which is already going to be a couple years past the end date of the data that they have available.

CHAIRMAN TRAIN: Any other questions or statements? Okay, we're going to have to vote on whether to include this or not. Then we'll move forward on whether we approve the terms of reference with or without these. That is the next two steps. Go ahead, Pat.

MR. KELIHER: I certainly appreciate Jay's comments on this. However, I really even

though there is a lot of work associated with it, the changes in productive habitat within the Gulf of Maine is a contributing factor to stock structure and the health of the resource going forward. I really think it should be included in the workload. If there are other things that maybe fall out, maybe they come back to us on that. But it should be part of the discussions.

CHAIRMAN TRAIN: Hearing little dissension, I'm going to try this by consensus. All those in favor of including these two into, I want to say the right term, the terms of reference. Is anyone opposed? Rhode Island. Everyone else is in favor, so we have consensus minus one. I guess we need a roll call vote because we didn't get consensus. No? Okay show of hands. Who is in favor? All states please raise your right hand; and governmental organizations**. All opposed, do you have a count, abstentions, null votes. The motion passes 10, 1, 0, 0.**

Now, we have to approve the Terms of Reference as amended, which means we've included these two. Is there any further discussion? All in favor raise your right hands; opposed, abstentions, null votes. It is unanimous with no abstentions, no null votes.

ELECTION OF VICE-CHAIR

CHAIRMAN TRAIN: We're on the next item, we need a Vice-Chair. Doug Grout.

MR. GROUT: I move to nominate Dan McKiernan.

CHAIRMAN TRAIN: Does anyone move to close nominations? Is there a second, Pat Keliher? Are there any other nominations; all in favor of Dan as the Vice-Chair, sorry, Dan, okay, other business? Pat Keliher.

MR. KELIHER: I'm not going to go into specifics, because it does pertain to right whales. But there has been a lot of conversation in regards to this fishery, the lobster fishery as it pertains to ropeless fishing. I would like to task the Law Enforcement Committee with investigating the enforceability of the lobster fishery as it relates to ropeless fishing.

OTHER BUSINESS

CHAIRMAN TRAIN: Okay. Is there any other business**?** Peter Burns.

MR. BURNS: Just a quick update on a motion that was approved by the Board at the last meeting; and the motion was to have NMFS and the states of New York and New Jersey get together and talk about the discrepancies with the Area 4 seasonal closure. I just wanted to inform the Board that I've been in contact with staff from New York and New Jersey Fish and Game, and we're meeting on February 26 to have an interim meeting to see how to move forward on this.

ADJOURNMENT

CHAIRMAN TRAIN: Anything else? We are adjourned.

(Whereupon the meeting adjourned at 12:35 o'clock p.m. on February 6, 2018)

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To: **ASMFC Lobster Management Board**

From: **LCMA 4 Lobster Conservation Management Team – NY members**

Subject: **Proposal to Decrease LCMA 4 Latent Effort**

Date: **April 16, 2018**

At the October 2017 Atlantic States Marine Fisheries Commission (ASMFC) Annual meeting, the American Lobster Management Board tasked Lobster Conservation Management Teams (LCMT) with investigating latent effort in their respective management areas and developing a proposal to reduce that latent effort. The LCMT for Lobster Conservation Management Area 4 (LCMA 4) met on March 28, 2018 to address latency and develop a reduction proposal to be considered by the American Lobster Management Board at their May 2018 meeting. To decrease travel impacts, the New York LCMT members met at the NY DEC Division of Marine Resources Headquarters and held a webinar with the New Jersey LCMT members who met at the Nacote Creek Research Station in Port Republic, NJ. NY team members came to consensus on a measure to reduce latent effort, while NJ members did not. Since NYDEC and NJDFW manage lobster trap allocations separately, different proposals from NY and NJ will not compromise collaborative LCMA 4 lobster management. Separate proposals are being submitted by each State's LCMT 4 members. The following proposal is being submitted as the latency reduction proposal by the by NY members of LCMT 4.

NY LCMA 4 Latency Reduction Proposal:

The trap reductions in this proposal focus on non-active permits. Due to the depressed status of the Southern New England lobster population, the group proposed that any type of fishing should be considered when determining who was active, not just lobster trap fishing.

Program details below:

- Reduce permit holders trap tag allocation by 50% if they hadn't reported actively fishing 50 days during the 5-year period from 2013 through 2017.
- This proposal would decrease latent effort by 19% (Table 1)
    - Minimum allocation capped at 50
    - To be considered "actively fishing" a permit holder must have reported fishing for any species. Fishing activity needed to be verifiable through submitted state or federal vessel trip reports.

This proposal only includes NY state lobster trap allocations for LCMA 4 and does not include trap allocations of NY federal lobster permit holders. These allocations are managed by NMFS.

- NMFS commented that reducing effort on some but not all Area 4 permit holders would be akin to another state/Federal cooperative limited access qualification and allocation program. This may require intensive work to implement because individual allocations would need to be re-assessed based on any new criteria that are adopted, and state and Federal decisions on revised allocations would need to match in order to avoid a disconnect on the number of traps a permit could fish. Such an approach also offers little direct conservation benefit because it would be regulating many fishermen who are no longer fishing. Across-the-board trap reductions (percent reductions to all Area 4 permit holders) may be more effective at addressing latent effort and could also remove active traps from the water. This approach would not be as intensive as a selective re-allocation program.

Table 1. Proposed NY LCMT4 Latent Effort Reduction

Scenario	NY Permits	NY Alloc	% Reduction
NY 2017 Allocation	85	39,165	
Proposal: 5 yrs <50 trips decrease alloc by 50%	56	31,605	-19%

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Larry Herrighty, Director

To: **ASMFC Lobster Management Board**
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NYDEC and NJDEP provided information on NY and NJ trap allocations and latent effort (Tables 1 and 2). They also provided information on several scenarios to reduce latent effort which were investigated by the LCMA 4 LCMT members (Table 3).

While NYDEC was able to come to a consensus, NJDEP LCMT 4 members were split between approaches to reduce latent effort. Since NJDEP and NYDEC manage lobster trap allocations separately, different proposals from NJ and NY will not compromise collaborative LCMA 4 lobster management. Separate proposals will be submitted by each State's LCMT 4 members.

There were NJ LCMT 4 members concerned about the validity of NJ latent permits since Federal lobster permit holders are not required to report. While NY has regulations, which require anyone landing lobsters in NY to submit harvester reports on either federal of state Vessel Trip Reports (VTR), NJ did not institute similar rules until 2016. NJ state lobster permit holders may not have evidence for reporting history. NY LCMA 4 members suggest using dealer reports and/or dealer receipts to verify fishing history.

NJ LCMA 4 members are additionally concerned because there are several active fishermen who hold multiple permits that have not been used in recent years. They fear that they may lose these additional permits, even though they have been actively involved in the fishery.

Based on these concerns, NJ LCMT 4 members would request that the Management Board evaluate the following approaches:

1. Status Quo-
NJ has had a moratorium on lobster permits since 2002. Since the effective date, no additional vessels are permitted to enter the American lobster fishery by any means except transferability of an existing permit.

Table 4 shows the number of actively fished NJ lobster permits in LCMA 4. The number of active licenses has seen a substantial decline within the last five years, with as much as a 28.57 percent decrease in the years 2014 and 2015 respectively from the baseline year of 2008. A number of LCMT 4 members have proposed that the percentage of actively fishing permits will continue to decline with the current measures and restrictions they are facing.

2. Latency by owner, not vessel-
As previously mentioned, there are a number of active NJ LCMA 4 lobster fishermen who possess multiple NJ lobster permits. Due to the depleted status of the SNE lobster population, many of these fishermen have not utilized the entirety of their permits within recent years. However, they do you not want to see these permits go away, since they have been actively involved in the fishery.

NJ LCMT 4 members requested that NJDEP staff consider looking at permit ownership and not individual permits to determine latent percentages. This is: if a NJ LCMA 4 lobster fishermen has actively fished enough to satisfy one of the latency requirements, then all lobster permits under their possession will be exempt from latency. Alternatively, if a fisherman does not meet those requirements for any of his/her permits, all permit would then be considered latent.

NJDEP staff has begun to review state permits and determine the occurrence of multiple permits owned by a single owner.

Table 1. NY-NJ Lobster Trap Allocation:

e r	erm t	oc t on	erm t	oc t on	erm t	oc t on	% Decrease
	104	44,062	42	46,630	146	90,692	
	100	42,512	41	45,785	141	88,297	-2.6%
	99	42,462	43	47,981	142	90,443	2.4%
	97	42,350	42	46,266	139	88,616	-2.0%
	97	42,350	42	46,926	139	89,276	0.7%
	96	41,050	37	40,436	133	81,486	-8.7%
	93	39,875	30	33,916	123	73,791	-9.4%
	92	39,865	30	35,796	122	75,661	2.5%
	89	39,515	31	35,072	120	74,587	-1.4%
	85	39,165	32	36,899	117	76,064	2.0%

Table 2A – 2D. NY-NJ Latent trap effort

T b e tent erm t
e r

e r	erm t	tent	tent
2008	42	21	50.0
2009	41	22	53.7
2010	43	21	48.8
2011	42	17	40.5
2012	42	15	35.7
2013	37	14	37.8
2014	30	12	40.0
2015	30	14	46.7
2016	31	10	32.3
2017	32	12	37.5

T b e tent Tr e r

e r	oc t on	tent Tr	tent	ct e
2008	46,630	20,877	44.8	25,753
2009	45,785	23,699	51.8	22,086
2010	47,981	21,091	44.0	26,890
2011	46,266	16,016	34.6	30,250
2012	46,926	14,996	32.0	31,930
2013	40,436	12,946	32.0	27,490
2014	33,916	13,446	39.6	20,470
2015	35,796	16,086	44.9	19,710
2016	35,072	11,022	31.4	24,050
2017	36,899	14,129	38.3	22,770

T b e tent erm t
e r

e r	erm t	tent	tent
2008	104		
2009	100		
2010	99	81	81.8%
2011	97	82	84.5%
2012	97	82	84.5%
2013	96	80	83.3%
2014	93	79	84.9%
2015	92	77	83.7%
2016	89	77	86.5%
2017	85	73	85.9%

T b e tent Tr e r

e r	oc t on	tent Tr	tent	ct e
2008	44,062			
2009	42,512			
2010	42,462	31,912	75.2%	10,550
2011	42,350	33,040	78.0%	9,310
2012	42,350	34,350	81.1%	8,000
2013	41,050	31,975	77.9%	9,075
2014	39,875	32,225	80.8%	7,650
2015	39,865	29,440	73.8%	10,425
2016	39,515	30,665	77.6%	8,850
2017	39,165	30,835	78.7%	8,330

Table 3. Possible Scenarios to Reduce Latent Effort

Scen r o	erm t	erm t	oc t on	oc t on	erm t	oc t on	re uct on
r tr	56	22	31,605	25,130	78	56,735	-25%
r tr	56	27	32,630	32,450	83	65,080	-14%
ro ort on tr oc t on	85	45	28,521	31,950	130	60,471	-21%
ro ort on tr oc t on	73	45	27,961	31,050	118	59,011	-22%
Tr	85	32	29,603	23,549	117	53,152	-30%

Table 4. Percent Decrease of NJ LCMA 4 Active Permits 2008-2017

Year	# permits	% decrease*
2008	42	
2009	41	2.38
2010	43	-2.38
2011	42	0.00
2012	42	0.00
2013	37	11.90
2014	30	28.57
2015	30	28.57
2016	31	26.19
2017	32	23.81
*Percent decrease based off 2008 baseline permit count		

Maryland-Delaware-Virginia
Lobster Conservation Management Team
LCMA5

Chair-Sonny Gwin Vice-Chair-Wes Townsend

February 15, 2018

Dear Ms. Megan Ware,

A Lobster Conservation Management Team (LCMT) 5 meeting was held on February 5, 2018 as requested by the Atlantic States Marine Fisheries Commission American Lobster Management Board to evaluate latent effort. As you know, LCMT5 is large, consisting of five states along the coast. It has been difficult to organize all the states represented in LCMT 5 but we shared the meeting announcement with relevant states. Representatives for Maryland were in attendance and the Chair discussed this topic with fishermen and dealers that were unable to attend after the meeting.

We examined latent effort in Area 5 and determined that in the past nine years' effort has been naturally declining. Specifically, we reviewed the number of active permits, maximum number of traps fished and latent effort for past nine years and effort is Area 5 has declined over that time period (Tables 1-2). Category A5 permits in LCMA 5 have declined in the past nine years from 28 active permits down to 26 permits which is reduction in potential effort. Category A5W active permits also declined in that time period from 20 down to 12.

Area 5 lobster permitees are only allowed a maximum number of traps which is based on their historical allocation of traps fished; therefore, the amount of traps allocated to each fisherman cannot be increased. This policy is already a deterrent to activating latent effort in Area 5 as some permits only allow a small amount of pots. The nine year average maximum potential trap limit was 800 traps with the lowest allocation being 200 traps and the maximum being 1,440 traps.

In conclusion the *de minimis* states of Delaware, Maryland and Virginia contribute less than 3% of landings in Southern New England and less than 0.1% of landings coastwide. As indicated in draft Addendum XXV, fishermen in this area participate in multiple fisheries. Fishermen add/drop fisheries based on factors such as markets, quotas, and life situations (examples: injuries, boat repairs and health). Lobster Conservation Management Team 5 recommends allowing the natural attrition to continue so as to allow for the continuation of the small historical lobster fishery in Lobster Conservation Management Area 5.

Thank you.

Sincerely,

Sonny Gwin*, F/V Skilligalee
John Gourley*
Merrill Campbell, Southern Connection Ocean City
Kerry Harrington, F/V Sea Born, F/V Integrity, F/V Delphinus
Wes Townsend, F/V Paka
Roger Wooleyhan, F/V Labrador, F/V Wooley Bully

*Attended the meeting

Maryland-Delaware-Virginia
Lobster Conservation Management Team
LCMA5

Chair-Sonny Gwin Vice-Chair-Wes Townsend

Table 1. Number of active Lobster Conservation Management Area 5 permits by year, principal port state, and category (Area 5 or Area 5 Waiver (A5W). Permits were considered active with renewal but may not have associated landings.

Permit Year	MA		MA Total	RI A5W Total	CT A5 Total	NY		NY Total	NJ		NJ Total	DE		DE Total	MD		MD Total	VA		VA Total	NC A5W Total	**Grand Total**
	A5	A5W				A5	A5W		A5	A5W		A5	A5W		A5	A5W		A5	A5W			
2009		1	1	1			1	1	16	10	26	4	3	7	7	1	8	1	2	3	1	**48**
2010		1	1	1			1	1	16	10	26	4	2	6	6	1	7	2	2	4	1	**47**
2011		1	1	1					15	9	24	4	2	6	6	1	7	2	2	4	1	**44**
2012		1	1	1	1				15	9	24	6		6	6	1	7	1	3	4	1	**45**
2013		1	1	1	1				14	9	23	5	1	6	7		7	1	2	3		**42**
2014				1					14	10	24	5	1	6	7		7	1	2	3		**41**
2015	1		1	1					14	8	22	5	2	7	7		7	1	2	3		**41**
2016	1		1	1	1	2		2	12	7	19	2	2	4	9		9	1	2	3		**40**
2017	1		1	1	1	1		1	12	7	19	2	2	4	8		8	1	2	3		**38**

Greater Atlantic Regional Fisheries Office. (2009-2017). Vessel Permit Data, Available at greateratlantic.fisheries.noaa.gov/aps/permits/data/index.html; accessed (January 23, 2018).

Maryland-Delaware-Virginia
Lobster Conservation Management Team
LCMA5

Chair-Sonny Gwin Vice-Chair-Wes Townsend

Table 2. Lobster Conservation Management Area 5 Permit, Trap, and Latent Effort Summary. These data do not include Area 5 waivers because the Total Maximum Traps was not available.

	Total Active Permits *	Total Latent Permits**	Total Maximum Traps	Total Maximum Latent Traps	Percent Maximum Latent Traps
2009	28	12	22,209	9,448	43%
2010	28	12	21,372	8,635	40%
2011	27	11	21,492	8,755	41%
2012	29	11	24,063	8,830	37%
2013	28	11	23,183	8,830	38%
2014	27	10	22,573	7,955	35%
2015	28	11	22,333	8,615	39%
2016	28	12	20,770	9,215	44%
2017***	26	10	20,499	7,741	38%
* Only active permits were included and there may be more in the Confirmation of Permit History. Permits were considered active with renewal but may not have associated landings.					
**Landings for states outside of Maryland may not be reflected in the count of latent permits.					
***Landings from 2017 are preliminary.					
Sources: Greater Atlantic Regional Fisheries Office. (2009-2017). Vessel Permit Data, Available at greateratlantic.fisheries.noaa.gov/aps/permits/data/index.html; accessed (*January 23, 2018*). Atlantic Coastal Cooperative Statistics Program. (2009-2017). SAFIS Landings – Row-Level Data; generated by *Angel Willey*; using Data Warehouse [online application], Arlington, VA: Available at www.accsp.org*; (Login) Data Warehouse;* accessed (*January 23, 2018*).					

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

To: **ASMFC American Lobster Management Board**

From: **LCMA 6 Lobster Conservation Management Team – CT members**

Subject: **Proposal to Reduce LMA 6 Latent Effort**

Date: **April 16, 2018**

At the October 16, 2017 Atlantic States Marine Fisheries Commission Annual Meeting the American Lobster Management Board tasked each Lobster Conservation Management Team (LCMT) with developing proposals to reduce latent effort in their respective lobster management areas (LMA). The LCMT for LMA 6 (Long Island Sound) met via teleconference on January 9, 2018 and March 29, 2018 to develop a proposal. The following proposal is being submitted as the latency reduction proposal by the CT members of the LMA 6 LCMT, with a preferred (Option 1) and non-preferred approach (Option 2) for the Connecticut waters of LMA 6. During the discussions surrounding the non-preferred option, (Option 2) while team members were in agreement surrounding the details of a target, no consensus could be reached between the CT and NY delegates on what measures to implement if the target was met. The options in this proposal were unanimously voted upon by the CT members of the LMA 6 LCMT at their March 29, 2018 meeting. Since NY DEC and CT DEEP manage lobster trap allocations separately, different proposals from NY and CT will not compromise collaborative LMA 6 lobster management. Separate proposals are being submitted by each State's LCMT 6 members.

LCMA 6 Latency Reduction Proposal

Option 1 (**Preferred Option**): Status Quo. The LMA 6 LCMT members had lengthy discussions surrounding the substantial decrease in effort and participation observed in the Long Island Sound lobster fishery since the large scale lobster mortality in 1999. The team felt strongly that given the current conditions of the lobster resource in Long Island Sound, natural attrition in the fishery occurring in both CT and NY, and the difficulties and improbability of inactive lobstermen returning to the fishery, latency is being addressed in LMA 6.

Additionally, Connecticut commercial fishery licensing statutes were amended in 2015 (Public Act 15-52) which mandated renewal of limited entry lobster licenses, whereby a license holder must renew their moratorium license by March 31 each calendar year to maintain their eligibility to renew those privileges in the future. In the first year since these changes were implemented on January 1, 2016, the total trap tag allocation for limited entry license holders in the state fell from 237,360 traps allocated to 126,319 traps allocated, a 46.7% reduction (resulting in 111,041 fewer traps). As the renewal requirement remains in place and as people continue to exit the fishery, trap allocations are expected to continue to slowly decrease in the future.

Option 2 (Non-preferred Option): Trigger approach to address latency. This option incorporates a trigger which would require trap allocation reductions should an 80% increase from the number of lobster traps actively fished in 2016 (30,188 traps) occur. Specifically, when more than 54,338 traps are reported fished by Connecticut license holders in LMA 6 in any given year, a trap allocation reduction process would be required.

Trap reductions will be calculated as a proportional reduction in trap tag allocations based on the number of years fished over the five year period from 2013 through 2017. The proportional reductions are applied as follows: (Trap tag allocations of 50 or fewer traps will not be reduced.)

- Trap tag allocations will not be reduced if a permit holder fished all five years;
- Trap tag allocations will be reduced by 20 percent if a permit holder fished four out of five years;
- Trap tag allocations will be reduced by 40 percent if a permit holder fished three out of five years;
- Trap tag allocations will be reduced by 60 percent if a permit holder fished two out of five years; and
- Trap tag allocations will be reduced by 80 percent if a permit holder fished one out of five years.

Should the trigger be reached, this option would further reduce the state's total trap allocation to 73,493 traps. This would be an additional 41.8% reduction (52,826 traps) from the 126,319 traps allocated in 2017 to limited entry license holders.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Marine Resources
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To: **ASMFC Lobster Management Board**

From: **LCMA 6 Lobster Conservation Management Team – NY members**

Subject: **Proposal to Decrease LCMA 6 Latent Effort**

Date: **April 16, 2018**

At the October 2017 Atlantic States Marine Fisheries Commission (ASMFC) Annual meeting, the American Lobster Management Board tasked Lobster Conservation Management Teams (LCMT) with investigating latent effort in their respective management areas and developing a proposal to reduce that latent effort. The LCMT for Lobster Conservation Management Area 6 (LCMA 6) met on January 9, 2018 to address latency and develop a reduction proposal to be considered by the American Lobster Management Board at their May 2018 meeting. To decrease travel, the New York LCMT members met at the NY DEC Division of Marine Resources headquarters in East Setauket, NY and held a webinar with the Connecticut LCMT members who met at the CTDEEP Marine headquarters in Old Lyme, CT. The LCMT 6 members requested that several scenarios be evaluated to decrease latent effort. The LCMT 6 members met via webinar again on March 29, 2018. CT team members came to consensus on a measure to reduce latent effort, while NY members were split. Since NYDEC and CTDEEP manage lobster trap allocations separately, different proposals from NY and CT will not compromise collaborative LCMA 6 lobster management. Separate proposals will be submitted by each State's LCMT 6 members.

NY LCMT 6 members did not come to consensus on a single management measure for reductions in latent trap effort, rather different members reached agreements on three different approaches. Some members of the group felt NY was already doing enough through annual attrition, others thought overall trap effort in LCMT 6 was too large and should be reduced, while others thought reductions should focus on allocations of permits that weren't being fished. NY LCMT members request the Management Board to evaluate the three approaches detailed below:

1 - Status Quo:
Table 1 presents the number of permits and trap allocation of NY resident lobster permit holders with LCMA 6 trap tag allocations. NY has had a moratorium on lobster licenses since 1995. If a permit isn't renewed, the permit is permanently retired along with the associated trap tag allocation. There is no permit or trap tag transferability, though permit holders can designate their permit to an immediate family member. LCMA 6 trap allocations have decreased by four percent on average over the ten-year period from 2008 to 2017. There has been a 33 percent decrease over the whole 10-year time period. These are permanent reductions in LCMA 6 trap allocation. There are a

number of NY's LCMT 6 members who propose reduction through attrition as the sole mechanism for NY to reduce latent effort.

Table 1. NY Lobster Permits and Trap Allocations

Year	# permits	Allocation	% Reduction
2008	307	197,117	
2009	285	179,752	-9%
2010	273	173,037	-4%
2011	259	166,392	-4%
2012	260	166,442	0%
2013	250	156,617	-6%
2014	245	154,082	-2%
2015	230	144,344	-6%
2016	220	137,228	-5%
2017	207	132,058	-4%
			-33%

2 - Trap Cap:

Another group of LCMT 6 member propose a more active approach to reducing effort in LCMT 6. This group feels the overall level of effort in LCMT 6 is too large. They suggest a trap cap of 800 traps. Any allocation above 800 would be reduced to 800, while those below would remain the same. Instituting a trap cap of 800 on NY trap allocation would decrease allocations by 30 percent.

This group also suggests raising the cost of trap tags from 14 cents to one dollar. The extra money collected through trap tag purchase must be used to fund lobster research. They feel that by raising the cost of trap tags people would limit purchases to the amount permittees intend to fish.

3 - Decrease allocations on non-active permit holders:

A third group recommend that trap reductions focus on non-active permits. Due to the depressed status of the Southern New England lobster population, the group proposed that any type of fishing should be considered when determining who was active, not just targeting lobsters.

Program details:

- Permit holders who haven't submitted at least 50 harvest reports in the last five years (2013 – 2017), would:

A. have their trap reduction decreased by 50 percent This would decrease allocations by 23 percent.
B. An alternative suggestion was to institute a trap cap of 800 on people not actively fishing. This would decrease allocations by 15 percent

Table 2. Scenarios to Reduce Latent Effort

Scenario	# permits	Allocation	% reduction
1) Status Quo	207	132,058	~4% annual
2) Trap Cap = 800	207	92,511	-30%
3A) 5 yrs >50 trips, 50% decrease	108	102,199	-23%
3B) 5 yrs <50 trips, 800 cap	108	115,888	-15%

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW JERSEY DIVISION OF
Fish and Wildlife
P.O. Box 400
Trenton, NJ 08625-0400
Larry Herrighty, Director

ASMFC: **Lobster Board**

From: **LCMA 4 Lobster Conservation Management Team**

Subject: **Allowance to fish for alternative species with pots during the LCMA 4 closed season in federal and/or state waters**

Date: **April 16, 2018**

At the 3/28/2018 LCMT 4 meeting substitute measures to LCMA 4 season closure (4/30 – 5/31) were discussed. LCMT 4 members feel they are being unfairly impacted during the closed season since NOAA Fisheries requires federal lobster permit holders to remove lobster pots during the closed season. This is not the requirement for state waters in LCMA 4 or for LCMA 6 permit holders during the LCMA 6 closed season. This results in a substantially longer impact to harvesters due to the amount of time it takes permit holders to remove the gear safely during the spring.

LCMA 4 members gave a number of alternatives; 1) fish for other species that they had permits for using lobster pots in federal and/or state waters, returning all lobsters to the water; 2) fish for other species using fish pots in federal and/or state waters, again returning all lobsters to the water; 3) fish for other species using pots with vents that are large enough to allow all lobsters in the LCMA 4 size range to escape in federal and/or state waters.

NOAA Fisheries point to the fact that the Lobster Technical Committee recommended that all lobster pots be removed from the water in relation to closes seasons and that the Board Motion on closed seasons required pots out of the water. The main concern is if pots remained in the water during the closed season lobster bycatch mortality would adversely impact the lobster population and negate benefits of the closed season.

Smith and Howell (1987) investigated bycatch mortality of lobsters due to the trawl and pot fisheries in Long Island Sound. They found both minor and major damage to lobsters due to both the pot and trawl fishery, but trawl induced damage occurred more frequently, especially during molting period. The incidence of immediate monthly mortality from pot gear never exceeded 0.05%, while trawl induced mortality never exceeded 2.2%. Delayed mortality was only seen in lobsters caught by trawl, not by pots. Trawl induced mortality was highest during molting, especially during the summer molt (21.3% in July vs 6.3% in November) and relatively low during intermolt (2.2% May and 1.0% in August).

Huntsberger et al. (2015) examined the seasonal bycatch of the scallop fishery on Georges Bank. The project tested two different scallop dredges in regards to bycatch. Overall there was no significant difference in lobster catch between gear types. Lobster damage was rated similar to Smith and Howell, no damage, moderate damage or lethal damage. Lethal damage ranged from 28 to 36 % by area. There was no significant difference in damage between areas with an overall lethal damage rate of 32%. Previous work by Jamison and Campbell (1985) as cited in Huntsberger et al. (2015) indicated Jamison and Campbell used SCUBA divers and noted that most of the lobsters avoided or escaped the scallop gear the study used.

In addition, the ASMFC stock assessment model does not include bycatch mortality in its calculations. Estimates of discard mortality were low, so it was not included in the model.

Besides the total loss of fishing income due to the federal gear removal requirement, LCMA 4 permit holders are also concerned about fishermen with other gear impacting the resource while the pots are out of the water. As evidenced from Smith and Howell (1987), even though trawl bycatch mortality is relatively low during May (2.2%), it's still significantly higher than bycatch mortality from pot gear. In addition, damage and mortality from the scallop fishery may not be insignificant. It also seems inequitable to allow other gears to fish during the lobster closed season that could impact the lobster recovery owing to their higher bycatch mortality than lobster gear.

Given the options express by LCMT 4, it would seem that NOAA Fisheries could come to some compromise so they could continue to make a living during the Spring. Especially in light of the fact that they allow other fisheries which catch lobsters in their gear to fish in LCMA 4 during the closed season which have higher bycatch mortality compared to pot gear.

Citations:

Huntsberger, C., K. Thompson, M. Winton, L. Siemann. 2015. Seasonal Bycatch Survey of the Georges Bank Scallop Fishery. NOAA Final Report NA13NMF4540011. 107 pgs.

Jamison, G. and A. Campbell. 1985. Sea scallop fishing impact on American lobster in the Gulf of St. Lawrence. Fish. Bull. 83:575-586.

Smith, E., P. Howell. 1987. The effects of bottom trawling on American Lobsters, *Homarus Americanus*, In Long Island Sound. Fish Bull. Vol. 86 No. 4.

February 23, 2018

Megan Ware
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200A-N
Arlington, VA 22201

Re: American Lobster Board

Dear Megan:

I submit the following comments on behalf of Maine Certified Sustainable Lobster Association, Inc. (MCSLA) to the Atlantic States Marine Fisheries Commission (ASMFC) American Lobster Board (the Board).

As you may recall, the MCSLA currently holds a Marine Stewardship Council (MSC) certificate of sustainability the Maine lobster fishery. Maintaining the certificate requires the MCSLA undergo annual audits and meet specific milestones set by MSC's independent auditor.

In anticipation of the upcoming annual audit, the MCSLA makes the following statements to the Board:

1. The MCSLA urges the Board to adopt appropriate harvest control rules for the lobster fishery;
2. The MCSLA urges the Board to adopt a method to provide sufficient bycatch data to detect significant increase in risk to the main bycatch species in the lobster fishery; and
3. The MCSLA urges the Board to develop and adopt a research plan that provides the ASMFC with a strategic approach to research with reliable and timely information to ensure the fishery activity level is such that lobster fishing can continue indefinitely and lobster fishing operations must continue to be managed in a way that maintains structure, productivity, function and diversity of the ecosystem.

The MCSLA appreciates the opportunity to provide these comments.

Regards,
/s/
John F. Whiteside, Jr.
General Counsel
John@JWhiteside.com

IMEP #62 The New England Lobster Convention of 1903

Habitat Information for Fishers and Fishery Area Managers

Understanding Science Through History

***Reprinted in the Comment Section Atlantic States Maine Fisheries Commission American Lobster Management Board Meeting, May 8th 9th, 2017, Alexandria, Virginia. Page 1 to 389.**

(IMEP History Newsletters can be found indexed by date

Title on the BlueCrab.infoTM website: Fishing, Eeling and Oystering Thread)

The Sound School ISSP – Capstone Series

Do Climate Factors Lead to Habitat Failure?

Climate Change and Habitat Capacity Complicates Policy Discussions

(Readers Should Review IMEP #53 The Southern New England Lobster Fisheries Collapse of 1898-1905 posted on July 30, 2015)

Timothy C. Visel, Coordinator
The Sound School Regional Vocational Aquaculture Center
60 South Water Street
New Haven, Connecticut 06519

Revised for Capstone/SAE Proposals, April 2017

ASTE Standards Aquaculture #5 Natural Resources #6, #7, #9

Review the 51 page "Report Upon a Convention Held at Boston, 1903, to Secure Better Protection of the Lobster" by J. W. Collins

Wright & Potter State Printers, 1904 Massachusetts

Two-Day 1903 Lobster Convention Allows Industry Proposals for Lobster Enhancement, Following Shallow Water Die Off

Submitted to the Lobster Management Board – Atlantic States Marine Fisheries Commission April 6, 2017
Public Comment Period LCMTs Prepare Preliminary Proposals (all pages)
Consider Habitat Enhancement (Artificial Reefs) and Lobster Hatcheries as possible response to management option for increasing egg production (survival).

To: Megan Ware, ASMFC

It was very nice meeting you recently at the Old Lyme Connecticut public hearing in response to Southern New England (Lobster) stock decline. Last year a paper regarding the lobster collapse 1898-1905 was included in the public comment section and perhaps this attached paper, IMEP #62 could be added as well.

I started this report after attending the 2016 Maine Fishermen's Forum in Rockland Maine, it had been many years since I could attend a forum and had a great time. One item that did come up in several lobster discussions during the forum was climate, predator/prey and habitat bottlenecks, many of the same issues raised a century ago at the New England Lobster Convention of 1903. This two day convention raised similar issues of climate, predation by fish and "water space" (habitat).

The 1903 convention discussed important issues concerning the 1898 lobster die off that started in the fall of 1898, lobster hatchery science was included and perhaps today habitat enhancement (artificial reefs) and hatchery transplants could be part of the Atlantic States Marine Fisheries Commission Management options. Some excellent research regarding habitat enhancement occurred in Boothbay Maine in the middle 1960s and later regarding the importance of kelp forests to southern New England's lobster resource regarding this issues.

Perhaps lobster hatchery science and habitat enhancement (rubble/kelp reefs) could allow our very much diminished lobster fishery here to continue, offering any assistance to the Commission we may be able to provide.

Tim Visel, The Sound School

Capstone Questions:

Most lobster regulatory policy articles do not include references to the 1898 lobster die off or the 1903 Lobster Convention held in Boston on September 23 through September 24, 1903. On the second day of the convention, the lobster industry was invited in for comment/discussion. Almost all of the industry proposals were later incorporated into policy. Did the previous day's discussions reflect in any of the resulting regulations?

Climate factors and temperature changes were mentioned at the convention but not connected to climate-induced cycles of lobsters. While some fisheries flourished in the Great Heat (1880-1920), such as oysters and blue crabs, others were in steep decline, such as lobsters and the bay scallop. How does the increase and decrease in these fisheries compare to multi-trophic predator/prey, habitat quality or quantity studies today as Maine's lobster catch continues at very high levels and a huge lobster predator (codfish) is at a low point?

Habitat capacity concepts of expansion or compression refugia or dominance were still decades away from fishery management discussions. A larger lobster actually reduces carrying capacity for habitat

limited areas and explains the first colonial reports of huge lobsters speared in shallow near shore areas. (They eat their young). Larger lobsters need deeper (colder) habitats and live in the shore only when water temperatures allow, giving the movement of lobsters back to the shallows each spring the appearance of runs – or the expansion or compression of habitats on a seasonal basis. Habitat enhancement (artificial reefs) was not part of the Lobster Convention discussion but lobster hatchery science was. How did this discussion impact future actions?

All the New England states built lobster hatcheries, including one at Noank, CT. Rhode Island, however, led the country with its development of a lobster upweller and larval culture bags. When the hatcheries were built, the summers were hot and winters mild. The summer of 1898 was so hot that ponds and lakes did not freeze. In 1899, southern New England experienced an "ice famine." It was at this time the ice business moved north to coastal Maine towns, such as St. George, mid-coast Maine, "The ice business in St. George thrived during the 1890's" (Coaster Days by Roy Meservey – Jackson Memorial Library, 1976, Pg. 14). Connecticut had declared brook trout extinct in 1901, but the oyster industry was thriving. Did any of these factors, in your opinion, influence the 1903 Lobster Convention?

Copies of the 1903 Lobster Convention report are available from Tim Visel in the Aquaculture Dept. (It is also available online)

The Lobster Convention of 1903

By 1900, it became evident that New England faced a severe "lobster problem." Inshore southern New England catches especially New York and Connecticut were dropping. By 1902, "the lobster problem" became a regional lobster crisis. The 1903 lobster convention focused on two issues: uniform laws on the size of lobsters for commercial markets and the protection of egg-bearing female lobsters. In the decades before, egg-bearing females were preferred by many chefs, especially those in the Boston area, as eggs went into sauces and stuffing of lobster caviar. Most states after 1850 had enacted stiff penalties for keeping "eggers" and now most members focused upon "shorts," now that each state was warned about its neighboring states well being if different sizes continued. However, it made enforcement of lobster laws tougher if just a few miles away what was a legal lobster was now illegal. Many lobster fishers may recall that Rhode Island had a smaller "legal" size lobster than the rest of New England for almost a century. The capture and selling of short "lobsters" now occupied much of the regulatory response to declining lobster abundance in southern New England. These lobsters had not sexually matured and sublegal lobsters represented a potential recruitment (egg) reproductive loss.

The state of Maine took much of the blame for insufficient enforcement of lobster regulation while recognizing the demand of summer visitors (summer trade/tourism) fueled the demand for lobster meat along its long hard to patrol coastline. In actuality, removing larger lobsters (from the 1820's onward) had altered the natural carrying capacity of the lobster resources in many areas. Lobsters are cannibals, so it is very possible that the fishery had, in fact, created the conditions for shorts to now become a dominant part of the lobster population. This population because of habitat refugia from larger lobsters

lived close to shore. Lobsters can live in excess of a century and crush any competing lobsters for food and space, allowing more (yet smaller) lobsters to live in a defined habitat area. A similar example exists with snapping turtles. Over time, one or two large snappers could exist in a small pond, crushing, killing or driving off smaller snappers, even its own young, unfortunately, until a balance to food and space is reached. Surviving snappers now grew to large sizes and existed within the carrying capacity of the available food. Trap out these large snappers and that would free up capacity for perhaps two or more smaller snappers; trap them and it freed up habitat for 20 to 30 small snappers, all competing for limited space and food. As snappers grew slowly in an area that had been "cropped," smaller turtles were all that could be had. The snapper turtle fishery actually made more space available for more yet smaller turtles.

You could see how something very similar could happen with lobsters. There is a reason that the first settler accounts had accounts of speared lobsters a fathom long in shallow waters; they had overtime limited the abundance of other lobsters by killing off the smaller water competitors. In time, you were left with some very large lobsters and many small lobsters trying to live in a habitat area that usually meant death. With the removal of large lobsters, the natural carrying capacity had been altered to favor more smaller lobsters or "shorts." Inshore areas where larger lobsters had held territory, this territory (habitat), were now available for many more lobsters. The trapping of legal size lobsters altered the capacity as well by feeding the shorts. In time, some areas within the small boat range contained all shorts, and if your job was to produce lobsters for the table, it left little choice. As larger lobsters freed up habitat space, the fishery did something as well – it now provided habitat and fed the shorts. Natural food limits had altered carrying capacity again as lobsters entered into a type of "bird feeder" husbandry. We had taken away the "groundskeepers" but now nourished the young as a contingent to fishing – the lobster bait itself.

The 1903 convention focused in on regulation, but in actual fact, climate had altered megalops drift (wind) and survival, carrying capacity had been altered by us, and warmer water reduced storm losses while speeding up growth. Lobsters in Maine were no longer habitat rich and cold water limited, but now habitat enhanced for a faster maturing lobster. In waters where lobsters could still live, those populations were mostly sublegal and surviving, as catch per trap (units of effort) dropped more traps (more food) were set. I would not be surprised that in many areas of our coast then sublegal populations surged as warm waters in southern New England contributed to a collapse of landings while those in Maine brought in many more legal lobsters. In the shallows of the southern range, waters were so warm there was an absence of lobsters of any size. It is these same conditions that govern carrying capacity for lobsters today, a century later, that remain poorly understood – temperature and energy cycles.

While the 1903 convention focused on regulation and lobster hatcheries, a warming climate, changing prey relationship and carrying capacity were not addressed. Maine's landings would continue to hold and then collapse as cod in colder waters now became more abundant. Cod in colder waters devastated the lobster population and reduced habitat capacity to those areas in which cod could now feed. What was good for the cod fishers meant doom for small lobsters, as cleaned cod soon yielded stomachs full of lobster. Any extra carrying capacity was soon lost to a growing population of codfish. Lobster catches in Maine then declined.

A Habitat History

By 1902, the southern New England lobster fishery was in ruin and the U.S. Fish Commission, created in 1871 to investigate the decline of warm water fish (the 1870's would bring incredible cold to New England, including the Connecticut cattle catastrophe of 1873 when exposed milking cows froze in Connecticut fields), saw opportunity in bringing all the states together to discuss lobster regulations, then termed "uniform laws." It was promoted by J. W. Collins of the U.S. Fish Commission and by Dr. George Field of Massachusetts, a colleague and once employed by the same U.S. Fish Commission who provided conference support and eventually its host site, Boston, Massachusetts.

1898 was a terrible year for southern New England fisheries. The summers of 1895 to 1897 had some of the worst heat waves since the Civil War. The bitter cold of the 1870's had now become a distinct memory when temperatures fell as much as 30 degrees below zero for days at a time. The late 1890s were very different.

Connecticut oyster growers suffered a massive sulfide kill in deep water of Long Island Sound beds, asking for a survey in 1899. In September of 1898, Narragansett Bay turned red and then chocolate, as Dr. Mead of Brown University wrote that a "plague" had descended upon the citizens of Rhode Island. In small salt ponds and coves in southern New England, the warm water had numerous fish kills, and some of the worst had black waters, the sulfide overturn that left an odor of sulfur in morning mists. In 1899, the warm waters from an extremely hot summer created an "ice famine." Southern New England block ice producers had no product to sell or store as waters did not freeze all winter.

Into this heat, small lobsters inshore died by the millions as city residents rushed to New England coastlines for the promise of cool water breezes, lobsters left the shallows for deeper waters into the mouths of deeper water predators. It must have been a slaughter. If they could move, many I estimate, did not make it and died in the shallows easy prey for "warm water" fish.

A type of habitat failure occurred, habitat compression. {The term habitat "compression" signals an event that after appears before a habitat failure defined as habitat conditions that no longer are able to support one or more habitat functions, nursery, grow out, maturation or reproduction. For lobsters undergoing compression from high temperatures it is a form of a "blue crab jubilee" detailed in southern areas and in the fisheries literature when extremely hot conditions with little wind or storm "energy." Sulfide levels from organic reduction build into the water column until organisms (in this case blue crabs flee, and crawl out of the water) are forced to leave the water itself, and thus make for easy catching.

A lobster jubilee is much less noticeable (lobsters rarely are reported to leave the waters) but easy catching is the lobster catches in compressed habitats that can be quite high or surge. These events are recorded in landings as described by Dr. Donald Rhoads of Yale in the early 1980s. Rising temperatures can cause sulfide events (such as the loss of Striped Bass nursery habitats in Chesapeake Bay in the 1970s) and for lobsters catches would increase just before a collapse.

Dr. Rhoads describes this event in a 1985 Long Island Sound Workshop – The EPA-NOAA estuarine workshop series #3 which brought about 50 Island Sound researchers (both New York and Connecticut) together to discuss habitat, environmental and fisheries concerns relating to Long Island Sound.

NOAA Estuary of the Month, Seminar Series No 3, Long Island Sound Issues Resources Status & Management PG 88-175773 Prepared for the EPA Washington CT January 1997 (Seminar date May 10th, 1989). On page S6 Donald Rhoads of Yale mentions this relationship.

"I want to leave you with an interesting thought about oxygen-organism relationships. Secondary benthic production can be very high in the hypoxic and dysaerobic zones, a phenomenon related to the abundance and high turnover rate of enrichment species that dominate these zones. This production (mainly polychaetes) may attract and support enhanced populations of benthic foagers such as demersal fish and crustaceans. However, as the basinal low-oxygen conditions spread up the sides of the basin, these commercially important predators may be compressed into an ever decreasing aerobic environment. The immediate perception may be one of increased catch per unit effort by fishermen. As a result, maximum commercial yields may be obtained just before there is a crash in the exploited populations. This crash may be related to enhanced fishing pressure, immigration of species from the encroaching hypoxic water and intensified competition for space and food in the diminished aerobic habitat space. These observations are consistent with the general observation that the early to intermediate stages of eutrophication may temporarily increase the carrying capacity of a benthic system." (Pearson and Rosenberg, 1978).

This is the type of situation that proceeded the industry lobster die off in Long Island Sound in the late 1990's just before the "crash" lobster catches soared, habitat compression did occur in waters with more oxygen a Long Island Lobster "Jubilee" but signified a much lower habitat quality.}Larger lobsters moved into cooler waters, and for a while, Cape Cod lobster catches increased. So did the state of Maine while lobster fishers in the south most likely found empty pots, dead lobsters or those diseased, called black tail. In some coastal towns, there were no small lobsters at all, such as Noank, CT once the Capital of New England lobster trade which "lay in destruction" as catches fell. Into the heat, eelgrass flourished and bottoms turned black. It is important to note that Native Americans may have left clues to previous reversals as Niantic River was once called "Black Bay." Perhaps an ancient reminder of long ago when shallow waters could turn black as part of a very long history of natural cycles (see Art Gaines, Value Judgment and Science, Woods Hole Oceanographic Institution, New England Salt Pond Data Book, June 1990, Arthur C. Gaines, Jr., Pg 17). (History of New London County D. Hamilton Hurd 1882).

The brutal heat waves of the 1890's had taken its toll on the freshwater fisheries as well. Here we see the first comments about fishery collapses and habitat failures. By 1900, states saw the failure of brook trout, a native coldwater species. Connecticut in 1901 declared brook trout now extinct, started to build the framework for the U.S. Fish Commission trout hatcheries and considered the importation of brown and rainbow trout as being more heat "tolerant." Some of the first hatchery science in the U.S. was for freshwater fish as the New England carrying capacity for trout declined for a decade. Alewife in this heat also declined sometimes "abandoning" its coastal runs (now suspected by the result of sulfide blocks).

But not all fisheries declined, black sea bass filled the Rhode Island trap nets, blue crabs now surged, and oyster sets covered the shores. Some of the best oyster sets had happened in the 1890's. In the 1870's, oyster sets were rare and New England once depended upon "Virginia plants" for seed oysters. When Block Island fishers reported tropical fish and tarpon were caught in Narragansett Bay fishery managers grew alarmed. In 1898 Rhode Island fishery managers now commissioned the Narragansett Bay Biological Survey and that annual survey continues today. A very famous striped bass fishing club, now known as the Cuttyhunk Club, moved its location north three times following huge striped bass that, into this heat, grew to enormous size, yet moved farther and farther north. The first marine experiment station was created to study the decline of coastal fisheries after an immense fish kill in Point Judith Pond, RI in 1897. The first director of this marine experiment station was none other than George Wilton Field himself, now working in Massachusetts after leaving the Rhode Island facility in 1901 (See the search for Megalops Blue Crab Forum™, Blue Crab Newsletter, Series #3, posted on November 2015 – Northeast Crabbing Resources, The Blue Crab Forum™ "Rhode Island, Blue Crab Capital.")

With both fresh and saltwater fisheries undergoing rapid change, the U.S. Fish Commission was building federal fish hatcheries (some of these programs continue today) investigating the decline of shad now thought to be the result of high temperature "sulfide blocks." It was this context that Dr. Field also hoped, perhaps, that uniform laws could stop and possibly reverse the decline of lobster in Massachusetts which had now become a popular seafood menu item for those wishing to spend summers at the shore away from the brutal "hot terms." Lobster fishers had now "ready markets" along the coast where lobsters were caught, no longer totally dependent on distant markets. The market had now moved to them as the "summer trade" from what must have been seen as a growing "summer population" at the shore. Some no doubt took advantage of this commercial opportunity, and scrubbing eggers (once a prized delicacy) and cooking "shorts" for fresh lobster meat for shore visitors was a problem as was the impacts of factory waste pollution that putrefied in slow moving streams. Overharvesting, impact of pollution and climate change would all "seats" at the lobster convention of 1903, which fishing area managers hoped would finally bring uniform lobster regulations to New England; it was not to be.

The Lobster Convention of 1903: A Missed Opportunity to Review Climate Change, Prey Relationships and Lobster Habitat Carrying Capacity

Was a decline in lobsters from overfishing or from climate? This question overshadowed the entire 1903 conference, and Rhode Island, which had several large fish kills in the 1890's including one in Narragansett Bay, put forth the strongest climate change questions.

"The ever varying conditions that exist on the surface of the earth doubtless exist in as large measure at the bottom of the ocean, in that part occupied by the fish. Just what effect is produced by the changes we will not attempt to solve at this time." Rhode Island Commissioner Southwick states "We cannot well control the effects produced by nature, hence all that can be done, if anything, is to restrict the catch by man." (Pg. 12)

That belief became pervasive in fisheries management and was to hold for over a century, what can we do about nature, delaying or dismissing critical predator/prey, carrying capacity, and climate cycles' impacts studies to the lobster fishery. In other words, the conference attempted to give nature a "free pass" for the lobster die off of 1898, which now continued. But some felt otherwise, and the Rhode Island Commissioner, Mr. Southwick, later read a paper to the convention that included this section: [My comments are in brackets, T. Visel]

"For ourselves, we think that only calculations of the inhabitants of the great deep, which ignores the fluctuations caused by nature, very fallacious" and further we ask here to be allowed to quote from Professor Baird (First Director of the U.S. Fish Commission) in his estimate of the number of fish destroyed upon our coast by blue fish at 10 billion daily or the number of menhaden so destroyed at 3 billion (daily) in the summer months. He also says this calculation might be pursued to any extent, but I have presented enough to show that the question of human agencies in the way of affecting or influencing the great ocean fisheries is scarcely worth considering." And Mr. Southwick continues "True every lobster taken causes a reduction, but the question is as to the measure of the reduction. It must, to be effective, be beyond their power of reproduction. This is the question of most importance relating to the legal control of the lobster fishery." (Pg. 40)

"So general and fixed is the belief in the efficiency of this method [controlling human catch efforts – T. Visel] that very much money and effort is continually being put into it, even though no apparent success follows, and within certain limits all are willing to acquiesce in it as on experiment, but some appear to wish it anyhow, successful or not, with these we cannot agree." (Pg. 41)

These were strong words from Rhode Island to the conference that was designed to put forth a "unified effort."

It is easy to read between the lines as J.W. Collins issues a stern rebuke to the Fisheries Commissioner, Mr. Southwick from Rhode Island, who later raises the issue of habitat carrying capacity to a species already known for its ability to eat each other – "water space" is referred to as habitat quantity and capacity as to control populations because they eat their young and each other. Today we would call these "space" issues as artificial reefs. According to Commissioner Southwick:

"… the great difficulty in the propagation of lobsters is in having the water space large enough under natural conditions to put them in after they are raised to the third or fourth moulting. Their home is in the ocean, and to find a space large enough that they can have control of is very difficult in a small state like Rhode Island. That is the difficulty in the rearing of lobsters for commercial purposes. The great destruction of lobsters, as I saw from the little experiments I had myself, was when they are in a confined space. They eat one another and fight like tigers. It is hard to get them distributed through the water and get them separated. The motion of the water in the breeding apparatus keeps them separate, but if they had a large space they would separate without the motion." (Pg. 14)

From: Our Changing Fisheries, USAPO, 1971, NOAA (In press as a US Fish & Wildlife Service Publication) on page 459 includes this reference:

"Current investigations include improving propagation techniques and living conditions for lobsters in their natural environment; one promising technique for improving lobster abundance is the construction of artificial reefs and burrows using such objects as tile pipes. An artificial reef was constructed in Boothbay Harbor in 1966 observations by a scuba team revealed a dramatic increase in the lobster population. By December 1967, lobsters utilizing the new reef and increased in number until they were six times as abundant as an adjacent natural grounds."

J.W. Collins, who co-chaired the conference, believed that overfishing was an industry condition, and New Jersey, although not invited, was mentioned.

"But the conditions that confront us today had confronted New Jersey, New York, Connecticut and Rhode Island, and may sooner or later present themselves to our friends in Maine." (Pg. 43)

{In other words, the die-off was suspected of spreading to the north but not detailed as such T. Visel}.

Commissioner Collins, whose opinion the convention valued, believed the increase in Maine's lobster catches was from an expanding winter fishery in the north (not climate related). Because of the bias at the time to seek out human causes, Collins dismisses the increase in Maine's catches as southern New England's catches declined from warm waters (Pg. 39). Winters were now open, warmer fish conditions improved as areas became ice-free – this was not mentioned at all! No one, it seems, mentioned on expanding the winter fishing season as a result of changing climate conditions that now made winter fishery possible.

"The distinguished commissioner from Maine finds that during the past three or four years, there has been a gradual increase in the yield of the lobster fishery of Maine as shown by carefully compiled statistics that have been gathered by his deputies. This would seem to indicate that there has been an increase in the abundance of the lobster. If not, why this increase in the catch? It is not necessary to seek far to find the cause," and this was the cause according to Collins was a winter fishery.

As Collins explains: [My comments are in brackets, T. Visel]

"The recent remarkable advance in the price of the lobster, especially accentuated in the winter, has led to the employment of a larger number of men and a still larger number of pots for the capture of lobsters. Also, whereas the lobster fishery was formerly pursued only six or seven months in a year, possibly eight

months in extreme cases, it has gradually become customary in these recent years for the fishermen to pursue their industry throughout the year, thus fishing about 40% of the time longer than they used to. Besides this, the winter fishery has led to the exploitation of new grounds. Now the boats sometimes go out ten or fifteen miles from land to fish, and fully investigate fishing grounds that they did not venture to visit five or six years ago. Thus, the area of available bottom resorted to has been doubled. This has led to a slight increase in the Maine catch from year to year for the past four years [I believe the rapid rise started in 1898, the year that the Narragansett Bay die off, known as "the plague," occurred and detailed by Brown University's Dr. Mead, T. Visel] because more and more of the hardy fishermen have taken up winter fishing each year recently [This period saw open winters, shorter "ice on" days and in 1899 New England weather was so warm an ice famine occurred. T. Visel]. But so far as showing any increase in the general abundance of the lobster, the contrary is true, for as already stated, there is a pronounced scarcity of lobsters on many of the inshore grounds where they were formerly present in large numbers."

[This is, of course, a form of high-temperature habitat compression lobsters leaving the shallows as determined by Rhode Island Narragansett Bay tagging studies] (See IMEP #53, The Southern New England Lobster Fisheries Collapse of 1898-1905)

In actual fact, "winter" fishery was occurring because the climate conditions from the 1870's had in time changed; it was warmer in New England and few strong storms during the Great Heat 1880-1920. That was, in essence, correct; a widespread decline had happened in the southern New England states and most noticeably in shallow waters. But conference attendees gave little review to climate conditions (This would change in two years as Rhode Island officials grew alarmed when Tarpon was caught in Narragansett Bay in 1905 with the combined incredible rise in eelgrass and the blue crab). The demand for lobster meat, mentioned several times in the conference report, came from summer visitors but made no mention of the reasons why large numbers of them sought to escape from city killer heat waves and disease outbreaks themselves, mostly tuberculosis, which spread fear and loathing to what was called "the hot term." (See appendix about Sanatoria). In this heat and dry summers, forest fires increased and coldwater brook trout had "vanished." While the lobster population collapsed the oyster industry grew rapidly in the same waters in which lobsters were disappearing, such as Narragansett Bay. No one mentioned the ice failure of 1899 just four years before the convention. And what about the blue crab, from minor importance in the 1870's, Noank, CT and Buzzards Bay, MA once thrived on inshore lobster fisheries soon found a new "blue" crustacean inhabiting its shores, the now abundant "southern" blue crab? The Great Heat of 1880-1920 for southern New England and 1890-1915 for northern New England saw oysters and blue crabs extending ranges far to the north as compared to the 1870's. Maine's rivers started to have again widespread oyster sets, which now spread into the Canadian Maritimes by 1910.

In these summer heats, black water fish kills increased, alewife and shad runs diminished and cod moved to northern cooler waters. All these factors contributed to a transitioning climate period, a warm stable coastline period with few storms. These climate shifts did not enter the discussions. As the heat moderated in the late teens and winters became colder, codfish returned in greater numbers and now found millions of small lobsters, prime food just waiting for the return of cod its chief non-human predator. The catching of larger lobsters enabled the natural carrying capacity to be moved far to the right of more yet smaller lobsters, ready to eat meals for codfish now poised to recapture lost habitat ranges. The heat would bring lower codfish catches declining in 1908 and drop to its lowest point about 5,000 metric tons in the gulf of Maine in 1915 when it started to cool in the 1920's, codfish catches recovered. This most likely contributed to lower lobster catches as cod now found an important forage base to help rebuild its population. It is important to note that cooler temperatures bring adult cod closer to (Pg. 173) shores and into habitats of small lobsters. In the spring of 1879, for example at the end of a decade of very cold New England temperatures, 11,000,000 pounds of codfish were caught in Ipswich Bay by local fishers (Bigelow & Schroder 1953, Pg. 193) and that the most prevalent bait used to catch cod was the soft clam (Pg. 196). As waters cooled, lobster growth slowed, and Maine's lobster catches tumbled while those in the south slowly recovered. With the clash of colder polar air sinking south, it energized coastal lows and it is during this period that small lobsters were cast upon the shore to die. Storm intensity and frequency increased ripping out eelgrass meadows in the 1940s, which dominated shallow habitats between 1880 and 1920 and replaced it with cleaned cobble stones and then kelp forests, a great habitat for those lobster areas in southern New England. The 1950's and 1960's saw the lobster recapture "lost" habitats at the turn of the century in southern New England.

And the blue crab which increased so rapidly at the turn of the century - it was now retreating into the warmer and shallower salt ponds and rivers. Here organics (Sapropel) allowed it to dig in and survive the winter but by the 1950s and 1960s at the height of a negative Northeast Atlantic Oscillation (NAO) colder waters and less Sapropel blue crab populations ended in may areas.

With all the information on climate patterns today from numerous sources, we should take a look at climate factors again influencing lobster stocks in New England, including habitat quality and quantity in the southern range.

The Lobster Convention of 1903 would challenge most of the assumptions of fishing impacts if a broader resource viewpoint was considered. Herrick, who had published a major study of the lobster in 1895 (he did not attend the 1903 convention), provides information on lobster carrying capacity on Cape Cod, notes that the Provincetown, Cape Cod and that the fishery started at 1800. By 1865, a marked decline had occurred; citing "Rathbun" "The Cape Cod lobster fishery has been at a low standing for many

years, and although but few men have enjoyed in the fishery of that region for a long time, there are, as yet, no signs of improvement." (Pg.22)

Now compare that to the statement from the same location in 1903 [The Lobster Convention of 1903] the Cape Cod fishery was improving. "Last year, 1902 the lobster fishery on Cape Cod never was better," pg 45. It is important to note that industry and lobster fishers were invited and did not participate in the first day regulatory discussion on September 23, 1903, but included only in the second day, September 24, 1903 the wrap-up session at 2:15 p.m. and largely gave the convention almost all of the measures for conservation and protection adopted for consideration in the final report [T. Visel] = use of a larger escape vent such as utilized by area lobster fishers on Cape Cod, a requirement having state permits, suggested uniform sizes (all states) and that lobsters be marketed live in the shell. Dr. Field supported the use of hatcheries and the conference becomes divided. "It was not found practicable for the committee to agree on any other recommendation for laws, which should equally apply to all the lobster producing states. In regard to the plan (hatcheries) advanced by Dr. Field, the convention was impressed with the idea that the experimentation had not been carried far enough to take the matter beyond the plan of theoretic, and therefore scarcely safe at this time to risk an entire change of the system of lobster protection". In other words, the construction of lobster hatcheries would continue and accelerate {CT approved funding in 1904 for the Noank lobster hatchery.}

Natural History of the American Lobster H.F. Hobart and Consideration of Water Temperatures

Would the convention of 1903 unify states to regulations or admit a climate/natural factor was a part of the decline? In the end, they decided to do both, protect the egg bearing females v-notch/gauge laws and invest some additional hatchery resources to raise stage 4 when it has a much larger chance to grow. Releasing the fry most likely fed increased Black Sea Bass, which surged in abundance during the Great Heat 1880-1920. (p. 376) Bulletin of the Bureau of Fisheries (1909, Document #47) told of the movement away from releasing lobster fry (megalops stage) to rearing lobsters until they reached stage 4.

"It further shows that the method of hatching the eggs of this animal and immediately liberating its young is ineffective, because of the meager results which can come from it. On the other hand, it speaks loudly in favor of a law to protect the large egg producers (regulation gauge v-notch), and of the newer plan of rearing (lobster hatcheries) the young to the bottom seeking stage (stage 4), as the only means pisciculture (old term for Aquaculture) can hope to aid this fishery materially."

The Natural History of the American Lobster – Bulletin of the Bureau of Fisheries Vol. 29, 1909, Document #47, Issued July 13, 1911

History of the Lobster Hatcheries

Did the 1903 lobster convention accomplish what conference organizers hoped for? No, it did not. If anything, it brought a strong rebuke from Rhode Island, which felt smaller lobsters increased habitat capacity (it did increase the gauge, actually reduces capacity for those species that are cannibals) and that weather (climate) conditions influenced the survival of young lobsters (Rhode Island's view would be largely supported by looking at climate energy and temperature cycles).

What we can do, in retrospect, is examine the lobster hatchery records themselves; they often contained habitat observations, such as the Wickford Rhode Island Lobster Hatchery reports.

We have a chance to look at an entire series of lobster hatchery reports from the Lobster Hatchery Reports from Noank, CT (Some of these reports are now posted on-line by the University of California at Berkeley). This quote is from the State of Connecticut Report of Fish and Game Commissioners 1911-1912: from a lobster fisher of the last century –

GUILFORD {CT} "The marked increase of small lobsters is very gratifying and is sufficient proof that the hatchery is one of the greatest institutions in the State, and I shall do all I can to help the Commissioners of Fisheries and Game in the protection and propagation."

In the end, what conference organizers had hoped to occur with unified lobster regulations did not happen. Lobster fishers continued to mention observations of no shorts at all. In 1904, as southern Connecticut lobster fishers continued to report a near absence of shorts in shallow waters and diseases (called black tail), a consensus formed around an artificial lobster culture of the stage 4 lobsters. Rhode Island had a major aquaculture breakthrough with its larval upweller in Wickford, Rhode Island and developed the concept of a hatchery stocking process, releasing stage 4 into an algae bottom cover.

Massachusetts would continue to push the regulatory agenda and issued a 200 page report titled "The Lobster Fishery: A Special Report - Suggestions for Unified Laws in 1911, mostly from Dr. George

Field's point of view. Massachusetts would, in time, open a lobster hatchery on Martha's Vineyard. The Boothbay Lobster Hatchery in Maine operated for nearly half a century. Eventually the cost of heating the seawater, it was felt, outweighed the benefits. Lost in the cost discussion, it appears, was the fact that seawater temperatures over time had gotten cooler and therefore cost more to heat.

In summary, all the states that operated lobster hatcheries should make these reports available to the lobster community, fishers, shippers, those involved in retail and wholesale businesses, and finally the seafood consuming public.

While the concept of overharvesting has followed the lobster fishery for more than two centuries, this latest die-off has occurred under excellent regulations. In fact, raising the gauge again will actually make the resource recovery harder (my view). Additional competition for food and space by raising the gauge does not ensure habitat quality or quantity.

In addition to the lobster hatchery efforts of the 1900's, fishery area managers suspected but did not know for certain the relationship of kelp/cobblestone to the survival of the key stage four for juveniles. They did not follow the cycles of vegetation as it compared with young of the year habitat quality. We have some excellent kelp/cobblestone habitat studies to support habitat enhancement itself, the construction of low profile "rubble reefs," which grow kelp and could help provide stage four lobsters with "new space." (See recruitment habitats and nursery grounds of the American Lobster Homarus americanus a demographic bottleneck? Wahle /Steneck 1991). We could, in fact, build more habitat capacity with artificial reefs, and we should proceed with both these site location reef efforts and investigate hatchery efforts – my view, Tim Visel.

The Southern New England Lobster Die-Off of 1898 The Lobster Convention of 1903

SUMMARY

The Lobster Convention of 1903 did not accomplish what it was intended to do, which was to unify regulations in the Maritimes including Canada. In fact, in many ways, it was an introduction to climate cycles. Maine presented data in which its lobster catches were now increasing. Maine, Rhode Island, and Canada pointed to nature and environmental factors as guiding lobster populations. The southern New England states and its fishery managers at the time were frustrated by these comments, thus the section from conference proceedings written by Joseph W. Collins:

"The distinguished commissioner from Maine finds that during the past three or four years there has been a gradual increase in the yield of the lobster fishery of Maine, as shown by carefully compiled statistics that have been gathered by his deputies. This would seem to indicate that there has been an increase in the abundance of the lobster. If not, why this increase in the catch?"

States reporting catch increases were not what conference organizers had anticipated. In reports at the time discussed a unified regulatory approach about sizes as "shorts" were a problem, especially areas in northern New England and in the Canadian Maritimes where a number of short lobsters had risen dramatically. The 1903 Lobster Convention transcripts record this frustration as representatives of several states mentioned climate factors and that, in some regions, lobster populations were in fact increasing. Nova Scotia, Canada felt that it was climate and was preparing for sector management; lobster biology conditions for the north were different than those in the south. Others at the convention agreed. Rhode Island felt it was the impact of temperature and strongly opposed additional regulation upon the industry. Some good rules happened, releasing eggers and trap escape vents. Rhode Island supported seasons, and did so in 1904, but reversed itself in 1905 as having no effect. Maine continued to press the point that as the lobster populations continued to die off in the south, lobster catches in the north were increasing and Canada was preparing individual management zones. Each area was climate different and was to be considered for lobster management separate. So instead of unifying regulations, Canada was poised to establish different rules for each section of its Maritimes. Mr. Southwick of Rhode Island read a prepared statement that concerned dramatic water temperature warming as a natural impact – and referenced Spencer Baird, the U.S. Fish Commission Director himself, who also felt climate cycles deserved a closer look with temperatures before enacting additional regulations – Southwick of Rhode Island comments:

"What is the cause of diminished size and decreased numbers? Admitting that both are true, these are important matters in the settlement of the very great questions how to stop a reduction and how to cause an increase of lobsters in our waters. If we can determine the cause we can better arrive at a conclusion as to what will be a remedy, as a doctor first diagnoses his case before attempting to apply remedies. Heretofore, remedies have been tried with no better result than generally follow quack practice. Restrictive laws have not sufficed to increase the numbers of lobsters, and we should be very glad could we know that artificial propagation had been made a commercial success. We would be the last to say a word to discourage the efforts made in artificial aid to nature in every way it may be applied to the lobsters or any other of our fisheries. There has been so much accomplished that we have great hopes of much more in the future. The importance of the object aimed at justifies all the effort that may be made and any expenditure of time and money it may require." …

"Yet there is another peril, which we have not mentioned —the diseases to which they are subject, for we cannot believe they are immune from what attacks other forms of life. The ever-varying conditions that exist on the surface of the earth doubtless exist in as large measure at the bottom of the ocean —in that

part occupied by the fishes. Just what effect is produced by these changes we will not attempt to solve at this time."

Additionally, Mr. Venny, the speaker from Ottawa, Canada was reported as saying:

"First, I desire to tender the thanks of the Department of Marine and Fisheries of Canada for the opportunity my colleague, Mr. Bertram, and I have of being here today, and the benefit we have received from the information given us by gentlemen of the different States. But of course we are here in a rather peculiar position. We will gladly give you the benefit of anything we know. If we in the Dominion have done something, which seems better to you than you have been able to do, we will be very happy to explain those points to you. But I don't think we can undertake to join in any agreement you may make about the sea and shore fisheries. Of course the lobster is a peculiar animal, and each country and perhaps each State must deal with it according to the needs of their respective localities.

Professor Prince in 1896 wrote: — "In the Dominion of Canada there remains the last great lobster fishery of the world, and it is not too much to say that this fishery has reached a critical stage."

"From time to time since 1873 restrictions have been imposed upon our lobster fisheries. As long ago as 1877 the necessity for sectional close seasons was recognized and admitted by Canadian legislation; and, although changes have since been made in the dates and geographical divisions, the principle has not only been maintained but greatly extended, inasmuch as at present there are no less than seven different close times."

"The question of a uniform close season has been open to much argument in the past, and the records of the department reveal that scarcely a season has passed without concessions, based on geographical and climatic conditions in different districts."

"I notice nothing has been said here to-day leading to the idea that you have any close seasons for lobsters. It seems that you are satisfied with attempting to save the lobster by the size limit. We go farther in that respect. We have seven sections in the Provinces having close seasons varying from eight to ten and a half months. We regard that as very important. We put berried lobsters out after the close season comes in force and after the open season is over, and therefore we think they cannot be caught again until the next open season. The close season with us is really the most important factor in the regulations."

"Lobsters are climatic. The difference in the legal lengths permitted by our regulations is explained in this way." (Collins, J., Report Upon A Convention held at Boston, 1903, to Secure Better Protection of the Lobster, pp. 18-22)

For the fishery management efforts, the conference was not accomplishing what fishing managers had hoped. Scarcely a season has passed without concessions "based upon climate conditions in different districts." In fact, the 1903 Convention had done more to identify differences of opinion and climate questions based upon temperature than uniform laws. It must have been frustrating for convention

organizers as attempts to unify regulations across large regions were failing. I think Dr. Field carried more than J.W. Collins ever realized to the convention and if I may read between the lines to "Dr. Fields' plan," George Wilton Field brought his personal experience as well to what habitat failure meant to inshore fishers; Dr. Fields was familiar with 1897 Fishkill at Pt. Judith Pond of Narragansett, Rhode Island. It was here that a growing land grant agricultural school we know today as a University of Rhode Island opened up the first marine laboratory in 1898 – staffed by Dr. Field. He was also in Rhode Island to see the beginning of the lobster die-off detailed by Dr. A. D. Mead of Brown University in Narragansett Bay itself. (An Investigation of The Plaque Which Destroyed Multitudes Of Fish And Crustacean During The Fall Of 1898 – November 18, 1898 issue of Science Magazine Vol. 8 #203.) Seeing these types of sulfide/low oxygen fish kills in the Southern New England was for different than the cooler, oxygen-rich shores of Maine. Blackwater events were rare in Maine (except those rivers obtaining pulp from lumber mills or paper factories) and storms killed many more lobsters in shallow water then black water. I feel after reading, the convention meeting summary was written by J.W. Collins, perhaps Dr. Field felt that this situation alone could not be solved by unified regulations and why perhaps his experiences would begin a lifelong support of Aquaculture? In many books today, Dr. Field is mentioned as the "Father of Aquaculture" and that interest possibly be traced to the lobster die-off of 1898.

The climate of southern New England was hot but warmer waters had increased lobster catches to the north. This difference was not easily explained and led to further division. Rhode Island, for example, felt a smaller lobster is more suited in its region and would have its own legal size lobster for 70 years. Maine would develop a double gauge and the v-notching of lobsters. Massachusetts and Connecticut moved to uniform laws. All, however, built lobster hatcheries.

In the end, New England states all soon had operational lobster hatcheries, realizing that it was perhaps not all a "regulatory solution." Something had happened to the "shorts" and fishery officials, even those who supported stricter laws, eventually supported the construction of lobster hatcheries. What had happened was beyond just better laws.

I have been asked many times recently if the "Aquaculture" lobster hatchery efforts a century ago – helped the lobster industry rebuild. I believe they did. The same question could be asked of Agriculture, "Does it help raise food?" The quick short answer is "yes," but one can have the best soil pH, the most expensive seed, and a proper nutrient balance, but if it does not rain, "all is lost."

That is what farmers and fishers face, the uncertainties of nature itself. Today we call it cycles; long ago it was "feast or famine."

We should not ignore the fact that turn of the century hatchery efforts coincided with a growing negative NAO phase – the climate conditions favorable for lobster megalops to stage four improved in the 1940's and 1950's (See NOAA Climate Prediction Center North Atlantic Oscillation – NAO Index since January 1950). It got colder. As kelp beds grew in southern New England, lobster recruitment now improved. By the late 1950's in a cooler climate period, these hatcheries were nearly all closed. The

warm waters of the 1890's had turned cool once again. While the hatcheries were active, however, the lobster fishery continued.

I respond to all emails at tim.visel@new-haven.k12.ct.us

Appendix A

New England Climate Conditions after 1864

492 – Boston Medical and Surgical Journal – May 3, 1906

Dr. William Ogle has shown that fishermen, who are from the nature of their occupation, exposed to the greatest amount of moisture in the air and surroundings, have the lowest death rate from respiratory disease, and that occupations necessitating an indoor life the highest, where presumably they are more protected from dampness and the vicissitudes of weather. The late Dr. Abbott of our State Board of Health conclusively demonstrated tuberculosis to be essentially an indoor disease and the outdoor treatment is our so-called damp and cold (The New England Journal of Medicine, Vol. 154, Pg. 491).

The incidence of tuberculosis, an infectious bacterial disease primarily of the lungs, once called consumption, soared after 1898, as cities felt the burden of outbreaks resulting in the construction of sanatoria for "fresh air" after reports were circulated such as the above after 1906. Sanatoriums were often built on lakes and by the sea. The Catskills in New York became the location of the first sanatorium for the treatment of tuberculosis. In 1930, the State Commission on Tuberculosis would purchase the Smith-Crimes estate in Waterford, CT and became a "Seaside Sanatorium" until the use of streptomycin made such establishments unnecessary. For half a century, people with tuberculosis would seek out salt air, believing it had curative powers. This belief of "salt air" continued far into the 1950s and 1960s. The estate is now scheduled to become a state park.

Appendix B

United States Commission of Fish and Fisheries

47th Congress First Session, Document 124, Part 3

Geographical Review of the Fisheries -

R. Edward Earl 1883 – Print Date 1887 GPO

New Jersey Northern Coast, Pg. 391

[My inserts/comments are within brackets T. Visel]

Northern New Jersey The Southern Limit of the Lobster Fishery

"Lobsters are found all along the New Jersey coast, but not in sufficient numbers in its lower half to warrant the fishermen in engaging in their capture. The lobster fishery of the state is therefore confined to its northern portion or to the region lying between Sandy Hook and Squan River, this being the southern limit of the lobster fisheries of the United States. The fishermen of northern New Jersey have been engaged in the capture of the lobster for many years, and about 1860, the fishery is said to have been quite important [This represents a much cooler period but increasing warmth in the 1860's – T. Visel]. From that date, the business gradually declined [This is the warming influence – T. Visel] until, in 1870, the capture of the species was almost wholly discontinued. In 1872, the fishery again to revive [This explains the impact of bitterly cold winters most likely created cold waters along the shore – T. Visel] and at present time large quantities of lobsters are taken in the region" [The 1870's had some of the coolest temperatures in perhaps several hundred years. The winter of 1873-1874 was so cold, minus 20oF or lower for days that apple trees froze and cattle in unheated barns died in Connecticut – T. Visel].

In 1880, there were fourteen boats with twenty-eight men engaged regularly in the capture of lobsters in connection with their work in the line and net fishery, the catch being sold in New York and Philadelphia and partly to the local trade. The pots, which are covered with netting, are usually set in May [about the same temperature range as the July "run" on the Long Island Sound – T. Visel] and the fishing continues until October, though a few men begin fishing early in March, and others fish until the last day in November [Also, the fall/early winter "run," usually around Thanksgiving in Long Island Sound, can be almost as large as the July "run" but of much shorter duration – T. Visel].

Appendix C
State of Connecticut --Report of Fish and Game Commissioners
1911-1912
Commissioners:
Frank W. Hewes, M.D., President
Groton, Connecticut
E. Hart Geer, Secretary
Hadlyme, Connecticut
Frank O. Davis
Pomfret, Connecticut

Lobsters. Through enactment of the Legislature of 1905, the propagation of the lobster was placed in control of this Commission. Previous to this little or no attention was given to lobster protection and none to artificial propagation.

The statistics collected by the United States Bureau of Fisheries in 1908 shows there were TEN persons pursuing the occupation of lobster fishing at Noank. In 1902, your Commission issued thirty-two permits for persons to engage in the lobster fishing. This number does not include quite a number of persons who confine their fishing operations in New York waters, but who live in and bring their product to Noank, and who take out no permit from this Commission.

The Acts of 1907 require lobster fishermen to furnish statistics of the fishery, and we find, at that time, 247 people engaged in lobster fishing, with a product of 391,203 pounds of lobsters, valued at $56,475.00. The statistics for 1912 show 498 permits issued by the Commission. The produce amounting to 514,579 pounds of lobsters at a value of $76,986.00. This increase, perhaps, serves as an index to the extension of the fishery.

- Connecticut Lobster Fishery Observations 1911-1912 -

NEW HAVEN.—" Not many lobsters this year. There is quite a few small lobster. No egg lobsters have been caught in three years."

NIANTIC.—"Lobsters scarce; more small ones than last year."

MADISON.—" I have noticed a large number of very small lobsters the whole season for taking in deep water. Egg lobsters are quite plentiful now, and these I find in shoal water close to the shore."

MYSTIC.—" Large lobsters have been very scarce. Small lobsters from four to seven inches long have been plentiful."

GUILFORD.—" The marked increase of small lobsters is very gratifying and is sufficient proof that the hatchery is one of the greatest institutions in the State, and I shall do all I can to help the Commissioners of Fisheries and Game in the protection and propagation."

EAST RIVER.—" A large number of very small lobsters."

BRANFORD.—" Early in the season lobsters seemed to be plentiful enough, but towards the end they became scarce. there are a lot of undersize lobsters in this vicinity which I think will be of size next season. Most of these seem to be perfect and not injured in any way. These undersize lobsters seem to stay in one place."

CLINTON.— "Small lobsters have seemed more plentiful for the last two seasons, but it may be because there are fewer big ones. Little ones are not apt to get into pots when there are large ones around."

COS COB.—" Large quantities of small lobsters this year. More than usual."

ROWAYTON.—" I found plenty of small lobsters, but the large ones were scarce."

NOANK.—"The Sound off Noank was full of small lobsters all summer, from two to four inches long."

STONY CREEK. —" I find a large number of very small lobsters the past two years of a size that I have not caught at any time previous to last year. Have fished lobsters about 18 years. My report includes last fall after the report was sent in, as I lobstered to December 1st."

WESTBROOK.—"There were lots of small lobsters. Should be better next season."

WATERFORD.—" The lobsters were more than last year. There have been more small lobsters this year than I have seen before in eight years, so it looks more encouraging than it was for four years. Lots of small ones."

STONINGTON.—" Lobsters were few, that is large ones, but there were a large number of short ones and a large number of them from five to seven inches long."

STAMFORD.—" I have found lobsters very scarce. Plenty of small ones not fit to sell."

Report of the NOANK Lobster Hatchery 1911-1912

Noank Station. In procuring the eggs for the operation of this Station the same general policy has been pursued as heretofore, by purchasing the adult lobster with the egg attached. These were collected from the fishermen the entire length of the coast, who are paid the full market price. After the eggs have been removed and placed in the hatching jars, the parent lobsters are returned to the waters of Long Island Sound, as near the same locality as possible from which they were taken.

During the biennial period, 1,474 ripe egg lobsters have been collected, from which 25,585,990 eggs were obtained, resulting in the hatching of 22, 750,000 fry which was planted in the coast waters.

During this same period, there were also collected 1,586 green egg lobsters, making a total of 3,060 egg-bearing lobsters collected, of which number 1,586 were held in cars during the winters, and the balance, 536, were returned to the water.

In the seven years of the operation of this hatchery, 208,761,870 fry have been hatched and liberated.

The lobster fishery in the State of Maine is the largest in the United States, and nearly 14,000 egg lobsters were collected the past season for the Federal hatchery at Boothbay Harbor. This is the largest collection ever made in one season. Conditions in the other New England States indicate a material decrease in the egg lobster collections with a corresponding reduction in hatcheries output.

The Noank Station* was visited by a representative of a foreign country who showed much interest in the hatching operations at this station. Your Commission supplied several adult lobsters to the Wickford Experiment Station* in order that this representative could observe the practical methods as conducted by the Rhode Island Commission.

[Note - *

These were often referred to as Marine Experiment Stations modeled after land prototypes, The Agriculture Experimentation Concept. The NOANK and Wickford stations operated the lobster hatcheries - Tim Visel]

Twenty-eighth Report of the Commissioner of Sea and Shore Fisheries of the State of Maine: 1903 - 1904

The U. S. Fish Commission has assisted this department by making collections for a part of the season in the western section of the State waters. It has also secured an artificial saltwater reserve in Lincoln county and is experimenting in the keeping of lobsters therein, awaiting transportation to the hatchery, and for other purposes of observation and investigation under natural conditions.

The following report for the two years 1903 and 1904 shows the magnitude and importance of this duty performed by the "Sea Gull," and it will be interesting to learn as to the collection and dispersing of the lobsters, and millions of fry hatched from them and returned to our waters. Account of purchase from fishermen of egg-bearing lobsters, and disposition for the year 1903.

Number purchased from March to November 30 14,173

DISPOSITION.

Transported to U. S. Hatchery at Gloucester, Mass., for scientific investigation and propagation of eggs: 1,925. The lobsters were later returned and liberated in Maine waters. Impounded at the U. S. Reserve in Bristol, Lincoln County to be cared for by U. S. officials: 6,801. These were in the following spring taken to the Gloucester, Mass., hatchery, the eggs hatched, and the mother lobsters all returned and liberated near the place of purchase. Number liberated at time and place of purchase 5,447

The young hatched from the above eggs were cared for at the Gloucester hatchery and were subsequently brought here and deposited to the number of 32,700,000 eggs, as will appear by reference to the following table for 1903.

LOBSTER FRY PLANTED IN MAINE WATERS, 1903.
Date of Plant Number fry planted Point of Deposit 1903.
June 5 1,200,000 Casco Bay, near north shore, Great Diamond Island.
June 10 1,500,000 Portland Harbor, In cove northwest of Portland Head Lt. Casco
June 11 1,500,000 Casco Bay, in a cove near the south shore of Mackey's Island.
June 12 1,500,000 Casco Bay, in a cove near the north shore of Cushings Island.
June 13 1,500,000 Casco Bay, east side entrance to Fore River.
June 15 1,500,000 Casco Bay, south shore Clapboard Island.
June 16 1,500,000 Casco Bay, Diamond Island Cove.
June 17 1,500,000 Casco Bay, near north shore Half Way Rock.
June 19 1,000,000 Maine Coast, off Cape Porpoise.
June 19 1,000,000 Maine Coast, north shore, Wood Island.
June 19 500,000 Maine Coast, south shore, Small Point.
June 19 1,000,000 Maine Coast, east shore, Pemaquid Point.
June 19 1,000,000 Maine Coast, Port Clyde, near shore.

June 19 1,500,000 Casco Bay, nearshore, Back Bay.
June 21 1,500,000 Maine Coast, Rockland Harbor.
June 20 1,500,000 Casco Bay, southeast shore, Peaks Island.
June 22 1,500,000 Casco Bay, near east shore Cushings Island.
June 23 1,500,000 Atlantic Ocean, off Kittery Point.
June 24 1,500,000 Atlantic Ocean, off York Harbor.
June 25 1,500,000 Atlantic Ocean, off York Harbor.
June 26 1,500,000 Atlantic Ocean, Kittery Point, off Whaleback Light.
July 2 500,000 Gulf of Maine, Richmond Island Harbor.
July 2 500,000 Gulf of Maine, Wood Island Harbor.
July 2 500,000 Gulf of Maine near south shore, Kennebunkport.
July 3 1,500,000 Casco Bay, at Diamond Island Bar.
July 7 1,000,000 Delivered to A. R. Nickerson for distribution, 333,000 to each,
July 7 500,000 Vinalhaven, Stonington and Cranberry Island. Boothbay Harbor, near Cape Newagen.
Total fry planted on Maine coast. 32,700,000

Account of purchase by this department of egg-bearing lobsters, and what was done with them for the year ending November 30, 1904.

Number bought from November 30, 1903, to November 30, 1904, 16,076
Number taken to the U. S. Hatchery at Gloucester, Mass. 1,646
Impounded at the reserve at Bristol, and subsequently taken to the hatchery 8,638
Number liberated at time and place of purchase 6,232
Quite a number of lobsters were caught and re-purchased. 1903 1904
Number punched 2d time 396 310
Number punched 3d time 18 35
Number punched 4th time. 9 7
Number punched 5th time — 1

For the information of those interested I will state that when a lobster is purchased, before being released a small hole is punched in the middle flipper, thus it will be understood that in 1903, for instance, nine lobsters were released, being marked with five perforations in the flipper, and in 1904 one was decorated with five punch-holes before liberation.

The lobsters taken to Gloucester as above to the number of 10,284 were after the eggs were hatched, returned and liberated. Young lobsters hatched from the eggs to the number of 53,950,000 were subsequently distributed in our waters along the shore.

Atlantic States Marine Fisheries Commission

Winter Flounder Management Board

May 2, 2018
3:30 - 4:15 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order *(D. Pierce)*	3:30 p.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from February 2018	3:30 p.m.
3.	Public Comment	3:35 p.m.
4.	Review and Consider Rhode Island Proposal on Commercial Trip Limits **Final Action (***M. Ware***)** • Overview of Rhode Island Proposal • Technical Committee Report • Consider Approval of Rhode Island's Proposal	3:45 p.m.
5.	Other Business/Adjourn	4:15 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Winter Flounder Management Board
May 2, 2018
3:30 – 4:15 p.m.
Arlington, Virginia

Chair: Dr. David Peirce (MA)	Technical Committee Chair: Paul Nitschke (NEFSC)	Law Enforcement Committee: Kurt Blanchard
Vice Chair: David Borden (RI)	Advisory Panel Chair: Bud Brown	Previous Board Meeting: February 6, 2018
Voting Members: ME, NH, MA, RI, CT, NY, NJ, NMFS, USFWS (9 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the Agenda. Individuals that wish to speak at this time must sign in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Rhode Island Proposal on Commercial Trip Limits (3:45-4:15 p.m.) Action

- In February, Rhode Island presented a proposal to consider aggregate weekly trip limits in the commercial SNE/MA winter flounder fishery.
- The Board tasked the TC with reviewing this proposal. The TC met via conference call on March 6th and April 17th to analyze the potential impacts of this proposal.

Presentation

- Review of Rhode Island's proposal by M. Ware **(Briefing Materials)**
- Technical Committee report by P. Nitschke **(Supplemental Materials)**

Board Actions for Consideration at this Meeting

- Consider approval of Rhode Island's proposal

5. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

WINTER FLOUNDER MANAGEMENT BOARD

The Westin Crystal City
Arlington, Virginia
February 6, 2018

TABLE OF CONTENTS

INDEX OF MOTIONS

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Sen. Brian Langley, ME (LA)
Doug Grout, NH (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
David Pierce, MA (AA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Colleen Giannini, CT, proxy for M. Alexander (AA)
Sen. Craig Miner, CT (LA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
Jeff Brust, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Alison Murphy, NMFS
Sherry White, USFWS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Paul Nitschke, Technical Committee Chair

Staff

Robert Beal
Toni Kerns
Megan Ware
Jessica Kuesel

Guests

Rachel Baker, NOAA
Bob Ballou, RI DEM
Chris Batsavage, NC DMF
Peter Burns, NMFS
Rene Cloutier, ME Marine Patrol
Heather Corbett, NJ DFW
Steve Murphy, NC DMF
Jeff Pierce, AHOM
Arnold Leo, E. Hampton, NY

The Winter Flounder Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Tuesday, February 6, 2018, and was called to order at 2:15 o'clock p.m. by Chairman Robert E. Beal.

CALL TO ORDER

CHAIRMAN ROBERT E. BEAL: I would like to call the Winter Flounder Management Board to order. As with the Herring Section, my name is Bob Beal; I'm the Executive Director of ASMFC. The Winter Flounder Management Board finds itself with no Chair and Vice-Chair at this time; due to similar circumstances in that there have been retirements and other issues that have prevented those folks from serving that were previously elected.

APPROVAL OF AGENDA

CHAIRMAN BEAL: I will kick off the meeting and move through the agenda all the way up through the election of Chair and Vice-Chair; and then the newly elected Chair will take over the meeting from that point on. With that there has been an agenda distributed in the briefing materials; any changes or additions to the agenda? Seeing none; the agenda is approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN BEAL: We have a series of minutes from about a year ago, so January of 2017 is the last time this Board has met. Are there any changes or adjustments to those minutes from the last meeting of the Board? David Pierce.

DR. PIERCE: Yes, on Page 2 of the minutes, the first column about the fourth paragraph down. There is a sentence that reads; in terms of considering changes to our states waters acidification. I think that is supposed to be specifications, so just a change in that would be useful.

CHAIRMAN BEAL: Thank you, David; somebody appeared to be overly worried about ocean acidification was trying to get it in there as much as they could. All right, we will make that change. Are there any other adjustments to the minutes from January, 2017? All right seeing none; those proceedings stand approved.

PUBLIC COMMENT

CHAIRMAN BEAL: Public comment, is there any public comment for items that are not included on the agenda? Seeing none; we'll keep moving forward.

ELECTION OF CHAIR AND VICE-CHAIR

CHAIRMAN BEAL: Agenda Item Number 4 is election of a Chair and Vice-Chair for the Winter Flounder Management Board; any nominations? Pat Keliher.

MR. PATRICK C. KELIHER: After a lot of deliberation, **I would like to nominate the only person in the room who read the minutes of the Winter Flounder Meeting, David Pierce from the Commonwealth of Massachusetts for Chair; and from the great little state of Rhode Island, David Borden for Vice-Chair**.

CHAIRMAN BEAL: Thank you Mr. Keliher, is there a second to those nominations? Ritchie White, thank you. We have nominations before the Board; David Pierce as Chair, David Borden as Vice-Chair**. Are there any objections to the approval of these two nominations for the leadership of this management board? Seeing none; congratulations David and David, good luck.** Now I will step down.

CHAIRMAN DAVID PIERCE: Well thank you everyone. I started my career working on winter flounder back in 1972. My career is not yet over; but nevertheless it's nice to get back to winter flounder in a meaningful way. We've covered everything on the agenda up to this particular point.

REVIEW OF THE 2017 GROUNDFISH OPERATIONAL STOCK ASSESSMENT FOR GULF OF MAINE AND SOUTHERN NEW ENGLAND/MID-ATLANTIC WINTER FLOUNDER STOCKS

CHAIRMAN DAVID PIERCE: Next on the agenda we have Review of the 2017 Groundfish Operational Stock Assessment for Gulf of Maine as well as Southern New England/Mid-Atlantic Winter Flounder Stocks. Paul Nitschke is going to provide that review for us; if you would, Paul.

MR. PAUL NITSCHKE: Good afternoon. My name is Paul Nitschke; I'm Chair of the Winter Flounder TC. I work in population dynamics in Woods Hole. I also have the lead on the Gulf of Maine winter flounder assessment, and I'm also the population dynamics representative on the groundfish PDT.

First I want to go through a little bit of the process that the Center is trying to do with the operational assessments. We're planning on trying to do these assessments, these operational assessments every two years; so that we rely less on projections. We have learned from the past that relying on old projections hasn't worked too well.

The projections tend to be overly optimistic and biased high. We have gotten burnt from that in the past. Now the plan is to update the assessments more often, rely less on the projections. In doing this we do these operational assessments. They are not full benchmark assessments; however there is a review component to these operational assessments also.

We do all 19 or 20 stocks every two years for groundfish. The last time we did them was last summer; and the review was in September. The other initiative is to do this efficiency initiative; to make the assessments more automatic. Put all the information online for everyone to see, it's more of a transparent process.

All the figures and tables are online on this data portal at this website. The figures and tables are updated; there are the model inputs and outputs, diagnostics, maps from the surveys, maps from the commercial fisheries. There is a lot of information on the data portal. For the operational assessments, we have these generic terms of reference.

There are some restrictions on changes that can be made; in order to get through all 20 stocks in one week. For the last round we basically updated the data; so we added two years of information to the analytical models. We run the models and estimate the stock size and fishing mortality rates, update the biological reference points, evaluate stock status, estimate the overfishing limits and catch advice coming out of those models.

Of course we have source of uncertainty and research recommendation. There is also Plan B developed in case the models don't pass peer review; so there is something to fall back on if they fail that review. This time around we had some information on catchability. This came from some cooperative research work that was recently done.

This information was used as a diagnostic in the analytical models. For some of the empirical assessments it was used directly in the estimates. As I've said there are some things we don't change. We don't change the life history; such as the natural mortality rates, selectivity, weightings in them all we don't try to change or haven't changed in the past. We retained this rule for the retrospective; which was developed at GARM III basically doing it on a retrospective adjustment, if the Mohn's Rho is outside of the 90 percent confidence intervals of the model. However, this didn't apply to the winter flounder stocks.

First up I'm going to go through the Gulf of Maine winter flounder Operational Assessment. I have the lead on this stock. This was last updated at the 2015 Operational Assessments. The benchmark is in 2011 at SARC 52. This is an empirical approach based on 30 plus survey area swept estimates.

Gulf of Maine winter stock, the stock status is overfished is unknown and overfishing is not occurring. The Gulf of Maine stock was historically the smallest of the three winter flounder stocks. It's concentrated in inshore waters in Mass Bay and Cape Cod Bay mostly north of Cape Cod. The Analytical assessment did not pass peer review at GARM III. It also did not pass peer review again at SARC 52; basically due to a very large retrospective pattern.

We tried looking at different models. We looked at the VPA, scale model, the ASAP model, other statistical catch-at-age models. But they all have this real major conflict within the data. Basically the models can't handle this lack of a relationship between the large decrease in the catch over the time series with little change in the indices and age structure over time.

Now the assessment is basically just based on the straight 30 plus area-swept biomass which comes directly from the surveys. For the operational assessments we do update the trends; just to keep an eye on them. There are updated trends for the NMFS survey, Mass DMF survey, and the Maine/New Hampshire surveys.

For this round we estimated the catch for 2015 with a terminal year of 2016. The catch is comprised of the commercial landings and recreational landings, recreational discards, the large mesh trawl discards and the gillnet discards. You can see here there is a large change in the landings over the time series from the 1980s.

There has been a large reduction. At the end of the time series we were around 5 percent of what the landings were in the 1980s. Most of the landings are coming from the state of Massachusetts, and from the trawl fishery. In the past about 20 percent or so came from the gillnet fishery.

Here are the total removals for the Gulf of Maine stock. The recreational component was significant in the 1980s. That pretty much disappeared in the early 1990s, and remains a very minor component of the removals. Once again you can see that large decline in that catch series. Here are the trends in the raw survey indices. On top is the NMFS surveys, in the middle is the Mass DMF surveys, spring and fall, and on the bottom is the Maine/New Hampshire spring and fall surveys.

The surveys tend to be relatively flat over the entire time series. The Mass DMF spring surveys show perhaps a slight decline over the time series. However, the Maine/New Hampshire spring survey shows a little bit of an increasing trend. Now the assessment is based on just the area swept from the surveys. The issue with winter flounder is we don't have a survey that covers the entire stock. We basically use three different surveys with non-overlapping strata to try to cover the stock. We use the NMFS survey to cover the offshore strata and strata in Mass Bay and Cape Cod Bay. The Mass DMF survey is used for the very shallow strata in Cape Cod Bay and Mass Bay. Those strata are very small. However, there are very large catches in those strata.

North of Massachusetts we used Maine/New Hampshire survey. This is a larger area, however very few, 30 plus area fish are caught in that survey. Here are the numbers that go into that expansion. On the top is this survey area. Then we've got the footprint for each survey, which produces that expansion factor.

This is the length frequency distribution from the Maine/New Hampshire survey. That survey does catch a lot of fish; however from these length-frequency distributions you can see that very few 30 centimeter plus fish are caught in that survey. Here is the basic equation for exploitable biomass. It is just simply the 30 plus biomass index multiplied by this expansion factor; which is the total survey area divided by the tow footprint times q.

Now q here you can think of as the efficiency of the gear itself. It's an important assumption and the results are sensitive to that estimate or that assumption of q. For exploitation rates is just

simply the catch over the 30 centimeter plus biomass. For Gulf of Maine winter flounder we developed biological reference points based on F40 from a length-base-yield-per-recruit analysis, which had the same life history assumptions that went into the 30 plus area swept.

We used a 30 plus centimeter knife-edge selectivity in that yield-per-recruit analysis, and a natural mortality rate of 0.3. This produced an FMSY exploitation rate of 0.23, 75 percent of that value is 0.17, which was used for determining the ABC. At SARC 52, we had very little information on what that q should be in this empirical approach.

At that time we had a range of differing q assumptions; 0.6, 0.8, and 1. The SARC 52 Review Panel basically picked the 0.6 assumption based on some information on the Georges Bank winter flounder BPA at that time. However, now we have some experimental information on efficiency from the Bigelow from winter flounder.

That average estimated q came out to 0.866 and was used for this assessment. We basically used the average of the fall survey queues to come up with that 0.866 value, which was used for all three surveys, acknowledging the fact that the different surveys have different gear types. The experiment basically looked at the efficiency of the Bigelow net, which is on the left here.

The Bigelow uses a roller gear so that the survey can sample different habitat types. For this work we want to look at the efficiency of flat fish, so we compared the catch rates from the Bigelow net versus a flat fish net. The flat fish net, flat net was a state of the art net for catching flat fish, had a thick chain for the foot rope instead of the roller gear, and tended bottom very closely.

These are the results that came out for winter flounder that came out of that comparison between the chain sweep and the rockhopper gear, at different lengths and for day and night tows. At night you can see there was very little difference actually in the efficiency between the two different gear types. During the day there was a difference with the chain sweep catching more fish than the Bigelow gear. We only used a 30 plus centimeter difference here, which produced just 0.87 q assumption. These are the results coming out of that calculation for all the different surveys. On the bottom is the fall survey and on top is the spring survey. The different colors represent the different surveys that go into that total estimate for the biomass. At SARC 52, the decision was made to use the fall survey, because there were concerns that in the spring we could be missing fish due to spawning within the estuaries where there is no survey information.

However, as we update these estimates, you can see that the total estimates for the spring and fall are pretty similar now. There is not a lot of difference between the two. The arrows here signify what data is used in determining the actual catch advice. When we update the assessments every two years, we basically use every other year for that catch advice.

You can see here from 2014 to 2016 that that total estimate does decrease between those two years. That contributes to the reduction in the ABC for this stock. The other big contributing factor to the reduction is the change in the q assumption. That basically results in a 30 percent reduction in the catch advice.

Here are the exploitation rates coming out of the spring and fall surveys producing very similar trends and relatively low exploitation rates over time. Here is the biomass trend from this method for the Bigelow years. One of the puzzling results to this is we have this declining biomass trend.

However, the exploitation rates are low and far below the overfishing definition. It's not clear why the stock is not responding to the low exploitation rates. Another way of looking at this stock status plot, you can see here the biomass tends to be

declining under these low exploitation rates. One of the major sources of uncertainty is to q.

There was a review of the sweep study. There was some concern about sample size for winter flounder in that study. More information on estimating that q would give us more confidence in the area swept estimates; and also more studies on the state surveys, because they used a different gear type.

Another comment was to perhaps produce more stable catch advice coming out of this method by using multiple years or multiple surveys. There is quite a bit of inter-annual variability in the estimates. Doing some sort of moving average would perhaps stabilize that catch advice. As I've said, one of the major concerns is why isn't this stock responding to the low exploitation rates?

A general concern is the fact that this method, you can't get a biomass status out of it. The PDT produces these; we call them catch performance plots. We produce these plots for the SSC to consider for all the groundfish stocks. Here you can see we put on the recent catches. Compare that to the historical OFLs, and the ABCs that came into play in 2010.

Then there is a catch assumption; for the analytical models this is the catch assumption used in the projections themselves for the bridge here. Then in 2018, '19 and '20, you can see the updated estimates coming out of the new assessment. You can compare that to the results from the past and you can see how that changes. Here you can see the black line, which was the historical ABCs compared to the updated ABCs, which is that blue line. There is a pretty big reduction in that catch advice. The yes/no on the X axis represent the overfishing status in the terminal year of past assessments. I also included just the straight numbers from that plot if people are interested in seeing the actual numbers and the changes in those numbers. For this one the OFL is simply based on that FMSY estimate multiplied by the 30 plus centimeter area-swept estimate; and the ABC is 75 percent of that value. The OFL was calculated at 596 metric tons and the ABC was 447 metric tons; which has held constant for the three years. I can take questions on the Gulf of Maine or I can go into southern New England if you want.

CHAIRMAN PIERCE: Let's work off of the Gulf of Maine for now. Do any of you have questions for Paul regarding the operational assessment for Gulf of Maine winter flounder? David Borden.

MR. DAVID V. BORDEN: Paul, have you ever plotted the rise in the seal population in the Gulf of Maine versus population of winter flounder; to see if there is a correlation between the two? I keep reading all these news releases from various sources talking about there being dramatic increases north of the Cape. Is there a relationship here?

MR. NITSCHKE: Yes, I mean there is a dramatic increase in the seal population. I don't know how many survey numbers we have. We do know there is a large increase in that population; especially also it affects the southern New England stock, maybe even more important for the southern New England stock with the gray seal explosion on Cape Cod.

CHAIRMAN PIERCE: Other questions for Paul. I have one, Paul. You indicated in your presentation that the value of q, the catchability coefficient was derived from commercial vessel experiments, am I correct? Okay, all right so you came up with those q values from those experiments using two different types of nets, right, one with rockhoppers and one with chain-sweeps?

MR. NITSCHKE: Right so it was on a twin trawl fishing both nets at the same time. One net was the exact Bigelow net and the other net was an efficient flatfish net.

CHAIRMAN PIERCE: Okay and then those q values that you determined from those experiments would apply to the catches by the Bigelow; is that correct?

MR. NITSCHKE: Right, so if we assume the flat net is 100 percent efficient, we get some idea of the

relative difference between those two gear types, and that difference was applied to the Bigelow for the area swept.

CHAIRMAN PIERCE: Okay applied to the Bigelow catches. But you mentioned that the Bigelow doesn't catch (I'm paraphrasing a bit) the Bigelow doesn't do a very great job catching winter flounder, because of the size of the vessel and whatever factors. How does that factor in to the application of the q value from those experiments to the Bigelow catches themselves? Shouldn't the q value be much lower for the Bigelow, because of the size of the vessel and the fact that it doesn't catch much winter flounder?

MR. NITSCHKE: Originally when we did this approach, we assumed a q of 0.6. Now with the updated information we now think that was too low. We think it's higher. We actually think for winter flounder it looks like the Bigelow was more efficient than we thought.

CHAIRMAN PIERCE: The higher the q value the lower the biomass overall.

MR. NITSCHKE: Correct.

CHAIRMAN PIERCE: Okay. The new q value is higher than what it was. Well with that said, I'll just offer one additional piece of information regarding the q value. This coming spring, May, the Division of Marine Fisheries will be spending three to five trips devoted to work on a fishing vessel with nets to get a better understanding of the q value for the net that we are using in our bottom trawl survey for the Gulf of Maine cod survey and the herding effect.

That's what we're looking into. The Board, we may be, later on this year, be looking at some additional information relative to the q values. It doesn't effect this year's information, but maybe down the road. All right no other questions for Paul on the Gulf of Maine. Operational assessment, let's get into the southern New England/Mid-Atlantic.

MR. NITSCHKE: Okay southern New England/Mid-Atlantic. The lead scientist for this stock is Tony Wood. Like the Gulf of Maine this was last assessed in 2015 at the Operational Assessments. The benchmark was also in 2011 at SARC 52. The southern New England stock was historically the largest of the three winter flounder stocks.

This assessment does have an analytical model, statistical catch at age model. The ASAP model with age is 1 to 7 plus spanning the years from 1981 to 2016. For the catch at age the commercial landings, commercial discards, recreational landings and recreational discards are in the catch at age. For the commercial discards we assume a 50 percent mortality rate; and for the recreational discards we assume a 15 percent mortality rate.

This was also true in the Gulf of Maine stock. Like the Gulf of Maine stock, there is a very large reduction in the removals over time from the 1980s. The terminal year was less than 4 percent of the removals that occurred in the early 1980s. The 2016 estimated catch was 679 metric tons. Like the Gulf of Maine stock, the recreational component was significant in the early '80s; however the recreational component has decreased and remains a pretty minor component of the removals.

I forgot to mention, as the output control system came onboard with Amendment 16, in 2009 this stock became a no possession stock, from 2009 into 2013. That no possession stock did result into a change of those fish that would have been landed into discards, so it also creates some uncertainty in the assessment, because we assume this 50 percent mortality rate on the discards.

It puts more pressure on that mortality rate, because a greater proportion of the removals are now assumed to be discarded. With a zero possession trip limit, mortality is still occurring and it's not clear whether the mortality rates were, or whether the catch truly was much lower during those zero possession days compared to more recently.

This can be seen in the proportion of the removals. You can see where that trip limit came into effect in 2009, where a greater proportion of the removals were discarded. The catch at age is mostly comprised of Age 3 and 4 fish. The mean weights at age are relatively constant for this stock over the time series. Now for many of the groundfish stocks we have large declines in the mean weights at age at the end of the time series. We don't see evidence of that with this stock. This assessment uses many different surveys. There are many different indices of abundance. We have the NMFS spring and winter and fall surveys, the Mass DMF spring survey, the Rhode Island spring survey, Connecticut spring, New Jersey oceans and rivers, URIGSO survey, and there are two young-of-the-year-recruitment surveys, the Mass DMF survey and the Connecticut survey.

All the surveys show very similar trends. We see this declining trend in abundance over the entire time series. All the survey information agrees with those trends, where we have low estimates in the survey abundance at the end of the time series. These are the trends for the summer, spring, fall, winter and Mass DMF spring surveys.

Here is a comparison for the state surveys, Rhode Island spring, Connecticut spring, New Jersey oceans and New Jersey Rivers, and the URIGSO survey. These surveys are near record lows at the end of the time series. For the age 0 indices, the Connecticut survey is showing very low recruitment at the end of the time series.

The Mass DMF survey is showing a little bit more of a flattening out of that survey trend at the end. Now that NEAMAP survey wasn't part of the benchmark assessment at that time. I'm showing this here, because I think there are some questions about this survey last time I was giving this talk.

However, keep in mind this survey is not in the stock assessment. For the spring survey you can see the green is the strata that go into that index; the green strata, which is a larger area than the fall strata that goes into the index. The fall strata are basically concentrated in that Rhode Island end of Long Island area, because most of the fish are offshore during the fall.

Here are the trends in the NEAMAP survey. Overall I don't think the trends disagree with what's coming out of the stock assessment; fairly flat over this time series. In the spring there was an increase in 2016 in the survey. However, in the fall index we didn't see that increase in 2016. Perhaps the fall survey is showing a little bit more of a declining trend.

For the biology, we assume an M of 0.3; and the maturity schedule comes from the Mass DMF spring survey, which came out of SARC 52 using the entire time series. These are the estimated selectivities from the commercial side in the model. One of the concerns is as we update this model the second block seems to be coming more domed shaped as we add data.

There is some concern about a buildup of cryptic biomass in the model. Because we have domed shaped selectivities on the commercial side, we also estimate domed shaped selectivity on the indices themselves. However, the indices the selectivity doesn't change as much as we update the model with more data.

They don't to be changing as much as on the commercial side. Here are the trends in the total biomass and SSB and exploitable biomass. There is this declining trend in all the biomass estimates. Here you can see that effect of the dome shaped selectivity when you compare the SSB trends and the exploitable biomass trends.

You're seeing that flip over at the end of the time series, where this cryptic biomass is creeping into the model. There was a retrospective pattern in this assessment; however, it wasn't severe enough to warrant a retrospective adjustment in the projections. For the stock status, this stock started out with high biomass and high fishing mortality rates; which drove the stock down to low biomass

and high fishing mortality rates. However, now in the last nine years we haven't been overfishing this stock. However, there is not any evidence of rebuilding biomass; even if we weren't overfishing in the last nine years.

The stock doesn't seem to be responding to these low fishing mortality rates. On this plot you can see where the retrospective adjustment, which is that red dot, it's within that block, which is the 90 percent confidence intervals in the terminal year of the model, so no adjustment was made.

Here is the change in the biological reference points from 2015 to 2017. FMSY increased from 0.33 to 0.34. SSBmsy decreased from 27,000 metric tons to about 25,000 metric tons. These are part of the standardized plots coming out of the standardized assessment models from the operational assessments. On the left is the spawning stock biomass trend.

The solid line is the updated model; the dashed line is the previous model, and the shaded area is the 90 percent confidence intervals around the updated model. For southern New England winter flounder, the biomass decreased quickly below the overfished threshold, and has remained below the overfished threshold for several decades.

The issue now is it appears the biomass is actually going in the wrong direction; where it is actually decreasing at the end of the time series, despite the fact that fishing mortality rates are below the overfishing threshold at the end of the time series. This is mainly due to this large decline in the estimated recruitment over the time series.

There is a little bit of an increase at the end of the time series. It remains uncertain whether this increase will continue or if this will change in updated models; because we don't see a lot of evidence of increases in recruitment in the survey indices themselves. The biological reference points for this stock are based off a stock recruit relationship with a fixed steepness.

One of the issues in particular for this stock is the points at the end of the time series all fall below the stock recruit relationship. When we look at the residual pattern over time, you can see it in this plot where all the residuals are on the negative side; indicating that if you did long term projections that you would likely overestimate the recruitment going into those projections.

This is another reason not to use long term projections for this stock. Here are the trends in the abundance at age over time. You can see that change in recruitment, how that changes the age structure through time. You notice at the end of the time series this is building up in proportions of the plus group.

You can see that in the proportion graph on the right. This is perhaps more evident when we look at this in terms of spawning stock biomass; where you see at the end of the time series we have this building up of the plus group, which a proportion of that plus group is cryptic biomass, which the fishery nor the surveys can catch.

That building up of the cryptic biomass is a source of uncertainty. The natural mortality rate has also been questioned as a source of uncertainty. The fixed steepness in the stock recruit relationship is a concern; and we're also not getting a lot of length information from the recreational side, mainly due to the fact that the recreational fishery is so small now. Of course the retrospective pattern is always a source of uncertainty. Here are the catch performance plots that the PDT developed for southern New England winter flounder.

Here you can see the estimated catch is closer to the ABCs; unlike for the Gulf of Maine where there was a large difference, between those two. More recently you can see that the updated assessment and the updated projections coming out of the assessment show a slight increase in the ABCs from those projections; so comparing that black line to the blue line.

Here are the numbers that go into that plot. However, when the SSC looked at this information there was concern about the cryptic biomass and the stock recruit relationship. The projections were not used for catch advice. Basically, the ABCs were determined using average catch from 2014 to 2016; which produced an ABC of 727 metric tons. The OFLs were still based on FMSY projections at 2018, and that number the 128 metric tons was held constant for three years. I can take questions on southern New England.

CHAIRMAN PIERCE: Board members, this is the assessment presented to the New England Fishery Management Council, reviewed by the Plan Development Team; certainly critiqued by the SNS Committee, and then it all resulted in the establishment of a new OFL as well as the ABC, and then the catch limits.

Specific for this group today, this Board, are the subcomponents; the state waters subcomponents, which we'll get into very shortly, discussion about those components and how we should react to those new numbers. With that said, are there any questions of Paul regarding this assessment? All right, I see none. There is definitely a lot to digest for sure**.**

CONSIDER SPECIFICATIONS FOR THE 2018 FISHING YEAR

CHAIRMAN PIERCE: If there is no objection, I am going to skip over Number 6, which is Discuss Potential Management Response to Operational Assessment, potential action.

We're not really in a position as a Board to consider what actions we might want to take; until after we hear a presentation from Megan on the Specifications for the 2018 Fishing Year, where we get into the issue of the state water subcomponents and what this Board would like to do regarding those components, and restraining catch further if indeed that is the desire of the Board. With that said, we'll turn to Megan and she'll now give us her presentation specific to those winter flounder specifications and the overview of them.

MS. MEGAN WARE: At its December meeting the New England Council approved Framework 57; which included the ACLs for Gulf of Maine and the southern New England/Mid-Atlantic winter flounder stocks. The largest change did occur in that Gulf of Maine stock; where the ACL was significantly reduced. In the Gulf of Maine the 2018 total ACL is 428 metric tons; which is a 348 metric ton decrease from the previous year. The state waters subcomponent is 67 metric tons; which is a 55 metric ton decrease from the previous year.

Just for some context, the 2016 state waters total catch was 100.9 metric tons. This is of concern, since this is significantly above the 2018 state waters subcomponent of 67. This suggests that the Board may need to consider different management tools or measures for this reduced subcomponent. In southern New England and Mid-Atlantic, the 2018 total ACL is 700 metric tons, which is a 49 metric ton decrease from the previous year. The state waters subcomponent is 73 metric tons, which is actually a slight increase. This is because the percentage associated with that state water subcomponent increased from 9 percent to 10 percent. Then for context the 2016 state waters catch was 64.7 metric tons; so that is below what the 2018 state waters subcomponent is.

Given the Board may need to consider change; specifically to those Gulf of Maine management measures. This slide is a quick review of the tools that the Board can adjust through Board action; and this is under Addendum III. For commercial measures the Board can adjust the size limit, the season, area closures, a trip limit or some sort of trigger for a trip limit.

That would trigger a reduction in the trip limit when a certain percentage of the state waters subcomponent is reached. For the recreational measures the Board can change the size limit, the bag limit, and the season. Then this is a review of our current Gulf of Maine, southern New England/Mid-Atlantic regulations. These have been in effect since 2014.

If no action is taken by the Board then these are the management measures that will roll over into 2018. There is a 500 pound commercial trip limit in Gulf of Maine, and an 8 fish bag limit for the recreational fishery. In southern New England it's a 50 pound commercial trip limit and a 2 fish recreational fish limit; and those all come with 12 inch size limits. We'll just leave this up here for the discussion.

CHAIRMAN PIERCE: As a reminder, in your binder or maybe on the table, there is a briefing document showing the specifications for the 2018 fishing year. It's a one pager and it has the information that Megan just presented. You can reference that to ease discussion as to what the Board would like to do in response to the presentation given by Megan.

Are there any questions of Megan regarding what she has presented? All right, no action would mean status quo for the upcoming fishing year; which begins May 1, 2018. We correspond to the federal fishing year; May 1 through April. That is what status quo would result in, as shown in that one pager.

I'll just call attention to one important point made by Megan; and that is for the Gulf of Maine stock the state waters subcomponent is now 67 metric tons. This is what is essentially set aside for the states; in hopes by the Council that the states will do whatever is possible to restrain the catch to that particular number.

It's not an allocation it's a set aside; expected catch inside state waters, so 67 metric tons, it's a decrease from 122 metric tons the previous fishing year. Of note, and highlight this because it's relevant, 2016 total catch, we don't have 2017. But 2016 total catch in state waters was about 101 metric tons, so with 101 metric tons in 2016, the subcomponent for 2018 is 67 metric tons. That is about a one-third reduction in the amount of catch in 2016 to get us presumably to that 2018 state water subcomponent, once again for the Gulf of Maine.

I'm not speaking of southern New England/Mid-Atlantic. That is the information we have before us; and the question of the Board is, do you care to take any specific action in response to these finding and what the Council has prescribed as subcomponents? Is there a need to consult the Technical Committee regarding what sorts of options might be available to get that necessary reduction? Are there any thoughts; Bob Ballou.

MR. ROBERT BALLOU: Rhode Island has developed a memo that has been presented to the Board; it came out late last week. I'm not sure if everyone has had a chance to read it. But the upshot is that we would like the Technical Committee to evaluate the 50 pound possession limit in the southern New England/Mid-Atlantic region; with a view to considering an aggregate weekly limit as an alternative approach.

The memo identifies two or three different options for how that could be done; and it calls attention to the fact that with that 50 pound possession limit, bycatch and discard mortality is a significant issue, and could well be addressed by an aggregate program. There hasn't been a lot of analysis done on it yet; and we would respectfully request through the Board that the Technical Committee take a look at the options that have been presented.

I know the Division of Marine Fisheries in Rhode Island is prepared to offer additional analytic support to that approach. It would be our preference to either await final decision on specifications until that analysis is completed and presented back to the Board for review; or potentially consider that as a conservation equivalency approach under the current specifications.

CHAIRMAN PIERCE: I'm going to read something into what you just said; and that is it seems that you do not believe that this Board needs to take any specific action to reduce states waters catch, recreational or commercial of southern New England/Mid-Atlantic flounder that you believe that should be status quo. Then to go beyond that

you're looking for a Technical Committee review of an aggregate landing limit as opposed to a daily limit. Am I properly characterizing what you've concluded and what you are recommending?

MR. BALLOU: The answer is yes.

CHAIRMAN PIERCE: David Borden.

MR. BORDEN: Are you at the point in the meeting where you just want general comments; or try to answer the question you asked?

CHAIRMAN PIERCE: I'm certainly willing to take general comments. Bob jumped ahead a little bit and that's fine. But David, what do you have to offer?

MR. BORDEN: Just a couple of observations here. We've got a rebuilding deadline of 2023. If my memory serves me correctly, this is the second rebuilding timeline we've had for this stock. In listening to Paul's presentation, and thank you for that presentation it was excellent. I keep coming back to the same point; that we have a disconnect between the Interstate Fishery Management Plan and the Council Plan. The interstate plan, particularly in southern New England and the Mid-Atlantic, is a super restrictive plan.

I mean the allowances of 50 pounds and 38 fish. I personally think that that is justified; in other words the status of the stock justifies that position. But where I really suffer, the logic breaks down at least in my own mind, is when I think about the federal waters component of this stock, where they have a different operating system.

The fishermen are allowed to target the stock; as long as they have a catch allowance for the stock. There is targeting; and in listening to Pau's presentation, at least with southern New England. We're in this mode where the recruitment and I wrote a note to myself, the recruitment has increased every year, I think, since 2012. We're in this mode, the SSD is going down I think; and the recruitment levels are going up. We've got this disconnect between the two regulatory systems. Nature is actually helping us out; because the recruitment values are going up. My thinking keeps coming back to this, are these two management approaches compatible?

I think my answer to that is they are not; because one allows targeting and the other one is a bycatch system, at least in southern New England. We need a process to reconcile these differences. At least from my perspective, I don't know whether anybody else agrees with that. But I think these two management strategies are incompatible.

CHAIRMAN PIERCE: Are there any further comments? Pat.

MR. KELIHER: In regards to the Gulf of Maine. I'm not sure I'm ready to suggest any management changes without further Technical guidance on this. I know from looking at our own Maine/New Hampshire trawl survey data, we're not seeing any larger fish. It was certainly shown in the presentation here today. Creel surveys are showing we're not interacting with a lot of fish on the majority of the coast of Maine.

From a recreational fish measure perspective, I'm having a hard time figuring out how we would, you know we probably could make changes within the state of Maine rules and not have any impact to the fishery if we're not interacting with them. While that may be a token gesture to make a change, if it doesn't have any appreciable difference in what's going to be landed then I'm having a hard time making the determination on how we should make management changes at this time.

CHAIRMAN PIERCE: Doug.

MR. DOUGLAS E. GROUT: A couple comments, one we've sort of been jumping back and forth between southern New England and Gulf of Maine. Just to one of David's points about directed fishery. My question is just as a comment more, is to keep in

mind that there are allocations for winter flounder in southern New England. But are they high enough that they could actually be targeting?

I mean we have low allocations up in the Gulf of Maine for certain fisheries like yellowtail that you can't target the fish. You have to use it as a bycatch in trying to target other things. Just we need to be careful about saying that everybody is targeting them. There may be, I don't know enough about the southern New England fishery. That is my comment on southern New England.

As far as Gulf of Maine, we had with this assessment our current ACL is about 55 percent, about what it was in the previous year. More importantly the state subcomponent is also now 55 percent of it. Given that the commercial landings are roughly about 85 percent of that. I think we've got to look at taking some action a little bit quicker.

If we waited until May to take action, and by the time those new measures got in place to try and constrain the state water subcomponent, it could be too late to stay at least within it. Obviously if you go over in the state water subcomponent, you are going to be affecting the federal permitted vessels are the ones that are going to be paying the accountability measures not the state waters. With that being said, I'm going to throw up a motion to see if we might be able to lower the trip limit on the commercial fishery. My motion is to move to reduce the trip limit on Gulf of Maine state waters commercial vessels down to 250 pounds per day.

CHAIRMAN PIERCE: Is there a second to the motion? Is there a second to the motion? Okay I see none**.** There is no motion on the floor. I'll make a suggestion in the interest of time. This suggestion is this. In looking at the southern New England/Mid-Atlantic stock in the state waters subcomponent that has been established for 2018; I see that it's 73 metric tons, 2016 total catch in state waters was 64.7 metric tons.

Now that would be again only for 2016, not '17. That represents commercial catch as well as recreational take; and therein lies the disconnect that David Borden has highlighted; that unlike Gulf of Maine cod where there is a recreational fishery allocation and a commercial, for winter flounder there is none.

Really management of winter flounder was initiated in a major way by ASMFC, by this Board, the Council eventually caught up, and now we're dealing with subcomponents and the need to try to live within those subcomponents. I'm suggesting to you that the data before us now suggest no action is needed for southern New England/Mid-Atlantic, beyond for example what was just offered up by Bob Ballou regarding a weekly limit.

For the Gulf of Maine cod stock however, that is a slightly different situation. As already highlighted by Doug that we have established for us by federal action, a state water subcomponent of 67 metric tons, and the catch in 2016, recreational as well as commercial was about 101 metric tons.

If we take no action someone is going to assume, perhaps the New England Council that in 2018, May 1 through April, 2019, we will that is the states and the Gulf of Maine, will take far more than the state waters subcomponent and that will have implications for federal waters fishermen.

I'll ask; does the Board believe that there is a need for us to take action at this time relative to that state waters subcomponent? If not, do we need to have some Technical Committee work to assist us in that regard; to determine what we might want to consider for the next fishing year, recognizing it's February, and the next meeting is in May? Ritchie.

MR. G. RITCHIE WHITE: If you could educate me, Mr. Chair. If we take no action and if we overharvest our component, what are the consequences?

CHAIRMAN PIERCE: I believe that well I'll turn to Doug to assist me in this regard or anybody else on the Council. But I believe that the federal waters fishermen, the federally permitted fishermen would pay the price for whatever is caught in state waters that brings the total take above the ACL. That would likely result in, just somewhat of an assumption, further restrictions on federally permitted fishermen in the coming fishing year. I think I've got that right. Paul.

MR. NITSCHKE: That is true if on the Fed side they catch their allocation. Now for the Gulf of Maine stock they've been way under. It's not clear. I mean if you look at the catch performance plot you can see that they haven't come anywhere close to the total ABC.

CHAIRMAN PIERCE: Thank you Paul, very important point. If catch by federally permitted fishermen is falling far short of what's been established for them as allowable catch. Then if the states go over the Gulf of Maine's subcomponent, there really is no consequence for the federally permitted fishermen, because we're not going over the ACL. All right, Colleen.

MS. COLLEEN GIANNINI: I think Pat alluded earlier that availability was an issue. Do we have an idea what the 2017 landings are estimated to be? Is it likely that they're lower than 2016 or the same?

CHAIRMAN PIERCE: We don't have the information in hand. My assumption is that the catch continues to be low because of lack of resource, lack of availability, and also other measures that are in place that are restraining the federal waters fishermen. David Borden.

MR. BORDEN: A question and then maybe a comment. Could somebody describe to me the process followed to assign a state waters subcomponent; either for the Gulf of Maine or southern New England. Paul.

MR. NITSCHKE: Could I show a slide actually? It's second to last in that presentation. When the PDT tries to estimate the state subcomponent every time we do the specs, now we don't know what the regulations coming out of this body is. But we try to get an estimate of what that catch is.

What we've been doing is used a three-year average of the estimated-state-subcomponent catch, use that three-year average and try to match that three-year average. Here in the middle column you can see the total catch estimate for the state subcomponent over time from 2010 to 2016. That is both the commercial and recreational state subcomponent.

On the left are the ABCs and the PDT basically tries to develop a percentage of that ABC needed to match the latest three-year average of that catch. Now for southern New England that three-year average was used in the specs. For the Gulf of Maine the PDT estimated the 22 percent that was not used. The Council used the 15 percent that was in the past, and that's why there is a reduction now in that state subcomponent.

MR. BORDEN: David, if I might. I guess a comment if I understand the mathematics here, and I'll use a hypothetical. If the states in the southern New England/Mid-Atlantic area reduce their catch to 0, then the consequence would be that the federal waters component would increase. Is that correct?

MR. NITSCHKE: Yes, whatever we put in the specs, it has a direct effect on the federal component; so whatever you put in for the subcomponent.

MR. BORDEN: It goes back to the question that Ritchie White asked. What is the consequence? I think there are consequences here. If the states continue to reduce their state waters catch, two points, this was not a negotiated sharing arrangement between the Commission and the federal partners on this, and it probably should have been. The second point is that if the consequence is that the more restrictive the states are, then that liberalizes the catches for federal

water. It's inconsistent with the logic of we want to rebuild the stock.

CHAIRMAN PIERCE: For those Board members who are new to these sorts of discussions, winter flounder is a unique species, in terms of it being the only groundfish species that ASMFC manages cooperatively with the New England Fishery Management Council. All other groundfish species are the New England Council's purview.

Obviously the Mid-Atlantic Council has some input to those discussions; and individual states are supposed to. On cod for example, on haddock for example, with the Commonwealth of Massachusetts being the excellent example, being obliged to seriously restrain catches in state waters by non-federal permit holders, so that we can keep to the subcomponents that have been set aside for expected state waters catch.

If we don't live with those subcomponents and the consequences is some additional restriction on federally permitted fishermen. But in this particular case again, it's this unique situation for winter flounder. Now I think this might be the first meeting where the Board is obliged to consider some response. At this point in time I don't see anyone willing to make a motion that would reflect a change in the approach or the change in the measures for 2018; I might be mistaken. Pat.

MR. KELIHER: You're not mistaken as it pertains to anybody making a motion. But I think David brings up an excellent point. In a couple days at the Policy Board meeting, we're going to be discussing the issues about herring as it relates to additional conversations with the Council, and discussing our mutual goals for that species.

I think in having a conversation over lunch with Mr. Stockwell, I think he brought up an excellent point. Those conversations aren't going to be just about herring; I think they're going to need to expand to other species, such as winter flounder, so we can talk about what our mutual goals are.

I think that's going to be every bit as important during those conversations as the herring conversations will be. I think moving in that direction, maintaining status quo right now, having those conversations with the Council, determining what the mutual goals are, and then coming back at a subsequent meeting to try to figure out where we're going to go from here will be very important.

CHAIRMAN PIERCE: Pat has offered up a suggested path forward. If there are no Board members motivated to make a motion regarding a change in the winter flounder specifications for 2018 at this meeting, we'll go on to another issue, which is the issue that was raised by Bob Ballou.

Bob, I'll paraphrase a bit. I believe you are asking the Board to request that the Technical Committee examine, analyze the suggestion that the state of Rhode Island has offered up regarding aggregate limits for winter flounder as opposed to individual trip limits. Am I properly characterizing?

MR. BALLOU: That's correct. Thank you, Mr. Chairman.

CHAIRMAN PIERCE: If there is no objection from the Board, the memo prepared by Bob and his staff will be forwarded to the Technical Committee for its review; in order for us to better assess whether or not that strategy will maybe be conservation neutral of catch neutral. In other words, see how that particular approach would relate to our keeping to the state waters, well actually it wouldn't be state waters subcomponent. This would be just a suggestion to move it to the Technical Committee for an evaluation as to whether the aggregate weekly limit is warranted.

MR. BALLOU: That's fair enough. I think certainly relating it back to the state water subcomponent is relevant as well. I'm not sure that's the primary charge; but to your point I think it's a combination of the two things that you just mentioned.

CHAIRMAN PIERCE: I agree that it is relevant; especially since it's possible that a weekly aggregate limit could result in more directed fishing on southern New England/Mid-Atlantic winter flounder. If indeed it does provide for more directed fishing, we need to know to what extent might that occur and what are the implications of that increased directed fishing, specific for the state waters subcomponents. Colleen, did you have your hand up? Eric.

MR. ERIC REID: The point of an aggregate is to avoid discards. That is the key to success there. Instead of trying to go out and catch 50 pounds every day, seven days a week, and discard whatever you catch over 50 pounds. If you have an aggregate and maybe it is 250 pounds instead of 350.

You would actually reduce discards, which is the whole benefit to an aggregate program. That is what we're hoping the TC is going to tell us. It may increase effort on an individual basis per day, but I think overall it will decrease discards, which is to our advantage. That's the point of it.

CHAIRMAN PIERCE: Thank you Eric for that clarification that's quite true; impact on discarding. That will be another element of the Technical Committee review. Emerson.

MR. EMERSON C. HASBROUCK: Yes I support Rhode Island's proposal for an aggregate trip limit. I just want to make it clear in our request to the Technical Committee that they analyze this relative to any and all states, you know for the southern New England/Mid-Atlantic winter flounder stock, and not just Rhode Island, because there may be other states that would like to participate in this as well.

CHAIRMAN PIERCE: Yes Emerson, my assumption would be that that is the case, not just for Rhode Island, anyone who wanted to take advantage of it. It might be a heavy lift for the Technical Committee, but it's certainly worth their examining it. All right with that said, and if there are no other suggestions, comments, motions specific for the specification process for 2018, and I don't believe there are. Megan.

MS. WARE: Just to clarify so I understand how the Board is intending to move forward for Gulf of Maine. What I'm hearing is maintain status quo and talk about mutual goals with the New England Council. Is the intent to have that conversation between now and May, so that in May this Board reconvenes to reconsider specifications, or the Board is comfortable at this point maintaining current specifications for 2018?

CHAIRMAN PIERCE: My assumption is that at this point in time we are comfortable with specifications for 2018, and work needs to be done between ASMFC leadership and the New England Council to begin those discussions, hopefully before May so that we'll be in a far better position in May as a Board to possibly take some action.

REVIEW OF FISHERY MANAGEMENT PLAN REVIEW AND STATE COMPLIANCE REPORTS

CHAIRMAN PIERCE: All right, let's go on to the next agenda item; which is the Fishery Management Plan Review. Once again we turn to Megan for her overview.

MS. WARE: I will keep this brief, because we have discussed a lot of components of this today. Jess, I'm just going to skip three slides to the status of the fishery. I think we've discussed status of the stock enough today. But in terms of status of the fishery, commercial and recreational landings have declined since the 1980s; specifically commercial landings peaked at around 40.3 million pounds in 1981, but have generally declined throughout the '90s and 2000s.

In 2016 commercial landings were 2.6 million pounds; with the majority of this about 80 percent taken in Massachusetts. Recreational harvest in 2016 was just over 100,000 pounds, and represents a significant decrease from the 16.4 million pounds that were caught in 1982. Between 2013 and 2016,

Massachusetts, New Jersey and New York comprised the majority of the recreational landings.

I'm going to again skip this slide here. I think we've talked about the commercial measures and recreational measures already. One of the plan's specific requirements for winter flounder is that under Amendment 1 the states of Massachusetts, Rhode Island and New York are required to continue annual surveys of juvenile recruitment to develop an annual juvenile abundance index for winter flounder.

In addition, the states of Massachusetts, Rhode Island, Connecticut, and New Jersey are required to conduct annual surveys to develop an index of spawning stock biomass, and all of these states have continued to meet this monitoring requirement. All states are in compliance with the FMP and addenda. There were no requests for de minimis status this year, so the PRT is recommending that the Board approve the 2017 FMP review and state compliance reports.

CHAIRMAN PIERCE: Are there any questions of Megan? **Okay if not do I hear a motion to accept the 2018 FMP Review and state compliance reports? Motion made by Doug Grout, is there a second; second by Colleen Giannini, thank you, Colleen. Alright, so we have a motion on the floor. Is there any objection to the motion? I see none; therefore the motion is approved.**

ADVISORY PANEL MEMBERSHIP

CHAIRMAN PIERCE: Next would be the AP Committee membership. As noted in the briefing material, we have an AP Committee membership that has not been updated recently, and as noted by staff attendance on conference calls has been low. We've been asked as individual states to review our membership and to nominate a new AP member; if the position is vacant. I assume for some states the position is vacant, or if the current member is not actively participating and that person has been contacted and questions have been asked why not. Are you still willing to be an AP Committee member? Are any states in the position now to offer up some names for membership on the Advisory Panel? If not, please get those names to Megan as soon as possible. I know Massachusetts has to do that. We haven't yet come up with someone to fill the vacancy. We'll be submitting a name to Megan fairly soon, or names to Megan fairly soon. Please, if you haven't already done so, take a look at that membership. In light of the discussions we've already had, and in light of the fact that there may be some change in the way in which this Board interacts with the New England Council, and how we have cooperative and collaborative management with the Council.

It will be even more important to have our Advisory Panel fully staffed; so please do that. I guess I jumped ahead a little bit, Megan. You were going to give a presentation on this or no, good.

ADJOURNMENT

CHAIRMAN PIERCE: Is there any other business to bring before the Board? All right, I see none; motion to adjourn. Motion made by Ray Kane, and a second by Pat Keliher. With no objection the meeting is adjourned.

(Whereupon the meeting adjourned at 3:37 o'clock p.m. on February 6, 2018)

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
DIVISION OF MARINE FISHERIES
Three Fort Wetherill Road
Jamestown, Rhode Island 02835

TO: ASMFC Winter Flounder Management Board

FROM: Jason McNamee, Chief
Rhode Island Dept. of Environmental Management, Division of Marine Fisheries

DATE: February 2, 2018

RE: Proposal for State Waters Winter Flounder Aggregate Landing Program.

The Rhode Island Division of Marine Fisheries (RIDMF) hereby requests consideration of changes to the management program for the state-waters winter flounder fishery in southern New England (SNE).

The state-waters winter flounder possession limit has been 50 lbs/day since 2009 pursuant to Addendum I to Amendment 1 to the ASMFC's Interstate FMP for Inshore Stocks of Winter Flounder. The Addendum was adopted in response to the poor stock status of the SNE winter flounder population. (It also addressed the Gulf of Maine stock.) At the time, NOAA Fisheries had implemented a moratorium on SNE winter flounder harvest in federal waters. In 2013, NOAA Fisheries lifted the moratorium and allowed fishing in federal waters under the federal groundfish sector and common pool quota management program. Since 2013, federal-waters groundfish sector fishermen have not been subject to a daily possession limit, and the federal common pool vessel starting possession limit has generally been set at 2,000 lbs per day-at-sea. The discrepancy in possession limits has created an uneven playing field between state waters and federally permitted fishermen. Additionally, federal vessels are disadvantaged at certain times of year when they would normally target other species in state waters but must stop fishing when the state water limit is reached due to the requirement to not discard legally sized fish.

With a view to providing more flexibility to fishermen fishing in state waters, RIMDF requests that the Board consider weekly aggregate possession limits for the state-waters SNE winter flounder fishery. This aggregate approach has been implemented in other RI state-waters fisheries (scup, summer flounder) and has proven to be an effective management tool. RIDMF

feels that if a weekly aggregate landing program for SNE winter flounder were enacted, it would have the following positive effects:

- Reduction of bycatch generated in state-waters fisheries, particularly gill net and otter trawl.
- Increase in efficiency for state-waters fishermen who could land similar amounts of fish in fewer trips.
- Allow federally permitted vessels to pursue other fisheries in state waters without being constrained by the 50 lbs possession limit for winter flounder

RIDMF proposes the following management options for consideration:

1. 250 lbs/week limit year-round.
2. 350 lbs/week limit in two periods: April – June and November- December. The limit would remain 50 lbs/day during the rest of the year.
3. Development of a permit program for the 250 lbs/week limit year-round. Permit requirements would include requiring captains to report daily via SAFIS Etrips-M as well as acquiring vessel monitoring hardware.

Option 1 would be aimed at offsetting any potential increased effort resulting from the new program. The 250 lbs/week limit generally corresponds to the maximum weekly landings of state-waters fishermen over the last two years, fishing pursuant to the 50 lb/day limit.

Option 2 limit would be aimed at limiting harvest to the periods when winter flounder move into and out of state waters and are thus more available for harvest.

Option 3 would afford management and law enforcement the most control over the management program; RIDMF acknowledges that it would also pose and increased administrative burden.

RIDMF requests that the Board consider forwarding this request to its Technical Committee for evaluation, at which time analysis of the options and details on potential impacts from the new management approaches will be presented. The Board could then review, and consider taking action based upon the TC's report.

RIDMF appreciates the Board's willingness to examine this important issue.

Atlantic States Marine Fisheries Commission

ISFMP Policy Board

May 3, 2018
8:00 - 10:00 a.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(J. Gilmore)* — 8:00 a.m.

2. Board Consent *(J. Gilmore)* — 8:00 a.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2018

3. Public Comment — 8:05 a.m.

4. Update from Executive Committee (*J. Gilmore*) — 8:15 a.m.

5. Review and Consider Commonwealth of Massachusetts, Rhode Island, Connecticut and New York Appeal of Addendum XXX to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (*T. Kerns*) **Final Action** — 8:25 a.m.

6. Committee Reports — 9:15 a.m.
   - Artificial Reef (*L. Havel*)
   - Law Enforcement (*M. Robson*)

7. Marine Recreational Information Program Update on the Transition to the Fishing Effort Survey and the Calibration Process (*K. Denit*) — 9:30 a.m.

8. Noncompliance Findings, If Necessary **Final Action** — 9:45 a.m.

9. Other Business — 9:55 a.m.

10. Adjourn — 10:00 a.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

ISFMP Policy Board Meeting
Thursday May 3, 2018
8:00-10:00 a.m.
Arlington, Virginia

Chair: Jim Gilmore (NY) Assumed Chairmanship: 10/17	Vice Chair: Pat Keliher (ME)	Previous Board Meeting: February 8, 2018
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (19 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Executive Committee Report (8:15-8:25 a.m.)

Background

- The Executive Committee will meet on May 2 , 2018

Presentations

- J. Gilmore will provide an update of the committee's work

Board action for consideration at this meeting

- none

5. Review and Consider Commonwealth of Massachusetts, Rhode Island, Connecticut, and New York Appeal of Addendum XXX to the Atlantic Menhaden Fishery Management Plan (8:25-9:15 a.m.) Final Action

Background

- Addendum XXX to the Summer Flounder, Scup and Black Sea Bass FMP was approved in February 2018 (**briefing materials**). The Addendum established a management process for the 2018 recreational black seas bass fishery.
- The four states are appealing the approval of the addendum (**briefing materials**).

- Following the Appeal Process (**briefing materials**), Commission leadership reviewed the appeal and determined the appeal should be considered by the ISFMP Policy Board under criterion 2 and 3 (**briefing materials**).

Presentations

- T. Kerns will present a background on the development of the management program as well as a summary of the justification provided in the record for the management board's action. The ISFMP Director will also present the potential impacts of the appeal on other affected states
- The four states will present their rationale for appealing the decision under criterion 2 and 3 and provide a suggested solution.

Board discussion for consideration at this meeting

- Consider the Appeal of Addendum XXX to the Summer Flounder, Scup and Black Sea Bass FMP

6. Committee Reports (9:15-9:30 a.m.) Final Action

Background

- The Artificial Reef Committee met on February 28- March 1, 2018 with the Gulf States Marine Fisheries Commission's Artificial Reef Committee. The Committee is creating a document compiling the state artificial reef monitoring protocols.
- The Law Enforcement Committee will be meeting on May 1, 2018.

Presentations

- L. Havel will present an overview of the Artificial Reef Committee's activities
- M. Robson will present an overview of the Law Enforcement Committee's activities

Board action for consideration at this meeting

- None

7. Marine Recreational Information Program Update on the Transition to the Fishing Effort Survey and the Calibration Process (*K. Denit*) (9:30-9:45 a.m.)

Background

- In 2015, MRIP launched a new method for estimating the number of trips taken by recreational fishermen. The new survey method moves away from household telephone surveys, which are becoming less effective as fewer homes use landline phones. In addition, the new survey uses license and registration information provided by anglers through the National Saltwater Angler Registry.
- Development of a calibration model (2016-2017): Consistent differences between new design and legacy design estimates will be evaluated to determine possible sources of bias in the legacy design that can explain those differences.
- Re-estimation of historical catches (2017): Once a calibration model has been approved, the model will be used to generate a corrected time series of recreational catch statistics

Presentations

- K. Denit will present progress of the MRIP Transition Process

Board action for consideration at this meeting

- None

8. Review Non-Compliance Findings, if Necessary Action

9. Other Business

10. Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ISFMP POLICY BOARD

The Westin Crystal City
Arlington, Virginia
February 8, 2018

These minutes are draft and subject to approval by the ISFMP Policy Board
The Board will review the minutes during its next meeting

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TABLE OF MOTIONS

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Sen. Brian Langley, ME (LA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Doug Grout, NH (AA)
Ritchie White, NH (GA)
Raymond Kane, MA (GA)
David Pierce, MA (AA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Mark Alexander, CT (AA)
James Gilmore, NY (AA)
Emerson Hasbrouck , NY (GA)
John McMurray, NY, proxy for Sen. Boyle (LA)
Jeff Brust, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Andy Shiels, PA, proxy for J. Arway (AA)
Loren Lustig, PA (GA)
Roy Miller, DE (GA)
John Clark, DE, proxy for D. Saveikis (AA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
David Blazer, MD (AA)
Rachel Dean, MD (GA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
John Bull, VA (AA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Steve Murphey, NC (AA)
Michele Duval, NC, Administrative proxy
Doug Brady, NC (GA)
David Bush, NC, proxy for Rep. Steinburg (LA)
Ross Self, SC, proxy for Sen. Cromer (LA)
Robert Boyles, SC (AA)
Spud Woodward, GA (AA)
Doug Haymans, GA (GA)
Pat Geer, GA, proxy for Rep. Nimmer (LA)
Jim Estes, FL, proxy for J. McCawley (AA)
Martin Gary, PRFC
Sherry White, USFWS
Kelly Denit, NMFS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Staff

Bob Beal
Toni Kerns
Laura Leach
Jessica Kuesel
Lisa Havel

Guests

Mike Asaro, NMFS
Rachel Baker, NOAA
Chris Batsavage, CCA
Heather Corbett, NJ DFW
Kiley Dancy, MAFMC
Emily Gilbert, NOAA
Brian Hooker, BOEM
Arnold Leo, E. Hampton, NY
Tom Lilly, Friends of Naticoke River
Dan McKiernan, MA DMF
Brandon Muffley, MAFMC
Michael Pentony, NMFS
Gary Redding, DC
Jack Travelstead, CCA

The ISFMP Policy Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Tuesday, February 8, 2018, and was called to order at 10:15 o'clock a.m. by Chairman James J. Gilmore.

CALL TO ORDER

CHAIRMAN JAMES J. GILMORE: Welcome to the ISFMP Policy Board. We've got quite a few things on the agenda today; so let's jump into it, but before we begin just some personal notes. Due to logistics at the annual meeting, I never got to thank everybody for electing me Chairman; so I would like to just take this opportunity for that and the honor of leading the Commission.

I would also like to thank Doug Grout. Doug did a great job in the two years that he was Chairman; and he was a great mentor to me. I thought I was ready a couple years ago when I was Vice-Chairman; but really Doug brought me along, so thanks again, Doug and a great job you did. Also thank you for electing Pat Keliher as Vice-Chairman.

I think I couldn't be happier; and I think myself, Pat, and Bob and all the senior staff of the ASMFC is going to make a great team in facing some of the challenges as we move forward, which we do have some challenges. I think we have some unprecedented times at the Commission's 76 year history.

I think that more than ever, as Robert Boyles has said, we really need to hang together if we're going to face these challenges effectively. Just a simple ask, and I think I haven't done this in a while, and maybe some people have never done it. But you really need to go back and just take a step back and look at the Compact.

Look at the rules and regulations, and look at the ISFMP Charter, and again take a fresh look at that. Because we really need to cooperate; if we're going to be successful, and I think the words in those documents really define who we are and who we should be, and how we should operate. With that I think if we do that and we stick to our principles, I think we'll all succeed as we go forward. Thanks for listening to my gravelly voice and we'll move on.

Well, a couple more things, and I'm going to do this now instead of at the end. We have a couple of departures in the family; first off Mark Alexander, this is his last meeting. Mark is going off to the retirement world; from what I understand. Although every time we say this, the next meeting they seem to be back, Spud.

But in any event, we wish you the best Mark in your retirement. Secondly, and near and dear to my heart, Dr. Duval is actually going to be moving on. She is going to be relocating to the wonderful Commonwealth of Pennsylvania; so she'll be living in southeast Pennsylvania, and will be taking a bit of a hiatus from all of this I guess, figuring out what to do. When she comes to her senses and decides to come back to us; I hope she will do that and we'll welcome you back. But in the interim Michelle, best of luck to you and all the terrific things you've done for the Commission and the South Atlantic Council. We sorely are going to miss you; both you and Mark, so best of luck in the future. (Applause)

APPROVAL OF AGENDA

CHAIRMAN GILMORE: Okay our next item of business is to go over the agenda. We obviously have some changes. We have taken out Item Number 5; in terms of the Virginia appeal on Amendment 3 to the Atlantic menhaden fishery management plan, so that will not be discussed today. Are there other changes or additions to the agenda? Dan. I'm clairvoyant.

MR. DANIEL McKIERNAN: Yes, I would like to talk briefly about an aquaculture and interstate shellfish seed issue.

CHAIRMAN GILMORE: Okay Dan, we'll add that to other business. Pat.

MR. KELIHER: Yes Mr. Chairman, under other business we need to discuss a tasking motion related to electronic reporting within the lobster fishery; and also to approve the tasking of the Law Enforcement Committee as it deals with the enforceability of ropeless fishing.

CHAIRMAN GILMORE: Okay, we'll add that to other business. Are there any other changes to the agenda? Okay seeing none; we'll adopt those by consent.

APPROVAL OF PROCEEDINGS

CHAIRMAN GILMORE: The next item is the approval of the proceedings from the October, 2017 meeting. They should be in your briefing materials. Are there any changes to those proceedings? Seeing none; we will adopt those by consent.

PUBLIC COMMENT

CHAIRMAN GILMORE: Before every meeting we have public comment. I believe we have one individual signed up that wants to make a public comment. However, I caution you we do not have the menhaden issue on the agenda any longer. We're going to limit this. We're not going to have any discussion because of the public comment we had had, but we're allowing one comment. If you're interested in making public comment, please raise your hand. Sir, please identify yourself and your organization; and please limit your comments to three minutes, thank you.

MR. TOM LILLY: Yes, Tom Lilly. I'm with the Friends of the Nanticoke River. We're a small group of folks interested in menhaden near Salisbury, Maryland. I would like to speak to you. By the way thank you, Mr. Chairman and all the members of this Committee. It is indeed an honor to be given this opportunity. Thank you very much.

But the topic I would like to brief you on, so to speak this morning, is how can we protect the schools of spawning menhaden in the Atlantic Ocean? First a couple words about our beautiful Chesapeake Bay. I know you all live on or near the water; you're concerned about it. But let's remember, the Chesapeake Bay is pretty amazing.

It has 40 major rivers that come into the Bay. You're near one right now, the Potomac. We have the Susquehanna, the Manokin, and the South River. Down south we have the York, The Rappahannock, we have these wonderful rivers. Remember, for each one of these rivers there are probably 500 creeks and small bodies of water that flow into them. Then let's not forget all the little bays, the wonderful little bays that we have scattered all around the Chesapeake. Now, while we're thinking about that let's think about the two or three million baby rockfish that are out in these wonderful bodies of water right now.

I'm talking about the small rockfish; the one and two year old rockfish. You know the waters are starting to warm up a little bit right now. These fish are getting active. I don't need to tell you. What are they all thinking about? They're thinking about getting something to eat. They're thinking about eating. They're thinking about finding the little worms, the little baby crabs and the things they need to survive.

The most important thing they need to survive on is the juvenile; the little menhaden are there that God put there to feed them. What we know from the last 20 years is that the supply of those little menhaden that those fish need to survive is dwindling, and has reached terrible rock bottom levels. We know that from all kinds of research.

We know that from guys like me that go out and fish. Don't forget that as that water warms up a little more those fish are becoming more active. They want to put on weight; and they're all searching and competing for food. Sadly, the

small baby menhaden aren't there. Now, why aren't they there? Okay that is controversial.

But one thing's for sure that the reduction industry is catching about 8,000 schools of adult menhaden out in the Atlantic Ocean. Thousands of those schools are being caught before they can spawn. Remember, those schools of menhaden, some of them weigh 25 tons. It's about the size of a tractor trailer load of fish. We don't think about that very often.

But those fish, one of those schools probably has the potential to produce a billion eggs underline again, a billion eggs. If we can protect 100 of those schools, and that's what I'm talking about. We can protect a hundred billion; we can create the opportunity for another hundred billion eggs to come into the Bay.

Okay, now a way to move forward and a way to move forward right now on this, yes. Do we need to do it? Yes, and I have three ways that we can move forward. Number one, this is important. Can we ask Cook Industries, and I guess your representatives are here this morning, to give us the information from the Captain's logs that have the information in the past about where these schools are caught, particularly what time of year they are caught.

Is there a concentration; and what is their condition as to spawning? More importantly, can we ask Cook Industries, and I hope you will answer this Cook Industries if you're here. In the future going forward, can you have your Captains record the GPS locations of the schools, their condition as to spawning?

When you take these fish in to be checked in Reedville, by the Beaufort Lab, the Beaufort NOAA Lab, can this Commission, and I hope you will do this, ask the people down at the lab, Ray Mroch for example. Can they take samples of the spawning condition of these fish; like goes on up in the herring industry in New England? What you've done in the herring industry in New England to protect the spawning fish is a great example for what can be done here. Now, those are the first two points. We need to get the records. Our scientists, many, many research papers as you know have been done on the movement of the spawn and the currents. Oceanographers have worked on this for years.

But they need the information Cook Industries, as to the locations and conditions of that spawn. That would help them tremendously. Okay as I mentioned, we know that system of closures is working up in New England. I'm asking you Commission, let's do that here and then let's not do it years from now. Let's start thinking about doing it now.

Now is when the Bay needs those fish desperately. Now, if you will agree. By the way, isn't this a win, win; win situation for you commercial people, for you recreational people, for you environmental people. Getting more juvenile fish into the Bay is a win situation for everyone. We should be together on this.

There is no reason to fight each other on this; this is something that would help everyone, and we can do it now. We can do it this summer. How do we get started? Staff, I'm asking you. Set a meeting within the next 30 days or 60 days rather on the stakeholders involved. Get them together. Let's sit down at the table; and let's explore the possibilities here. There are a lot of opportunities here to do a lot of good. That's it, thank you so much for listening to me. It's an honor, really. Thank you.

UPDATE FROM THE EXECUTIVE COMMITTEE

CHAIRMAN GILMORE: Thank you, Mr. Lilly. Are there any other comments on topics not on the agenda before we move on? Seeing none; we will move on to our next item, which is Update of the Executive Committee from yesterday. Mr. Lilly, could you please switch that microphone off? Thank you. I get to do the honor.

For the Executive Committee yesterday we had several topics. The first was we reviewed some updates on ACCSP; which Mike Cahall had done. In your briefing package it gets into the details of Mike's update. But essentially, he went over different issues; particularly funding, data collection, data dissemination, APAIS, and particularly with the data dissemination and collection some electronic advances that we'll be doing in the not-too-distant future. If you have more interest in that again, the details of that are in the briefing document.

Number two is we reviewed the leadership nominating and election process. The last election that we had gone through there were some questions raised about two particular issues; how we were executing the nominating process, and then who actually was eligible to be considered to be Chairman and Vice-Chair of the Commission. There is a document that identifies essentially that whole process. One thing it was unclear as to who was being contacted, and was everyone being contacted.

In terms of the eligibility, up until probably the last election it was generally that only the Commissioners would be eligible to serve as Chair or Vice-Chair. I think the only other addition was permanent proxy. There was generally a limit to maybe some of the people that could sit on the Board that could Chair the Commission. I think there was recognition that there was some great talent around the room that serves as permanent proxies or ongoing proxies. After some discussion during the meeting, a motion was put forward and essentially took both issues on under one motion. The first issue was on the nominating process. We went with the second option, which essentially boils down to the Nominating Committee will contact the Administrative Commissioners of each state, who then in turn contact their legislative and governor appointee Commissioners to make sure everyone is considered, in terms of who would be eligible to be Chair or Vice-Chair of the Commission.

The second issue on eligibility, it was agreed that we would actually add on a little bit; and we went with the second option with that ongoing proxies will now be eligible, but only with the approval of the appointing Commissioner. If we have ongoing proxies now, when we get into the future they will be eligible to be considered for Chair or Vice-Chair of the Commission.

That again was approved by the Executive Committee yesterday. I'll pause here; because I know Ritchie had a comment whatever about. Generally that is under the purview of the Executive Committee, but there is a little bit of feedback as to any feeling on that. Ritchie.

MR. G. RITCHIE WHITE: I was able to attend the meeting. I take exception with the contact going to the Administrative Commissioner. I think each of the three Commissioners are independent and are of equal importance. I think the contact ought to go directly to each Commissioner; and not through the Administrative Commissioner.

Each Commissioner then gets to give their input separately and not a state input; even though the state will vote in the end. It doesn't mean that each Commissioner might have different ideas about who may want to serve or who they believe would be good choices. I also think that the issue was discussed about legislative Commissioner, and then the legislative proxy, and how the legislative Commissioner very often is busy and may not see an e-mail come in, may not recognize it.

Therefore, the legislative proxy might not be told from a legislative Commissioner about this process. I think that when there is contact by e-mail that it ought to go to both at the same time; so that we know that the proxy that is active here is getting contacted, and it doesn't go by the wayside in the legislative Commissioners in their e-mail box. That is my thoughts, and I hope that all Commissioners can participate in this process equally.

CHAIRMAN GILMORE: I've got Doug next. Dennis.

MR. DENNIS ABBOTT: Having made the motion, either I made the wrong motion or you're not quoting the results of the vote. But on Issue 1 and during our discussion, we talked about compiling a list to talk to each appropriate Commissioner; whether it's an ongoing proxy, the legislators, or whatever.

We were strongly in favor of that so that we wouldn't be subordinate to the Administrative Commissioners in voicing our opinion of our interest in being Chair, Vice-Chair or talking about whom we wanted or who we thought might be a good next Vice-Chair. That is my recollection of what I said.

CHAIRMAN GILMORE: I just conferred with Pat. Yes, if you'll recall we had a rather tag team approach yesterday, so I stand corrected. What you said, Dennis is accurate. Just to remind everybody. This now is going to go before the Commission's attorney for review, and I think we're going to probably talk about it at the May meeting to finalize it once we come back. I guess it's a proposal at this point that's been recommended by the Executive Committee.

Again, I think we'll have further discussion on this after we get that review back. The next item was indirect cost rates. As Laura has been telling us; and everybody knows, the indirect cost rates have been going through the ceiling. I know back in my state it's really affecting a lot of the grants we have, and how things are being done.

At this point in time I think, and Laura and Bob have made this pretty clear. We're trying to strike a balance where to keep those as low as possible; to keep most of the money going towards the projects instead of the indirect cost. But there is a balance that needs to be made between that and accounting and audits and things.

Laura and Bob have committed to staying on top of that and keeping us informed as those rates change. The theme still is to keep them as low as possible; but we will adjust them as time is required under legal requirements. The next item was the appeals process. There was some concern. Well, it's funny when people talk to me about becoming Chairman they said, oh never worry about the appeals, they never happen.

Now we seem to be having them on a regular basis. We had been tweaking the appeals process somewhat; and we seem to be using it a lot more now. We've taken another look at it. There was some discussion around the criteria. There are essentially five criteria that an appeal can go forward on.

Specifically during the discussion yesterday, Criteria Item 3 and 4 there were some concerns about maybe vagaries under it, maybe misinterpretations of it, and even possibly under 5. Considering the fact that we're anticipating maybe more appeals in the not-too-distant future, we really needed to tighten those up.

Jay McNamee and Jeff Brust volunteered to expand and clarify on these two points as an initial take. Of course Item 3 in particular is on data; and the information we use in terms of these things. They're going to take a first crack at this; come up with maybe some suggested changes to it, and then we're going to bring it back in the May meeting and we'll have another discussion about if we're going to amend the Appeals Process for better clarification, and maybe better use as we move forward.

The last item on the agenda was conservation equivalency. There was some discussion about some of the requirements that are being under conservation equivalency, and are they actually being applied. Particularly, the Plan Review Team essentially after conservation equivalency

is implemented, is there reviews being done after the fact a year later.

It came up yesterday I guess at striped bass is that if we do these things, are we truly looking at them? The response was kind of a mixed review; sometimes, sometimes not. We really need to look at that a little bit and maybe tighten that up. Once again the overworked Jay McNamee is going to be looking at essentially that particular issue; and maybe some more. Really the one issue was we have to add in sufficient time to review for the PRT to review some of these. If the conservation equivalency truly is working, and that the information that they need to make those decisions, this actually takes a little time to go through.

That's another effort that Jay will look into; and then we'll be bringing that back at the May, 2018 meeting. That was pretty much the end of the meeting; and I'll actually leave it up to Pat, since he took over for me since my voice didn't last very long, so did I miss anything? Are there any comments or questions on that before we move on? Okay, seeing none; Roy, go ahead.

MR. ROY W. MILLER: I hesitate to stop forward progress; but I thought I had a good understanding of where we were with regarding the nomination process. But frankly, the two questions and then the response to the questions have confused me a little. Could you clarify that once again; who the Nominating Team will contact to solicit names for officers?

CHAIRMAN GILMORE: Laura, do we have the motion from yesterday; because that would be the best way just to read the motion the way that it was approved. I don't feel so bad, Roy. Now you're confused too, because I was for a minute or so.

MS. LAURA LEACH: What I got was move that we adopt Number 2 on Issue 1; and adopt Number 2 on Issue 2.

CHAIRMAN GILMORE: Pat's got it first, and then I'll come back to you, Robert.

MR. PATRICK C. KELIHER: Issue 1, what is the appropriate approach to contact Commissioners for nominations, and the motion that was supported was Item 2 under Issue 1. A member of a nominating committee will contact the Administrative Commissioner from each state and request they communicate with the state's legislative and governor's appointees.

Then to clarify to the point that Dennis Abbott brought up; staff will compile a list to ensure that the Administrative Commissioner has that full list of who he needs to contact. Under Issue 2, who should be eligible to serve as an officer? Under Issue 2, Item 2 was chosen. Commissioners and ongoing proxies are eligible to serve as officers. However, the appointing Commissioner must agree to the eligibility of a proxy. Clear as mud now?

CHAIRMAN GILMORE: Are you good, Roy?

MR. MILLER: Thank you.

CHAIRMAN GILMORE: Robert.

MR. ROBERT H. BOYLES, JR.: Mr. Chairman I'm sorry, I missed the conversation. I think I heard the operative point. I think there are some questions that I have regarding some of the legal questions. Did I understand we are going to request legal counsel review of this; and if so, will we revisit this in Executive Committee in May?

REVIEW AND CONSIDER THE CLIMATE CHANGE WORKSHOP WHITE PAPER

CHAIRMAN GILMORE: Correct on both points, Robert; anyone else on this topic? Okay, moving on the ptomaine twins up here are going to tag team; Toni is going to go off the Review and Consider the Climate Change Workshop White Paper**,** so Toni, take it away.

MS. TONI KERNS: At the annual meeting I went through the Draft Climate Working Group white paper in full detail; so I'm going to briefly run through it again today. What we had said at the end of the discussion was that folks would sit on the white paper; bring forward any concerns or comments they had to staff, and then we would vote on approval of the white paper here today.

I only received one set of comments from NOAA Fisheries; which we've incorporated into the document, which was included on your briefing materials. Just as a refresher. The Climate Change Working Group was tasked to develop a science policy and management strategy to assist with adapting changes in species abundance and distribution, resulting from climate change impacts.

This white paper was pulled together to provide options to assist Boards and Sections in the management of species that are being impacted by climate change; with the focus on stocks with low biomass and allocation issues. This is by no means a marching order for any Board or Section; it's just there to be used as guidance if they would like to do so.

We should note that none of the options that were analyzed to clarify the pros and cons of them, and that the options that are included in here are not all consistent with federal law or the fisheries management goals identified in the charter in some cases. The list is just a starting point for managers as they begin their discussions on these issues.

The document contains a stepwise approach in looking at how to address these climate change issues. The stepwise approach allows for change in the process throughout time, as we see changes in either species allocations or in the environment. It considers information for stocks at persistent low biomasses.

It asks questions about what are the appropriate level of harvest; how the resources should be committed to continuing monitoring and managing of the species, looking at status quo of how to address monitoring and management, evidence of a change in productivity to adjust reference points to reflect that change.

If there is evidence that the stock has low to no productivity, is recovery to sustainable levels highly unlikely? For management and monitoring to cease, harvest does not need to continue because it becomes economically feasible. These are some of the options that you can choose from. The document goes to list a series of science requirements that you should have when thinking about these stocks at persistent low biomasses.

It also has a section contained on management for stocks with changing distributions. It has options that look at different types of state-by-state allocations. It has options that look at maintaining state-by-state allocations; but revisiting those allocations based on certain triggers, and there are a series of triggers that are listed. Then lastly it has options for management for moving away from state-by-state allocations. In addition the document has a suggestion to recommend a term of reference for stock assessments for climate impacts on the stock. If there are no impacts then it shouldn't be included in the terms of reference for those stock assessments. Then lastly it recommends a coastwide database to summarize the types of climate related data that is out there. It's not storage of all that data; but just to provide a list for us to have at our fingertips. Are there any questions? I'll try not to repeat what I did last time.

CHAIRMAN GILMORE: Wow, you stumped them, Toni, very good. Doug.

MR. DOUGLAS E. GROUT: Not a question, because I was pretty intimately involved with this. But just Mr. Chairman, do we need a motion to adopt this as a policy that would be sent off to the Sections and Boards for consideration?

CHAIRMAN GILMORE: Yes we do, Mr. Grout. Would you like to offer one?

MR. GROUT: Sure. **I would move that the Atlantic States Marine Fisheries Commission or the Policy Board, adopt the management policy and science strategies for adapting fisheries management to changes in species, and abundance in distribution resulting from climate change as a policy, and to send it off and distribute it to the Board and Sections for consideration in their management.**

If I might add one thing, I noticed Toni that you made a little introduction that some of these may not be compliant with federal laws or the Compact. Do you think that might be something that we should put in the introduction to that as a modification?

MS. KERNS: It is.

MR. GROUT: Thank you.

CHAIRMAN GILMORE: Okay Doug, I think we have the motion up there. Is that correct?

MR. GROUT: Sure, and if I could also say and to distribute this policy to the Boards and Sections for consideration.

CHAIRMAN GILMORE: Okay, do we have a second to that motion; Jason McNamee, discussion on the motion, Dr. Pierce?

DR. DAVID PIERCE: I do support the motion. However, I did want to point out one thing that probably is obvious to everyone. But this is an important element of the position taken by the group that put this document together, referencing Page 3, where under management options for stocks at persistent low biomass on Number 3.

When we have some evidence that a stock has a low to no productivity and recovery to sustainable levels is highly unlikely. Then every Board is going to be faced with a rather difficult choice. We either say, according to this document a permanent moratorium in harvest occurs, until it becomes economically, how does it read? A permanent moratorium is put in place, or harvest continues until it becomes economically unfeasible. Tough choices, and a tremendous demand or an obligation is put on those who provide us with the science, who provide us with answers, who have to provide us the answers or try to give answers to the five questions under science requirements.

I just wanted to point out that when we determine that a particular stock has that low to no productivity; and we have to make a choice then between a permanent moratorium, or to let them go until it becomes economically unfeasible. We have to have some answers to those five questions. It's a tremendous demand on those who provide us with the science. I hope that we'll be able to get some answers to those questions.

I'm not optimistic; but nevertheless, it's a very frank description of what's going to be required for us to make that distinction between a moratorium or just let it run until it becomes economically feasible. Thanks to the group that put this together. They did a good job; and they're very frank in terms of the choices we're going to have to make based on good science, which I hope we'll have as we address some of these stocks, maybe one being southern New England winter flounder.

CHAIRMAN GILMORE: Good points, Dave. I think between winter flounder, as you mentioned, and weakfish, it does become frustrating that you see you're out of compliance, because you've maintained a very modest fishery to collect data. But then it's very difficult to get the data, because you can't find the fish. It's a very good point. Adam.

MR. ADAM NOWALSKY: I appreciated the opportunity to be part of the group; and glad to see that the body as a whole is prepared to utilize it. I would just offer that at the end of

the introduction the last sentence says; the lists are thus intended to provide a starting point for managers as they discuss the management options.

It would be my request that when this be distributed to Boards and Sections that that be highlighted, and it be made clear that these are not mandates given to those Boards and Sections, it's meant to be hey, we've already done the legwork for you for some ideas that you could pursue in this. Just so we don't wind up with questions about why aren't you following that document that was sent to us?

CHAIRMAN GILMORE: Good point. I think we can add that in. Ritchie White.

MR. WHITE: To David's comments. We're very close to being there with northern shrimp. We're in our fifth year of moratorium; and clearly wrestling with how many more years. You don't have reasonable recruitment, and with fishermen saying gee, let us have a chance at what's left. I think we're going to be making a decision using this at some point in the next few years.

CHAIRMAN GILMORE: Jeff Brust.

MR. JEFF BRUST: Just to Adam's and Dr. Pierce's points. I'm wondering if we leave the term distribute this policy. Are we constraining ourselves to just the options that are in this document; or are we using this as a guidance document with potential options for where we want to go, but not necessarily the entire menu? If not, should we perhaps change that to; to this guidance document?

CHAIRMAN GILMORE: Well, Jeff I think that was the intent all along. This is a guidance document; and I hope to God we never stifle ourselves, where if we can come up with some creative solutions to any fishery that we would tie ourselves to a policy that we couldn't get out of. Again, I think it was originally envisioned as a guidance document. That's what it is. I would be reluctant to change the title at this point; unless anybody disagrees. I think it stands for that as it is. Go ahead, Jeff.

MR. BRUST: I'm just wondering, does the language in the motion itself constrict us; and to distribute this policy to Boards and Sections.

CHAIRMAN GILMORE: Doug, do you want to consider changing that to guidance instead of policy?

MR. GROUT: If it makes people more comfortable. Again, I can see a policy can be a guidance document at the same time. I don't think it's something we have to – well and the title is Policy and Science Strategies, so that is where I was coming from. Clearly these were guidance documents.

If you come up with something that we haven't thought of, great, and I think we should even modify this document if there is a new idea about how to handle things, I think that would be great. That's my thought, talking the same. But if it makes the Board more comfortable with it saying guidance document, I'm willing to change it.

CHAIRMAN GILMORE: Well at this point I think it's on the record now that you've pretty much identified it as what it is. Why don't we leave it alone; so we don't start changing some of the wording in the document? I think it's pretty clear it is a guidance document; and trust me, back in my state when you say the word policy, lawyers all get involved. I can understand the sensitivity. But I think it's pretty clear on the record what we have right now; any other comments on this? Dave.

MR. GROUT: I can support this as a guidance document. I think it's well done. But I would just note that I think as we try to implement these provisions, we're going to have to continually tweak these and add and delete to the group. Given the discussion we've had over the past few days about weakfish and some of

these other stocks, and southern New England lobster.

Where we already have a strategy in place to downsize, right size the industry to the available size of the resource, we're going to have to just kind of customize our responses; based on a lot of the biological facts and industry economics. I think these should be guidance and flexible is the point.

CHAIRMAN GILMORE: Yes understood, Dave, I agree; other comments. Okay, well let's maybe do this simply. Is there any objection to the motion? Okay great, seeing none we will adopt the guidance/policy/whatever we're going to call it, as a unanimous consent.

HABITAT COMMITTEE REPORT

Okay we're going to move on to our next item; which is a Habitat Committee report and Lisa Havel is going to lead us in on that discussion. Lisa, whenever you're ready.

MS. LISA HAVEL: I'm going to be presenting on two different documents that the Habitat Committee has produced; since we last saw you back at the annual meeting. Hopefully you all will approve them today.

REVIEW AND CONSIDER CLIMATE CHANGE GAPS AND RECOMMENDATIONS REPORT

DR. HAVEL: The first one is our Climate Change Recommendations Report, Task 4.6.2 of the 2017 ASMFC Action Plan.

It says to identify gaps in state coastal regulatory planning regarding climate change impacts; and make recommendations to increase resiliency. That is what this report is doing. It builds off of the 2016 summary of state initiatives that address climate change that we presented last year to you. State initiatives were grouped into eight different categories.

Since I have a little more time today I'm going to read through this quickly. The first one is established working groups or legislation to reduce carbon output. The second is establish working groups or legislation to respond to climate change threats. The third is produced reports on climate change.

Number four is assesses and monitors the effects of climate change. Five is has mechanisms for collaboration among agencies and other organizations. Six is addresses climate change and planning documents. Seven is has responded to climate change on the ground; and eight is includes climate change in outreach efforts.

Each state has implemented between one and eight of these initiatives; and four states have implemented all eight of them. At a minimum, all states addressed climate change in their state wildlife action plans. We notice that there are opportunities for more on-the-ground response depending on the state; also more opportunities for working groups or legislation to reduce carbon outputs, as well as to respond to climate change threats, and more opportunities for collaboration and outreach.

The report includes lists of recommendations; and these fall under three different categories, energy production and use, science and monitoring, and increasing resiliency. The report also includes additional literature and links to climate change initiatives along the coast; including a lot of information from NOAA and the Department of the Interior.

There is also a summary of the initiatives taken by each state.

REVIEW AND CONSIDER SUBMERGED AQUATIC VEGETATION (SAV) POLICY REPORT

DR. HAVEL: The second document that we produced was an update to the Submerged Aquatic Vegetation SAV Policy; 2017 was the 20th anniversary of the Habitat Committee's

Submerged Aquatic Vegetation Policy. In 2017 the Habitat Hotline theme was SAV.

The Habitat Committee also reviewed and updated the 1997 Policy Document. The Habitat Committee reevaluated the policies recommendations and importance; and determined that the policy is still relevant, arguably more important now than ever. They left the goals largely unchanged from the 1997 version; with the primary goal being to preserve, conserve, and restore SAV where possible, in order to achieve a net gain and distribution and abundance, and prevent further losses. There were six key components to achieving the goal of this policy; and these components did not change from the previous version. They are the assessment of historical, current, and potential distribution and abundance of SAV, protection of existing SAV, SAV restoration and enhancement, public education and involvement, research, and implementation. The policy was updated based on emerging issues and new information.

Emerging issues include aquaculture and climate change; which has changed a lot over the last 20 years. New information includes more up-to-date information on what's going on in the Chesapeake Bay; the goal of restoring 75,000 acres by 2025. There is more up-to-date information in the background information section, the policies, and also the recommended actions.

The policy also includes a summary of initiatives taken by state and federal partners; as well as SAV contacts for each state. I also wanted to add that the Artificial Reef Committee is meeting jointly with the Gulf States Marine Commission at the end of this month; so I'm happy to take any issues that you may have to that committee when I go as well, if there is anything you want to discuss about that. With that I'll take any questions on either of these two documents.

CHAIRMAN GILMORE: Great report. Questions for Lisa on either one of these reports, I guess the clickers wore everybody out this morning. We're going to need a motion to adopt both of these, the pleasure of the Board if someone would like to offer a motion. Mr. Grout.

MR. GROUT: I would, hold on a minute, move to adopt the Climate Change Gaps and Recommendation Report; and the revised Submerged Aquatic Vegetation Policy Report put forward by the Habitat Committee.

CHAIRMAN GILMORE: Do we have a second to the motion? Jeff Brust. Is there any discussion on the motion? Is there any objection to the motion; I'm sorry, David, did you have a comment?

DR. PIERCE: No, only that with regard to the Submerged Aquatic Vegetation Policy I'm glad to see that we're updating it. Certainly in my state there is high priority on regaining some areas; eel grass notably, you know planting eel grass, trying to regain that which has been lost over the years.

We've had some modest success regarding that; plus we're also very much engaged in some ongoing efforts to identify and protect eel grass beds, especially from the variety of different fishing gears. This updated Submerged Aquatic Vegetation Policy is quite consistent with what we're doing in state; and I can use this updated policy as a way to further our ongoing efforts, and to defend our ongoing efforts.

CHAIRMAN GILMORE: That's a good point; same thing in New York, we have a lot of aquaculture interests now. This is really helping steering those locations away from aquatic vegetation. **Are there any other comments? Seeing none; is there any objection to the motion? Seeing none; we will adopt that by unanimous consent.** Our next item is actually lunch break; but we're going to keep working

until we get to 12:00 o'clock, and we'll stop at that point.

NORTH ATLANTIC RIGHT WHALE FIVE-YEAR REVIEW AND REINITIATION OF ESA ACT SECTION 7, THE FISHERY BIOLOGICAL OPINION

CHAIRMAN GILMORE: Our next item is the North Atlantic Right Whale Five Year Review and Reinitiation of Endangered Species Act Section 7, the Fishery Biological Opinion; and Mike Asaro is going to come up and lead that discussion.

MS. KERNS: We had Mike come to the Policy Board instead of just the Lobster Board; while this is definitely a significant issue for the Lobster Board, this reinitiation will affect other species as well. It is something that the Full Commission will want to be aware of and fully abreast of the tasks that are ongoing for this.

CHAIRMAN GILMORE: I'll take this opportunity for one quick announcement. I found a really beautiful pair of sunglasses in the elevator; so if you dropped them come up and claim them. But you'll have to identify the interesting band on the back, which I'm not going to read. If not, we'll raffle them off at the end of the meeting.

MR. MICHAEL J. ASARO: Thank you all for the opportunity to be here today to speak to you on right whales. My name is Mike Asaro; I run the Marine Mammal and Sea Turtle program for the Fishery Service Regional Office. I would like to hit a few topics this afternoon, or this morning. One is to talk about the **Right Whale 5-Year Review**; it's a document that we issue under the Endangered Species Act.

There will be three components to that; one is a summary of recent right whale biology, and I'll also touch on some management actions that are underway, and some that are planned for the future too. At the same time I'll talk about the fisheries consultations under Section 7 of the ESA. Then lastly I'll talk about the Atlantic Large Whale Take Reduction Team activities planned for this year; under the authority of the Marine Mammal Protection Act.

But first just a little bit of background. A 5-year review is required under the ESA. It's something we do as a follow on from the Right Whale Recovery Plan. Essentially there are a few different parts to it. One, it's meant to look back at the last five years of endangered species research; in this case right whales.

At the same time it's supposed to summarize the biology of what we've learned about the species in the past five years; and also summarized the past five years management activities, and then lastly look ahead for the next five years, and plan management priorities in the coming 5-year period.

The biological findings of the 2017 5-year review that we finalized last fall was – and I'll get into these topics in more detail – it's a low rate of reproduction for right whales, prolonged calving intervals, declining population abundance, the continued mortality from both ship strikes and entanglements, and pretty significantly some changes in prey availability, and with that increased transboundary movement and risk. Of course the review confirms the species status as endangered.

Here is the major biological finding I would say over the past five years of right whales. This is a new method for modeling abundance of right whales. The top chart, if you can see it, it's basically the modeled estimate of right whale abundance over time. You can see there are two lines there; and the two plots diverge pretty greatly in recent years. You should know for many years right whales showed such high site fidelity in places where we would expect to see them each year; that we could essentially fly aircraft over where right whales aggregate, and using photography and our ability to identify every individual right whale, basically get a photograph census of the entire population.

Because right whales came to the same areas each year, it made the process relatively easy. That is unique for large whales in this country. Right whales are the only species for which that was the case. You can see starting in 2010 however; that changed pretty significantly. It's a theme with right whales; just overarching theme of change since 2010.

A lot about what we thought we knew about right whales in terms of where we would expect them to be, and how we would expect them to behave has changed significantly since 2010 in particular. You can see the lower plot that drops off pretty precipitously; that would be the abundance if we had continued the old method, basically, relying on photographs to take a census of the population.

What that was telling us during that time is that right whales; well it could have been two things. It was either right whale weren't returning to the areas where we would expect to see them; making the census method no longer applicable, or there were fewer right whales, one or the other.

Richard Pace, he's the large whale statistician out of the Northeast Fisheries Science Center; developed this methodology to assess right whale abundance statistically, no longer relying on the minimum count methodology. What he was able to conclude that in fact the changes we've been observing are attributable to both a distribution change and also a population decline.

You can see that's the upper plot in that top figure. The study also concluded that the probability of a decline in right whale population since 2010 is 99.99 percent; so we're very certain that there is a decline happening, but in the middle of it and complicating that signal, is also this changing distribution.

The lower figure I'll just point out; this has been the case for many years of the right whales, but it's worth repeating that the right whale population as a whole is about 40 percent female. This is pretty significant. We know right whale females are much more susceptible to human interactions and mortalities from entanglements in particular, but also ship strikes; given their increased movement down to the calving grounds off of the southeast U.S.

Over time this population has had fewer and fewer percentage female; now about 40 percent. Of those females in the population, about 100 of them are reproductively capable. This is a plot showing per capita human interactions from the NOAA Fisheries stock assessment reports that are published each year.

You can see a general trend of decreasing ship-strike mortalities; particularly in response to the ship-speed rule that was put in place in 2010. We saw as predicted in the development of that rule, slowing vessel speed has had a pretty significant reduction in ship-strike mortalities over the past decade. Over the same period there has been a pretty significant increase in entanglement mortality as well; up over 1 percent of the population dying of entanglement each year, at this point. I'll mention that the numbers here are observations. There is no systematic observer program for right whale mortalities. Everything is really opportunistic; with no sampling methodology or observer program or things like that.

It's basically what we can see; which we're fairly certain is a conservative estimate. Over time as well and here is a figure taken from a paper by Amy Knowlton at the New England Aquarium; you can see the number of entanglements over time has increased, particularly in the past 20 years in general.

The severity of entanglements has also increased, and that correlates pretty highly with the type of entanglement configuration; that is the more complex entanglement configurations

that right whales are dealing with, the more likely they are to result in serious injury and mortality. At the same time here's just a visual depiction of how the scar coding works with right whales; to get a sense of whether an entanglement would be considered miner, moderate or severe.

At this point about 85 percent of the right whale population has entanglement scars; in any number of these categories. This scarification assessment methodology has been updated over time for many decades. What we've seen is basically just a steady increase in the percentage of the population that has entanglement scars.

The old number was 83 percent; now with the most recent update as of last fall is now 85 percent. You can see in that bottom photo the severe entanglement. In that category that's an entanglement that is likely to kill the whale. Also over time, particularly since 2010 as well, we've seen a pretty significant decrease in right whale calf production.

The trend is moving downwards, and down to five calves observed last winter. The last I checked as of a couple days ago there have been zero calves down off the southeast U.S. this year; and we're more than half way through the calving season. There have been a couple of right whales that have traveled down to the calving grounds; but as of yet no calves seen.

Related to that as the number of calves that we're observing is going down steadily each year, and that is the red trend line you can focus on over time going downward. The number of right whale females that we would expect to be able to reproduce; given the number of years generally between calving events, it should be about three years.

But the interval is getting longer; up to seven years at this point. What we have now is a population, as I mentioned, about 100 reproductively capable females. Nearly 80 of them at this point, we would expect them to be calving at any given winter, but they're not. That number is increasing over time too; the blue trend line upward.

There is also a pretty standardized health assessment methodology; looking at a number of factors, again based on photography of right whales, assessing blubber thickness, blowhole condition, presence of orange sciaenids, a host of other different factors that you can use to access the health of right whales and give a health score. This research is done at our New England Aquarium. What we've seen over time over the past 30 years has been a general worsening of health conditions for all right whales in particular. But what we've noticed that if you break it out demographically, females seem to have the lowest health scores; and reproductively active females seem to have the worst of all. Some recent research has attempted to get a better understanding of what the impacts of a chronic, long term sublethal entanglement is on right whales.

These are entanglements that don't necessarily kill a whale immediately; because we know that is rarely the case. Because right whales are so strong, they are rarely ever anchored in place like say a minke whale could be. Generally right whales become entangled and drag gear away for weeks, months, or years at a time. A focus of research in the past five years has been looking at what the sublethal effects of that entanglement could be; particularly the energetic cost of the drag on right whale of gear.

This is a pretty significant paper that looked into that; which was published in 2016. The conclusion was that the energetic cost of entanglement for right whales is basically the equivalent of a female's energetic expenditure to undergo reproduction from calving down in the southeast, traveling down to the calving grounds, and then a full year of lactation and travel back up to the waters off of New England,

so a much more energetically costly factor than we had ever considered before.

Here is a photo showing just visually how that health assessment methodology has done for right whales. This is the same whale in both photos; and the sightings are exactly a year apart, about. You can see the whale on the bottom is entangled. There is a line coming out of its mouth. You can see the pretty obvious deterioration in health over the year that this whale was entangled; the presence of orange sciaenids, a concavity behind its blowhole, evident of a significant loss of blubber, scarring, rake marks, et cetera; a pretty significant decline in body condition.

Piecing all these things together, where the research has emerged most recently is looking at the correlation between declining health scores and the disproportionately affected reproductive females, and the correlation between those two factors and what we're seeing now is a pretty significant reduction in right whale calving over time.

It is an important thing about that back in the context of this figure; because what we know about right whales is, look at the period before 2010. That's pretty significant growth. There doesn't appear to be a significant increase in fishery interactions that would necessarily warrant the population to turn at such a significant inflection point there in 2010 downward.

Right whales are extremely resilient; and have been subject to ship strikes and entanglements for decades. Yet as you can see here, it showed pretty good growth over time. In the period since 2010, the reason for the decline largely is because of this lack of calving. Right whales just haven't been replacing themselves at the rates seen in previous years; and that's pretty much what we can attribute this decline to.

I will add. The study period in this analysis here was 2010 to 2015; which took the number of right whales from 480 down to 453. The methodology was updated in 2016; using the same model and the number went down to 451. Then the model will be rerun this October with 2017 data. But based on what we were able to observe in 2017, which I'll run through here. We can count on that number going down even further. Last year there were 17 dead observed right whales; 12 of those were up in Canada in the Gulf of St. Lawrence over the summer, while their snow crab season was going on in the Gulf.

Of those 12 whales up in Canada, 7 necropsies were performed. Two died of entanglement and four died of blunt force trauma, and one was unknown. There were also five dead whales off of Massachusetts and around the Cape and the Islands as well, floating. One was inside Cape Cod Bay; that was a ship strike on a one-year old.

The other four were severely decomposed, floating. One was 100 miles east of Cape Cod on Georges Bank. The other three were down floating by the Islands. These were severely decomposed animals. Not much is known about how they died or where they died. The cause of death on two of those is pending; with some evidence of entanglement.

But it's not necessarily conclusive, because as I said, a lot of them have entanglement scars so it's unlikely that that necessarily killed them. One was blunt force trauma; as I said in Cape Cod Bay, and then two are unknown. There are also nine live entanglements observed in both U.S. and Canada last year.

It was five up on the Gulf of St. Lawrence, and then four in U.S. waters as well. Then you may know, just a couple weeks ago there was a dead right whale entangled seen off of Virginia Beach. A necropsy was performed on that animal. The cause of death was the chronic entanglement.

We were able to retrieve the gear from that animal; and it was shipped up to our gear storage warehouse in Narragansett, Rhode Island, where our gear team is starting to take measurements and analyze the gear. There doesn't seem to be any necessarily obvious clues on where, when, and how the entanglement occurred; but our team is giving it a look now, to see if there are any leads we can follow to try to get a better sense on where that whale was entangled.

Some of the long term recommendations of the 5-year review, I'll just go through this quickly. It's getting a better understanding on the energetic stressors on right whales; including sublethal entanglement, but also on the changes in environmental conditions and prey availability in around right whale habitat.

There is also some research showing a pretty significant distribution of copepods, which are right whales primary prey, in and around the Gulf of Maine and in the Gulf of St. Lawrence as well. Given right whale size and the species they forage on, when they're not reproducing they're spending pretty much their entire time foraging.

Right whale behavior and where and when we see right whales is predicated largely on where copepods are too. Trying to get a better understanding on where copepod distribution may be taking right whales; and if in that movement they're either spending more energy foraging than they had before, of if that change in movement is taking them into areas of higher entanglement in ship strike risk as well. Looking at how we can best allocate resources and efforts to get a long term cross-regional plan for monitoring right whale population trends and habitat use. Using the array of shipboard, aerial and passive acoustic survey tools that we have currently deployed and being used throughout right whale range, to get a better idea of where these animals are, and possibly to the point where we could even predict where they are based on certain environmental conditions.

That follows along too with prioritizing funding for the variety of surveys; so we can understand where and when right whales are in as near real time as we can get it. Then pretty significantly, analyzing effectiveness of the regulations we put in place under the Marine Mammal Protection Act over the past two decades, and also the Ship Speed Rule over the past ten years.

To see what role those regulations have played in right whale recovery and how effective they've been at each iteration of those rules; which I'll go into in a little more detail here. Then again, related to the Section 7 process, which I'll talk about is analyzing the effects of commercial fisheries on right whales as well.

Some things currently underway, we are engaged with our counterparts in Canada, both Transport Canada and Fisheries and Oceans Canada, as part of a Bilateral Right Whale Working Group. The Canadians have been pretty open and sincere; especially their Minster of Fisheries and Oceans Minister LeBlanc, about their willingness to implement both shipping and fishing measures in prep for their upcoming season here this spring to prevent a repeat of the mortalities that happened last year.

We have a new in the Regional Office a Right Whale Recovery Coordinator that is Diane Beauregard; some of you may know her. Her job is going to be to get a better understanding of some of those larger risks and energetic stressors of right whales; including the potential effects of climate change on right whale prey, and how that's changing distribution.

She'll be forming a new Right Whale Recovery Team. We'll be looking at some outside expertise in areas related to climate and oceanography; to get a better sense of how we can incorporate those factors into our management, and understanding what role environmental variables pose in all this. Then lastly is reinitiating our fisheries biological

opinions under the ESA; which I'll talk a little bit about here.

Briefly, Section 7 of the Endangered Species Act, for those of you who don't know it requires federal agencies to ensure that the actions that they authorize, fund, or do don't jeopardize the existence of endangered species under the ESA, or destroy or adversely modify species critical habitat. Just in general sense, here is a little decision tree on how the consultation process goes for our purposes here. We're just following that lower path.

It's important to note that in the case of the commercial fisheries, the FMPs that we analyze looking at right whales. It's kind of unusual in that the Fisheries Service is both the action agency and the consulting agency. With the action agency to the extent that we issue the FMPs, and with the consulting agency to the extent that we are charged under the ESA to make sure that the FMPs don't jeopardize endangered species. At the end of the day this does result in a formal consultation; which it has in many iterations over the years, and that's what we're reinitiating now, a formal consultation. We announce just part of this 5-year review; we're reinitiating consultation on a number of FMPs. You can see them all listed here; it includes American lobster, and the last biological opinion and consultation done on the lobster FMP was in 2014. The so called batched fisheries, all those fisheries rolled into one consultation you can see there, and then also the Atlantic deep sea red crab as well.

The last time we underwent this process to produce these biological opinion, the conclusion was that these FMPs were not likely to jeopardize the continued existence of right whales, or any other ESA listed species. Just to give you a sense of what a biological opinion is; and this is the process that we're just starting underway now.

It's basically just a detailed explanation of what the action is; in this case the fisheries, status of the species, in our case focusing on right whales as well. Then the environmental baseline, meant to capture the climate change issues, the changes in right whale distribution, potential risks right whales are now facing in Canada that weren't considered before.

Then the specific effects of the proposed action, basically layering on what potential effects each of these individual fisheries might be layered on top of that environmental baseline, to look at the cumulative effects. In putting it altogether making the jeopardy conclusion, so you know, where will fisheries after this consultation is completed and the analysis is done, do we have evidence that these fisheries will jeopardize the existence of right whales or other endangered species?

Then in Step 9 they can include things like reasonable and prudent measures for cases where it's not a jeopardy finding; and those can be recommended tweaks or acquired tweaks to a action meant to minimize some of the effects of endangered species, or in the case of a jeopardy conclusion it's reasonable and prudent alternatives, so alternatives to eliminate jeopardy.

If the conclusion is that the action is jeopardizing the endangered species, a reasonable and prudent alternative would be measures that can be put in place to eliminate jeopardy. In that instance we have a few things that we have to consider. One is it needs to be implemented in a manner consistent with the intended purpose of the action.

If the intended purpose of the action is a fishery management plan, a reasonable and prudent alternative can't be, no fishing, because then we've changed. It's no longer in the manner consistent with what the action is proposing. It must be consistent with the scope of our agencies legal authority under ESA or MMPA.

Then it must also be economically and technologically feasible. This is one of the rare

instances where the ESA directs us to consider economics too, in this case. Any reasonable and prudent alternative must be both economically and technologically feasible. I'll just give you a brief update on what the TRT is up to; but first just a little refresher. I know there are a lot of TRT members here.

Bear with me as I go through a little bit of history; just to make sure people get an understanding of some of the work that's been done here over the years. The Atlantic Large Whale Take Reduction Team, it's our oldest and largest TRT in the country. It was established in 1996 after the MMPA was amended in 1994, creating this entire process, and the purpose is to develop a plan to reduce takes for not just right whales, but also hump back whales and fin whales, and to a lesser extent minke whales in trap pot and gillnet gear, all fixed gear fisheries in U.S. waters on the east coast.

The goal is to reduce the serious injury mortality to below the potential biological removal level. The PBR is a calculated value considering the species population size; whether it's endangered, a number of other factors, and gives you a number, the number of animals that can be removed from the population without jeopardizing its sustainability.

For reference, for right whales over the 20 year period the PBR has been basically 0 or 1, or around there, so very, very low. You just get a sense of the team membership, as I said it's a large team, because it affects so many different fisheries and geographic locations along the east coast, 61 members.

Over time, I won't walk through the timeline step by step, but I will just say the initial Take Reduction Plan established things like weak link requirements 20 years ago. There was some gear marking and closures initially too. Then the first major rulemaking after that was the 2007 Sinking Ground Line Rule, and then most recently the 2014 Trawling-Up Rule, meant to cut down on the number of vertical lines in the water.

Again, just to show you graphically the geographic scope of the regulations contained in this plan. These are for trap pot gear; it basically covers all of the U.S. EEZ on the east coast, and again all the managed areas for gillnets as well, so the scope of the regulations are very large. What has the Take Reduction Team accomplished?

In 2007 with the Sinking Groundline Rule that went into effect in '09, that rule basically amounted to removing 27,000 miles of floating groundline from the water column, by laying it down on the bottom. Then in 2015, as part of the trawling up strategy, the number of end lines was cut down by a little over 2700 miles.

Also part of the Take Reduction Plan we have a number of closures along the coast; in total area of about 32,000 square miles for both trap pot and gillnets, up off of New England and down off of the calving grounds in the southeast. You can see geographically where those closures are; on the top left the Massachusetts Restricted Area trap pot closure, smaller gillnet closure in Cape Cod Bay, the Great Salt Channel closure for both trap pot gear and gillnet, and then closures off of southeast U.S. calving grounds.

We also have universal requirements as part of the Take Reduction Plan; like weak links and a gear marking scheme requiring different colors painted or taped, or anyway attached to vertical lines based on gear type and geographic location fished, because as I said right whales are hardly ever anchored in place.

When we do recover entangling gear, either through disentanglement at sea or if a dead whale washes ashore. The gear marking is intended to give us a better sense of where, when and how the gear was deployed. Coming up in 2018, the Take Reduction Team has done a lot over two decades; in some pretty

significant rule makings. Given what we're seeing with right whales most recently, the Take Reduction Team is coming together this month and for the next six months in two subgroups; smaller working groups of the team that are meant to do some fact finding on some of the ideas that we've been hearing most recently on potential mitigation measures, should they be needed at some point in the future.

The two measures are reduced-breaking-strength rope, so called weak rope for vertical lines and then we've also included a closer look at gear marking in there as well. Just on the earmarking, I'll say that we require three marks each a foot in length at the bottom third, middle third, and top third of an endline for fixed gear fisheries.

With that strategy, still about 60 percent of the rope that we recover is unmarked. We've asked the subgroup to look at alternatives to our current gear marking strategy; that may result in a higher percentage of marked gear being recovered in the future. Then the second subgroup will look at ropeless fishing.

It's something we've been hearing more and more about over time; most recently especially the Woods Hole Oceanographic Institution hosted a ropeless fishing workshop last week, where a number of prototypes were on display. We've asked a subgroup to look at this issue; to get a better sense of what do we mean when we say ropeless? What technologies exist, and where might the technology be headed in the future?

More on ropeless fishing in a minute, but just first on the 1700 pound breaking strength rope. This comes from some research by Amy Knowlton at the New England Aquarium, looking at the breaking strength of gear recovered from entanglements. Basically what she observed is rope that breaks at 1700 pounds or less is hardly ever, if ever, recovered from entangling gear.

More severe entanglements occur as rope strength gets higher; thereby reducing the ability of a large whale, right whale in this case, but also any large whale, to break free once becoming entangled. This is the idea that's been put forward. You know we have a lot of questions about both of these technologies.

We're asking the Take Reduction Team to ask some focused questions and get answers; before we can bring it back to the full Take Reduction Team for discussion. Just to get a sense of what some possible technologies on ropeless fishing are that we've been hearing; either bottom-stored rope or pop-up buoys, things like that. Variable buoyancy traps are an idea that we've heard, and also ship-based retrieval systems are also something we've heard.

Again, the ropeless options that we've seen are largely in prototype phase. When we think about ropeless, it's important not to be thinking about ropeless tomorrow, it's what might the future hold for the development of these ropeless technologies. These TRT subgroups are going to be focused on feasibility.

Technological feasibility, does the technology exist, or in the case of ropeless do we have any certainty on whether it will develop over time and what might that development look like? Functional feasibility, will it work? For weak rope, we have a lot of concerns about the functional feasibility that we would like the fishing industry, the fishermen and industry representatives on the Take Reduction Team and the subgroups to help us answer these questions. It's likely that there are areas where 1700 pound rope just will not work; for a variety of reasons. Safety is an important one there too.

It's getting a better sense of, are there areas where it might be a good idea to use this? Are there areas where it just would be just a bad idea? Answering all those questions, and then of course economic feasibility too, is it cost

effective? For in the case of weak rope, you know what manufacturers produce 1700 pound breaking strength rope?

Is it available? What are the costs; getting all this information for the Take Reduction Team? It's important to emphasize that. You know we aren't in rule making. These aren't decision-making subgroups. The Take Reduction Team throughout its 20 year history has spent a lot of time researching gear modifications and new technology.

This is nothing new. We know these ideas have been put on the table; and we're hearing about them, and we know we'll hear more about them. The plan here is to get the Take Reduction Team members asking really focused feasibility questions, to do some fact finding to present results to the full Take Reduction Team later this year. Are there any questions?

CHAIRMAN GILMORE: We've got time for a few, Doug Grout.

MR. GROUT: That was very informative. One of the things, when I first brought to our Law Enforcement the concept of ropeless, they almost had a heart attack, because of the concern they had on how that would affect their ability to enforce, not only the whale protection measures, but also other fisheries management. Where in this feasibility – you have technical, functional and economic feasibility considerations – would those kinds of questions be addressed?

MR. ASARO: Absolutely. I should add a major part of the subgroup work will be looking at not only enforceability, but also gear conflicts too. That is just a natural question we need to get answers to as well. We'll have OLE representation working as part of the subgroups too. These are issues that the subgroups will have to work on too; and get answers to, if there are answers.

CHAIRMAN GILMORE: Ritchie White.

MR. WHITE: I think another important piece that the states of Rhode Island through New Hampshire are presently talking about is enforcement. At the present time there is no platform to enforce, to haul lobster gear or crab gear out in federal waters; especially Area 3 getting some enforcement from state vessels in the near offshore Area 1.

I think this need to be a priority; because you have existing regulations in place that we don't even know if they're being used, because there is no enforcement and no checking. I think that needs to be a high priority and it's going to take a large vessel and a bunch of money. I think there can be workings with the state and the Service; you know to try to accomplish this.

MR. ASARO: You are absolutely right. We have a full Take Reduction Team meeting planned for this fall. Between now and then we have our Productive Resources Law Enforcement liaison working with his contacts, to pull together a working group to get right at the issue that you bring up. Hopefully we can have some work done on that; and some finding to share with the Take Reduction Team, and hopefully a plan forward when we meet later this year.

CHAIRMAN GILMORE: Mr. Vice-Chairman.

MR. KELIHER: That was a great presentation, Mike. You did answer part of my concern when you said the OLE will be interacting with the subgroups. Do we discuss that at our meeting at GARFO, this larger group, because I think because of the way the subgroups are broken out and the TRT works? I think it's really important that other law enforcement components and agencies are part of that process.

They are more familiar with the issues of hauling gear; and what the gear is. Quickly to your slides, Mike you did a per capita mortality slide; and it showed what looked like substantial increases in entanglement. It looked like a broad-brush approach. Is that

Area 1, Area 3 lobster only, or is this including Canada? We know a lot of the mortalities associated with the Canadian Fishery were included. Is that also included in that slide?

MR. ASARO: Yes, my apologies. I should have clarified. These are the mortalities reported for the entire species throughout its range in both U.S. and Canadian waters; as reported by our stock assessment reports. Yes, U.S. mortalities, Canadian mortalities, all mortalities throughout its range are reported there.

MR. KELIHER: Just one last question. Obviously 2017 was a bad year for right whales; but you also had unusual mortality events with other species, including minkes, a lot of strandings in both Maine and Massachusetts, and some mortality associated with that. Is there any link here between the species? We're focused right now on right whales because of the uncertainty with rulemaking, obviously. But is there a broader environmental factor out there that is really a part of this; besides the manmade issues?

MR. ASARO: Yes. We currently have three unusual mortality events declared for right whales, humpback whales, and minke whales most recently. I will say the UME Investigative Teams haven't gotten together yet to look through all the data to see if there might be an underlying cause.

I will just say from my look at things; both right whales and humpback whales, a majority of the mortalities were from human causes. Then with minke whales were a little bit different, where we're seeing more pathological causes of death there with minkes that we haven't seen with humpbacks or right whales.

CHAIRMAN GILMORE: The bad microphones keep following you, Pat. Dr. Pierce.

DR. PIERCE: Thank you for your presentation. It was very comprehensive; much appreciated. You did note at the beginning of the presentation that work is being done to evaluate environmental conditions and prey availability that might have some impact on the health, effects on reproductive success. You noted that the calf count is way off. Is there any information that would provide some insight as to what proportion of the deficits of calves can be attributed to entanglements, or to other causes such as reduction in forage?

I mean forage is incredibly important; as we all know. They go where the copepods are; Cape Cod Bay, notably. If their distribution is changing because of a lack of copepods, or copepods are elsewhere. That can have a huge impact from the health of the females, and on their ability to calve on the reproductive success. What can you share with us regarding that particular issue?

MR. ASARO: You're right that is exactly what the Section 7 process will analyze; from the baseline and looking at layering on the potential effect to the fisheries. You're right. Clearly right whales are moving now than they were before, and there is an energetic cost to that movement. The question becomes, are they finding a food source suitable enough for them to replace the energy stores lost during increased movement, if that maybe the case? We know right whales are capital breeders. We know reproduction occurs when females are fit.

If they're not fit for a variety of reasons, either human caused or environmental conditions, then reproduction won't occur. We're in that situation now. But you know exactly as you bring up, it's trying to piece together how the story unfolds; in terms of what changes in distribution might mean for right whales, both in terms of their food source and hypothetically if right whales are moving more into areas like the Gulf of St. Lawrence, where we didn't necessarily see them or expect them in the past.

Is that movement, well A is there an energetic cost to that movement? Are they finding a food

source once they get there that is suitable to replenish the energy lost? Then on the other side is have they now moved into an area that is a higher risk of either ship strike or entanglement? All these questions are part of the consultation process.

DR. PIERCE: Very good. I hope you actually have the data necessary to evaluate again the food source and effects on the productivity of this important species. I'll mention that with regard to ship strikes. Obviously in my state we're quite concerned about that. We know that the federal government has the speed limit on vessels over 65 feet.

We're in the midst now, my agency. We're in the midst of implementing some speed limits on vessels under 65 feet; just to provide some additional measure for protection, slow these vessels down when right whales are present in our waters. High priority issue and I am glad to see that all these initiatives are underway.

CHAIRMAN GILMORE: Actually Mike, I'll jump in here because I have a question. The data indicated that I guess with that 10 knot speed restriction on those larger vessels the ship strikes have dropped significantly. Is that consistent across the U.S.? Secondly, is there more that should be done on that aspect of it; even though it has come down?

MR. ASARO: Yes that's a really important question. We know in some areas, a lot of projection went before the rule was developed, looking at areas of high risk and what the projected risk reduction would be in areas where the risk was the highest, like on the shipping lane going into Boston. It was projected that the speed limit would reduce ship strike risk by up to 90 percent; and we're pretty confident that happened. If you look in the Mid-Atlantic, ports throughout the Mid-Atlantic, the speed restrictions are a lot smaller, kind of radiused outward off of ports.

Our thinking at the time was that right whales were using the Mid-Atlantic as a migratory route between the feeding grounds up north and calving grounds in the south. What we've learned most recently is that there are essentially the entire east coast is right whale habitat nearly year round, including the Mid-Atlantic.

I haven't looked into specifics on whether the rule, if there is data warranting the rule could be amended or the speed restrictions could be revised. But as it stands now, the data in the resulting decade after that rule show it's been highly effective; and an even shorter term experiment I'll add too is when the mortalities up in the Gulf of St. Lawrence occurred last summer, the Canadian government and Transport Canada drew a big box and instituted the 10 knot speed restriction up there and the sip strikes mortality stopped then pretty much instantly.

CHAIRMAN GILMORE: Andy.

MR. ANDY SHIELS: Just very briefly. With a population estimate of 450 individuals, at what level of decline would a jeopardy decision be likely?

MR. ASARO: That's difficult to answer. I mean the process that is underway now in the early stages, as I said we'll get to that point. It's hard to know. I mean just a bigger picture going back to the trajectory of right whale population growth. You know we were at lower numbers than this; and we've had periods of decline before. It's analyzing specifically what do the numbers mean today?

What does this decline since 2010 potentially mean for the recovery of the species? It's difficult to answer. I mean that's what the consultation process is meant to give us an idea of. But just in a larger context of right whale history, we were at fewer than 300 right whales and recovered, under many of the same threats too. It's a difficult question to answer without a

deeper dive into watching that consultation process unfold.

CHAIRMAN GILMORE: Eric.

MR. ERIC REID: I just have a question about noise. We're not increasing our fishing effort, at least that's what you indicated. I don't know about ship traffic. But it seems to me we've increased our noise; especially off of southern New England with seismic testing. Whales hear at a pretty low frequency.

Seismic testing is at a pretty low frequency. I mean to me, excess noise can prevent you from doing a lot of things in life. But if you can't hear, especially a ship coming at you, you know you're more susceptible for ship strikes, or maybe you're moving where you used to go because you want a nice, quiet place. But that is something I really think needs to be looked at; is the amount of noise humans are making off the coast, and what that effect is on these populations, because my position is that increased noise is substantial. It's just something for you to think about.

MR. ASARO: I'll just add. You know a lot of work has been done looking at the potential effect of ocean noise on right whales; both on their behavior in particular, but also on their level of stress hormones. You know right whales in general, because they spend so much of their time near shore with a lot of shipping around them.

A lot of human activities nearby and noisy waters have pretty high levels of stress hormones pretty much all the time. What we haven't seen is a clear behavioral response based on noise; or what the implications of the high levels of stress hormones have on right whales. But we know they're there.

A pretty significant research study was going on in 2001; looking at the presence of stress hormones in right whale fecal material. It was occurring before and after September 11, 2001. If you recall, shipping activity stopped after September 11th, and just fortuitously this study was going on. What it showed was a pretty significant drop in stress hormones nearly instantaneously in right whale fecal matter.

CHAIRMAN GILMORE: Dave Borden.

MR. DAVID V. BORDEN: Two quick points; first off Mike, excellent presentation. I was particularly pleased to hear that you and the new Regional Administrator are moving forward with this suggestion to form a subgroup to address the enforcement concerns. I think that's a key part. It's not the only part. I think everybody understand that.

But if we can't solve that problem in the near term, I think it's going to erode our ability to modify any of the other measures. Then the second point I would make is this whole process is going to have a profound impact on all of the fisheries, all of the fisheries with vertical lines between the Canadian border and Florida; a number of which this Commission obviously regulates, in conjunction with our partners in NOAA.

I think the Commission leadership needs to talk about ways that the Commission can actually interact in the process. A number of us are already members of the NOAA team that's working on the issue. But we're going to need a slightly broader discussion at some point.

CHAIRMAN GILMORE: Good point Dave and we'll be talking about that after Mr. Abbott speaks.

MR. ABBOTT: Getting close to lunch. Has there been any consideration or look into the United States Navy using active sonar's along the east coast, and their effect on whales?

MR. ASARO: The answer is yes. I don't know specifics, so things like Navy activities undergo the same Section 7 process that we're undergoing on the fisheries. The Section 7

consultations for those activities are done out of our Headquarters Office. I'm not an expert on those; but the same process that I described to you looking at the effects of the fisheries, goes into looking at Navy activities too as part of the consultation. You know looking at the environmental baseline, specific effects of the action walking through that same process.

CHAIRMAN GILMORE: Okay, following up on Dave's points, sorry, Doug.

MR. DOUGLAS HAYMANS: Just one quick question. Are you seeing the reproduction issues with the other species of whales, or is just more specific to the right whale?

MR. ASARO: That is a difficult one to answer. For right whales, because they give birth off of the coast of Florida, really far inshore in clear, calm waters. It gives us the ability to see every single calf that's born; and that's unique to that species. There aren't other comparable species; where we can see essentially every new entrant into the population. It's a really unique situation for right whales.

CHAIRMAN GILMORE: Okay Toni, do you want to talk a little bit about where we go from here in coordination?

MS. KERNS: Following up on what David said. Megan Ware is on the Take Reduction Team for the Commission. She's sitting on both of the subgroups, and then will sit on the full TRT team meetings as well. Typically when Commission staff sits on the TRT, we are there just to present information and facts.

That is typically because all the states don't necessarily agree on a position for issues to be brought forward to the TRT from the Commission itself. A question to the Board as we move forward and this may not be something that can be solved today. But as we move forward on this, if the Board is wanting Megan to advocate certain issues, then we'll be needing direction to do that.

We'll need to figure out a way to give her that direction if we want to move forward. We could either pull together a subgroup of interested Commissioners for making recommendations to Megan, or making recommendations to bring them back to the Policy Board, so that Megan can then bring those forward.

The hard part there will be that at times I don't think that a Policy Board meeting will quite align with meetings that Megan will be going to. Sometimes she may need some direction outside of our quarterly meeting process. It's just something to think about, and sort of my question to you all is how should we move forward?

CHAIRMAN GILMORE: Pat.

MR. KELIHER: Thanks for that Toni. I think we do need a subgroup to work on this. Dave Borden and I and others, and Ritchie and particularly we've talked a lot about the enforcement components. There is going to be a tasking motion later for the Law Enforcement Committee, in regards to enforceability of ropeless fishing. There is as Toni said earlier, we're here as a Policy Board because this covers many of our species that are managed here at the Commission**. I am going to make a motion now to address this by moving that we establish a working subcommittee to develop direction and policy as it pertains to the protection of right whales, in relationship to the Commission activities.**

CHAIRMAN GILMORE: Let's get that up there. Do we have a second to that motion? Dave Borden. Do you have any suggestions on who would Chair this?

MR. KELIHER: Dave Borden. From a practical standpoint I think what we probably ought to do is just suggest to have Toni just send an e-mail out seeing if we can get volunteers, and make a determination from there. I would love to see Dave do it. I would be happy to Chair it if

needed. But the Committee can determine that when it's established.

CHAIRMAN GILMORE: Dave.

MR. BORDEN: This is such a big issue, Mr. Chairman, we may need two Chairs.

CHAIRMAN GILMORE: Yes that always works well. Okay, any discussion on the motion? Seeing none; any objection to the motion? Oh, Michelle, sorry.

DR. MICHELLE DUVAL: Far be it for me to stand between people and their food. But, just a cautionary note that there are already state representatives on the Take Reduction Team, so this kind of gets back to what Toni brought forward that not all the states are going to agree. It seems like I know there is a lot of concern right now with regard to the lobster fishery.

Certainly the Lobster Board is going to have a lot of discussion about this. You know we've had I think our own concerns in the South Atlantic with regard to right whales and fishery interactions; and spent about three years at the South Atlantic Council trying to address that in a mutually acceptable manner. I just want to make sure that the working group is sensitive to the fact that there is already state representation on those TRTs.

CHAIRMAN GILMORE: Good point, Michelle; any other comments? Okay, any objection to the motion? All right seeing none; we will adopt that by unanimous consent. I think it is good; Toni can send out an e-mail and solicit some membership. Toni.

MS. KERNS: There are two calls that are coming up quite quickly. Megan and I can sit down and maybe talk with David and Ritchie and Pat to start; to see if we think we need to get some immediate feedback to her for those two calls, and if so I might ask for your volunteerism very quickly. Then I think we can break for lunch.

CHAIRMAN GILMORE: I think we're at the point now; unless anybody objects that we'll break for lunch. Out in the lobby, so please let the Commissioners and proxies go first; because they have to eat quick and come back. We've got a few more things to get done. The food is out in the lobby and have at it.

(Whereupon a recess was taken.)

REVIEW AND CONSIDER APPROVAL OF THE 2019 SHAD STOCK ASSESSMENT AND PEER REVIEW TERMS OF REFERENCE

CHAIRMAN GILMORE: Okay, our next item on the agenda is Review and Consider Approval of the 2019 Shad Stock Assessment and Peer Review Terms of Reference. Jeff Kipp is going to go through a presentation on this. Jeff.

MR. JEFF KIPP: The Shad and River Herring Board obviously are not meeting during this meeting; and we have our first in-person workshop for the shad benchmark assessment process scheduled for early March. I'm here on behalf of the Shad and River Herring Stock Assessment Subcommittee, and Technical Committee to present the terms of reference for the assessment.

The terms of reference for the stock assessment process, these will generally look familiar to everyone who has seen TORs before. I'll go through these rather quickly. The first is; define and justify stock structure. Characterize age and repeat spawner data by stock; and identify utility of data source, provide descriptions of methods, any changes to methods and associated peer review literature.

Describe validation experiments of available and available samples. Where possible explore reader consistency, potential bias in agreement statistics. Where possible explore use of correction factors; when consistency in method or reader was not maintained. Characterized precision and accuracy of other fishery dependent and fishery independent data used

in the assessment; including nontraditional data.

Characterization should include the following; but is not limited to provide descriptions of each data source. Describe calculation and potential standardization of abundance indices. Discuss trends and associated estimates of uncertainty. Justify inclusion or elimination of available data sources. Estimate bycatch where and when possible, summarize data availability and trends by stock.

If possible develop models used to estimate population parameters and biological reference points; and analyze model performance. Recommend stock status as related to reference points; if available. Evaluate other potential scientific issues. Compare trends in population parameters and reference points with current and proposed modeling approaches.

If outcomes differ, discuss potential causes of observed discrepancies. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies. Explore climate change impacts on the species. Explore predation impacts on the species.

Discuss all known anthropogenic sources of morality and productivity by stock. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority. Develop detailed short and long term prioritized lists of recommendations for future research; data collection, and assessment methodology.

Highlight improvements to be made by initiation of next benchmark stock assessment. Note research recommendations from the previous assessment that have not been addressed; and those that have been partially or fully addressed. Recommend timing of next benchmark assessment and any updates if necessary; relative to biology and current management of the species. I'll now go over the terms of reference for the Peer Review Panel during the peer review of the assessment. These are generally similar to the terms of reference for the assessment; only they're to evaluate what the Committees have done through the assessment.

Evaluate choice of stock structure. Evaluate the thoroughness of data collection; and the presentation and treatment of fishery dependent and fishery independent data in the assessment, including the following but not limited to. Presentation of data source variance, justification for inclusion or elimination of available data sources, consideration of data strengths and weaknesses, calculation or standardization of abundance indices, estimation of bycatch.

Evaluate the methods and models used to estimate population parameters and biological reference points, including but not limited to; evaluate the choice and justification of the preferred models. Was the most appropriate model chosen; given available data and life history of the species?

If multiple models were considered evaluate the analyst's explanation of any differences in results. Evaluate model parameterization and specification. Evaluate the diagnostic analyses performed, including but not limited to sensitivity analyses to determine model stability and potential consequences of major model assumptions.

Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty and technical conclusions are clearly stated. If a minority report has been filed, review minority opinion and any associated analyses. If possible make recommendation on current or future use of alternative assessment approach presented in minority report.

Recommend best estimates of stock biomass abundance and exploitation from the assessment; by stock for use in management if possible, or specify alternative estimation methods. Evaluate the choice of reference points in the methods used to determine or estimate them. Recommend stock status determination from the assessment, or if appropriate specify alternative measures for management advice.

Review the research data collection and assessment methodology recommendations provided by the TC; and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment; and provide recommendations to improve the reliability of future assessments.

Recommend timing of the next benchmark assessment and updates if necessary; relative to the life history and current management of the species. Prepare Peer Review Panel terms of reference and advisory report summarizing the Panel's evaluation of the stock assessment, and addressing each Peer Review term of reference.

Develop a list of tasks to be completed following the workshop. Complete and submit the report within four weeks of workshop conclusion. This is an abbreviated version of the stock assessment schedule; with all the in-person meetings here. Obviously today we are presenting the terms of reference. We have a data workshop scheduled for March 5 through the 8th. We'll have a methods workshop in October, an assessment workshop tentatively scheduled for February of 2019, and then the Peer Review workshop we anticipate in August of 2019, with the results of that assessment and peer review presented during the annual meeting in 2019. If there are any questions on the terms of reference or the schedule for the assessment, I can take those now.

CHAIRMAN GILMORE: Thanks Jeff, good report; questions. Jason.

MR. JASON McNAMEE: Yes, Jeff. Just one question, there is a reference point term of reference. It's my understanding that the shad is kind of this amalgamation of a bunch of kind of sub-stocks, and you do your best to assess them. But I'm guessing some will be data limited approaches. Do you think that that reference point term of reference is too restrictive? I'm thinking that you might not be able to develop a reference point in some of these instances; but maybe will be able to offer a recommendation on catch advice, rather than a reference point.

MR. KIPP: Sure yes. I think we tried to include, if possible, to try and capture that. We think that there may be some stocks pining on what our stock structure determination is; where we may be able to develop certain reference points. Whereas, there may be other stocks that are much more data limited; where we may only be able to provide advice on trends, and that type of information. Similar to what was seen for a lot of the river herring stocks in the last river herring assessment update. We try to keep it vague; so it doesn't hold us to providing reference points for each individual stock.

CHAIRMAN GILMORE: Are there other questions for Jeff? Michelle.

DR. DUVAL: Just one quick one. Jeff, can you remind me what the terminal year of data is for the assessment?

MR. KIPP: Yes, the terminal year will be 2017.

CHAIRMAN GILMORE: Are there any other questions for Jeff? **Okay this is an action item; so we're going to need a motion to accept, go ahead, Michelle.**

DR. DUVAL: So moved, Mr. Chairman.

CHAIRMAN GILMORE: Okay, it's going to be an imaginary motion for a while; until we get someone to type it, and Andy you're seconding

that imaginary motion, great. Okay, move to approve the 2019 shad stock assessment and peer review terms of reference. It's a motion by Dr. Duval and seconded by Mr. Shiels.

Is there any discussion on the motion? Is there any objection to the motion? Seeing none; we'll adopt that unanimously. Thanks Jeff.

BUREAU OF OCEAN ENERGY MANAGEMENT UPDATE REGARDING RENEWABLE LEASE STATUS AND FUTURE LEASING

CHAIRMAN GILMORE: Okay, we're ready to move on to the Bureau of Ocean Energy Management Update Regarding Renewable Lease Status and Future Leasing; and we have Brian Hooker, who is going to do a presentation on that. Welcome Brian and whenever you're ready have at it.

MR. BRIAN HOOKER: Good afternoon. Thanks for this opportunity to give the Policy Board an update on the status of renewable energy leasing; and our environmental studies on the Atlantic. This is part of our general strategy; to try to keep Commissioners informed about what the status is of projects, and where we are with some of our environmental studies as we've promised to do in our ocean plans, the Mid-Atlantic ocean plan and the northeast ocean plan. What I'm going to do is just kind of leave this map up here for a little bit.

Where we are is that we've had 7 competitive lease sales, 13 leases actually issued, and then we have 1 lease auction anticipated for early 2018; and there is a proposed sale and there is some development for that. That is for; I don't know if you can see, oh you won't be able to see my cursor. But that's for the two areas in Massachusetts wind energy area that weren't leased in the previous auction.

Moving down the coast, in the Gulf of Maine some of you may be aware that there was an application received for a right-of-way through the Gulf of Maine for a cable installation. That was to bring Canadian hydropower to the state of Massachusetts. That project wasn't selected by the state of Massachusetts in the latest round of solicitations. However, the developers still indicated that they want us to still proceed with that what we call a competitive interest, determination of competitive interest in that Gulf of Maine right-of-way.

They still might see a Federal Register notice asking for notice and comment on that right-of-way through the Gulf of Maine. Moving further south into the first of, I guess the eastern most lease area in the Massachusetts wind energy area; that is Vineyard Wind. Right now their surveys are ongoing.

They are about to ramp up some surveys this spring. They did submit a construction operations plan in December; which is undergoing review. This is our kind of first construction and operations plan since the Cape Wind project, which you may have noticed in the news there. We're processing a relinquishment request for that particular lease.

Anyway, so there should be a notice of intent to prepare an EIS this spring; so that's the next step in that process, once we determine that construction operations plan is complete. It will be of a notice of intent to prepare the EIS to kick off the EIS process for that construction operations plan. Moving west, Bay State Wind still has surveys ongoing.

They've had their site assessment plan approved; which was for two meteorological buoys, and we're anticipating a construction operations plan from them in late 2018. Continuing west is the South Fork Wind Farm. Again, surveys are ongoing. This is the Deepwater Wind project. The site assessment plan for that one was approved in October, 2017, and we do anticipate a construction operations plan in 2018 for that project as well.

As I mentioned earlier the Massachusetts un-leased areas, areas still that are west of

Nantucket Shoals there; there is a proposed sale notice currently under development. Continuing westward, we have the Empire Wind lease area that the lease holder is Stat Oil. Early planning is still underway. There is a SAP Survey Plan that was submitted in November; that's still under review. They hope this spring to begin doing some surveys in the Empire Wind lease area. Also, in New York Bight as I've briefed the Mid-Atlantic and the New England Council recently. We're in the process of developing a call for information for additional sites in the New York Bight. This is a map that was shared with the New York Task Force. It was actually, New York Task Force involved adjoining states as well.

This is still under development. It's not clear if this is the actual areas that will be in the call for information; but what we're doing is wanting to solicit more information on how these areas are used, and what may be compatibility issues for the purposes of leasing for offshore wind energy development.

Again, that call for information will likely be this spring. Continuing to move further south and through the New Jersey wind energy area, the northern site there is owned by a leaser U.S. Wind. We're still anticipating a site assessment plan for the deployment of potentially just meteorological buoys in 2018.

The Orsted Energy, the ocean wind site below south of that they have completed their SAP surveys, and their deployment of their meteorological buoys is currently undergoing final review. We also anticipate that we might receive a construction operations plan from them in late 2020. Continuing down into the Delaware lease area, the Skipjack Wind Farm has a SAP term ending in December 2019, and we anticipate a COP later in 2018.

They were one of the finalists for the Maryland offshore renewable energy tax credit; and then further down into the quote of Maryland Wind Energy Area that was U.S. Wind. That SAP is also nearly complete. They are hoping to actually build a meteorological tower. That is one of the few sites where, I think actually the only site that they're proposing to build an actual meteorological tower. We expect to wrap that up this year.

Continuing down is the Coastal Virginia Offshore Wind Project. It was formerly known as VOWTAP; that is the Virginia Department of Mines, Minerals and Energy, along with Dominion, and the ORSTED have kind of revived that research assessment plan. That is for two turbines offshore Virginia.

That RAP is actually already approved; we're just undergoing a review of any changes that they've made. Primarily they proposed changing the foundation type for those two turbines; and we anticipate undergoing that final review, and then they anticipate construction in 2020 for those two turbines.

The Virginia Commercial Lease Area, the larger lease area adjoining the study site. We anticipate buoy deployment there, not until 2020. Then continuing further south, off of North Carolina, the Kitty Hawk lease site. That was awarded to Avangrid Renewable, on October 10, 2017, with an effective date of November 1, 2017; and so they're just getting their act together, as far as determining their timeline and when they want to pursue activities, like site assessment plan activities in that area.

BOEM most recently regarding that area, most recently had a task force meeting on December 7, in Virginia Beach, where both the CEVOW project and the Avangrid Renewable site were discussed. As just another BOEM program note. As you're probably aware of in the news, the oil and gas side of BOEM is in the process of developing a draft proposed program for 2019 through 2024. They have been holding several meetings up and down all over the country in state capitals.

Lastly, the Atlantic G&G Seismic Survey permits. There are five permits that are being processed for incidental harassment authorizations; and those IHAs are likely looking to be approved probably early this spring. Moving on to some of our studies, I just want to highlight some of the studies that we're doing. We are continuing to do some work around with our ventless trap survey around Cox's Ledge.

We just finally posted a benthic habitat mapping study that we did for all the wind energy areas. That was done with the Northeast Fisheries Science Center out of Sandy Hook. Again that's on our completed environmental studies page; and that report is now available as of just a couple weeks ago.

We're continuing a lot of work on fish telemetry between New York, Delaware, and Maryland and Virginia. Those reports should be available in the coming year. We're also anticipating the release of the final report on electromagnetic fields on lobster, skates, and crabs that was done in Long Island Sound by the University of Rhode Island.

Then lastly, we have funded and we are starting to get some preliminary results in on some of our study that's done with Woods Hole Oceanographic and Northeast Fisheries Science Center; looking at the sound of the construction noise generated at the Block Island Wind Farm in state waters, and how that affects black sea bass and longfin squid.

Again, these are in tank studies right now, but hopefully we'll be able to do some more empirical work offshore in the future. With that I'll open it up to any questions you might have; and hopefully touched upon all the questions you might have.

CHAIRMAN GILMORE: Thanks Brian, great report; questions for Brian? Jason.

MR. McNAMEE: Thanks for the report. One question I have is with regard to rules about fishing. I'm wondering if within these areas, would there be fixed gear fishing allowances, mobile gear allowances, or are those sorts of things going to be determined by the companies that end up picking up the lease.

MR. HOOKER: No, each company is required to do a navigational risk assessment that the Coast Guard will evaluate. But at this time though there has been no indication by the Coast Guard or BOEM or anyone that there would be any prohibition on fishing activity of any kind, once the wind farm becomes operational.

In the case of Block Island Wind Farm, there were zones during construction, when there is active vessel movement around the construction area that prohibited some other vessel movement in that area. But we looked at Block Island Wind Farm as like the example of how work and fishing is completely allowed within and around those turbines.

CHAIRMAN GILMORE: Are there other questions for Brian? John Clark.

MR. CLARK: Thank you for the presentation, Brian. How much time does each lease holder have to develop these sites, before they either have to renew or the lease is terminated?

MR. HOOKER: Generally they have a five-year site-assessment lease term. They can ask for an extension of that five-year lease term prior to when you're supposed to submit a construction and operations plan. You have to be showing due diligence; and work on the leasehold. There are steps in place to ensure that we issue leases and they just don't sit there idly; that there is some activity occurring with those leases.

CHAIRMAN GILMORE: Are there any other questions for Brian? Jason.

MR. McNAMEE: Brian, you had mentioned there are during the construction phase and they're building the turbines, there is a need to

close the area so that the work can get done. Is there any thought to, so I'm thinking about the Block Island example again. In the ramp up to construction they identified impacted fishermen in the lease area.

They developed a, I'll call it a compensation program, for lack of knowing what the actual term was. Is there any guidance or plan from the federal government to have that be a requirement; as these areas are being built, to develop some sort of mitigation is the word, mitigation plan for these areas for displaced fishermen?

MR. HOOKER: Sure, we have guidance on how to comply with information requirements on the socioeconomic status of fisheries in the area; and how your activities may be impacting those entities. That generally won't occur until the EIS process, if there is a significant impact in how they intend to mitigate it.

That will be part of that NEPA process. There is no specific requirement per say for the compensation of lost fishing opportunity from construction. However, that is one thing that we'll be looking closely at with the review of these construction operations plans and in the EIS process. I will stress we do have guidance.

I mentioned we have that guidance document that really stresses the importance of developing a fisheries communication plan, and to ensure that that communication is happening and that the information provided in the construction operations plan is reflective of, they know what their potential impacts are to fishermen in that area. That is what the objective of those guidelines are; so that nothing is a surprise when it comes down later that they may be impacting some fisheries operations in a negative fashion.

CHAIRMAN GILMORE: Eric Reid.

MR. REID: Mr. Hooker, how are you? Can you tell us what the Coast Guard has to say about all this? There are real concerns about the effect of wind turbines on radar, and of course vessel movement and the safety of that. Can you tell us what kind of advice you've gotten from the Coast Guard, and what your response to that advice might be?

MR. HOOKER: We get advice from Coast Guard throughout the process; whether it's on the initial siting of the areas that we want to lease. They do red, yellow, green maps of like where they think heavy concentration of vessel traffic and how offshore wind may or may not be compatible with that level of use.

But as I mentioned earlier, when we get down to the individual project level, their role really comes in that navigational risk assessment aspect. That is prepared as part of the construction operations plan, and that's reviewed by the Coast Guard directly. Through that process they can provide advice and feedback to the developer.

As a matter of fact they have a navigational circular. They have their own guidance document on how to prepare that and how they intend to use the information in that document. Some of that can happen more directly between the developer and the Coast Guard as well.

MR. REID: It's the Coastguard. You know there are a lot of issues beyond navigation; including things like Homeland Security. Is that advice from the Coast Guard binding, or is it just advice that doesn't necessarily have to be followed? When you look at what's going on south of the Vineyard; then maybe you can remind me how many turbines are potentially capable of going in that area, just the sheer transiting capabilities of, not necessarily recreational guys or small commercial boats.

They may not be affected so much, but the larger boats that go through that area to get offshore are going to be substantially affected, depending on what that looks like. That's my

question. Are the Coast Guard's advice binding, and how many turbines can go into those areas south of the Vineyard?

MR. HOOKER: As I said, they make recommendations as far as some of the early planning process. Those are nonbinding recommendations. But I think when we get into individual project specifics as part of that navigational risk assessment. I think that is binding on the developers; as far as like what their determinations is regarding that navigational risk assessment, whether it's acceptable, and the measures they have in place are adequate to ensure the navigational safety of the area.

Regarding the number of turbines that that area could support, I don't have a number on what the total could be. As you know the markets are driven by what the individual states have set, and the renewable energy targets, and how much they plan on purchasing. It's ultimately dependent upon the states renewable energy goals.

MR. REID: Thanks for that. I'm sorry, I get three bites, because that's against Mr. Abbott's directions, but anyway, yes he's not here. I've heard the response about market and all that Mr. Hooker, we both know that. But the question is, given the spacing between those turbines, how many can go into those areas and how far apart do they physically have to be? It's not very far.

There is a zone around those turbines that has to be considered. That is my question. How many can you put in there given the spacing between those turbines? It's a big number; it's not like seven. I've asked that question before, and everybody is afraid to answer me. But maybe the next time I see you, which will probably be pretty soon, maybe next week. I would like somebody to tell me that number.

MR. HOOKER: Thanks, I'll see if I can put something together for you.

CHAIRMAN GILMORE: Dave Borden.

MR. BORDEN: This just follows up on the point that Eric raised. You know this came up at the Mass Lobstermen's Association meeting; where they had some of the wind companies come in and give very good presentations on what was going to happen in that southern area, south of the Vineyard and south of Nantucket.

What I kind of struggle with is the same issue that Eric is trying to get at. I want to know what the aggregate number of towers is that's going to take place in all of the build out areas, not one specific area. I've talked to some people; I talk about the potential for 10,000 or 15,000 wind towers out there. I think one of the things that this body, along with the Councils has to deal with is aggregate impacts. We need to know that number.

CHAIRMAN GILMORE: It's a good point, Dave and I think it's technically covered under NEPA. There is a cumulative impact section of that. Unfortunately, I think the practice over the years is that you just look at projects that are currently proposed; you don't look at potential for the next 30 years. I think that's something that maybe needs to be addressed as we move forward; anyway, Andy.

MR. SHIEL: I just want to point out something. We're dealing with natural gas in Pennsylvania; and first we had the pads and the drilling sites, and we permit those and we oversee them. But what we're dealing with now are the pipelines that connect all those drilling sites; and there is a lot more impact with the pipelines, because of what they cross and where they go then there is with the drilling sites.

I would assume the same thing would be true. You have to connect all of these wind power generators with cables. They're probably going to be interconnected. In terms of your impact on ocean bottom, it's going to be more than just where they're physically sited; it's going to be the root that the cables take how many

cables if there are 10,000 or 15,000. I would say similar to what Eric asked. In a future presentation if there is any way to kind of scale that for us that would be appreciated.

NON-COMPLIANCE FINDINGS/ OTHER BUSINESS

CHAIRMAN GILMORE: Okay I think we've had some good discussion on this. Thanks, Brian, for your update. I'm sure we'll be talking with you, and keeping my office busy. Anyway, thanks for coming down. That brings us down to **other business. We don't have any noncompliance findings.** Can you actually read that Toni? I can't read your writing.

MS. KERNS: He has to read my writing. Dan, you wanted to bring up the shellfish seed initiative shipment activity.

MR. McKIERNAN: Yes thank you Toni, I'll be brief. Back in October or early November, David Pierce wrote a letter to Bob Beal; looking for the Atlantic states to get involved with some oversight of shellfish seed issues. Quickly the statement of the problem is we want to get ahead of what we are seeing as unauthorized aquaculture operations receiving seed; usually sent to hobby farmers.

As this aquaculture industry matures, we're getting pressure, and we see the need to sort of professionalize the industry, and to make sure that people who are not authorized aquaculturists aren't receiving seed. What I hope will happen in the future. I understand Louis Daniel is reconvening a shellfish transport committee as part of an aquaculture initiative. Maybe you can clarify that. But what we would like to do is ask the states to work together to hold their instate hatcheries accountable.

If that hatchery is going to ship seed to an out-of-state farmer that farmer would have to have permission from the state to receive it. Because if a hatchery in another state sends seed to a Massachusetts unauthorized farmer, I don't have a permit to sanction at the hatchery side, and I don't have a permit to sanction on the receiver's side. We would be looking for the states to work together to establish some kind of standards.

MS. KERNS: Louis is currently working on the aquaculture RFP, and when he finishes that up, which I think closes in about another month or two, then we would reinvigorate the Interstate Shellfish Committee, which has not gotten together in many, many, many years. What I can do is send David's letter out; because I'm not sure if that went to the full Policy Board or not. Then ask for membership for that Shellfish Committee, and then we'll get that Shellfish Committee working on that task that was in the letter from David.

MR. McKIERNAN: Thank you.

CHAIRMAN GILMORE: Next one is Pat wanted to raise an issue on the Electronic Data Working Group. Pat.

MR. KELIHER: Yesterday at the Lobster Management Board, a motion was passed that would institute 100 percent harvester reporting within a 5-year period, with a strong emphasis on electronic reporting. At the time it was thought that it would be tasked between the Technical Committee and the Commercial ACCSP Working Group. That is not necessarily the right committee.

In discussing with staff and a few members of the Lobster Management Board, I crafted a motion, and I think if you could get it up on the screen. **Mr. Chairman, I would move to convene a Lobster Electronic Reporting Subcommittee; with representatives from the Lobster Board, the state and federal agencies, ACCSP, and ASMFC staff.**

The objectives for the subcommittee are to (1) Evaluate the need for an electronic harvester reporting form, based on stipulations in the lobster and Jonah crab FMPs, and individual

state requirements. Evaluate various electronic reporting platforms and their ability to be housed within SAFIS, as well as state-specific data bases. Recommend simple and logistical solutions to improve the ease of electronic harvester reporting. This includes evaluating the best ways to report spatial locations; considering the new requirements to report LCMAs and 10-minute squares, and the ability for states to use state-specific subareas in state waters, and outline a timeline for the development of electronic harvester reporting in the lobster and Jonah crab fisheries. If I get a second, I will give further justification if needed.

CHAIRMAN GILMORE: Seconding the motion, Dave Borden. Go ahead, Pat.

MR. KELIHER: The purpose of the subcommittee is obviously to guide development and implementation of electronic reporting in the fishery. Obviously it again is prompted by the finalization of Addendum XXVI and 100 percent harvester reporting. In the end I want to make sure that we have a very good, user friendly product for the industry.

If we're moving into the state of Maine with 100 percent reporting; we're talking about adding a lot of harvesters and a lot of data points, considering the amount of trips that are going to be made. I want to make sure we do this once; and when we do it, we do it right.

CHAIRMAN GILMORE: Discussion from the Board. David Pierce.

DR. PIERCE: I wasn't here at the Lobster Board discussions; so I really can't comment on that outcome. But I'll just ask a simple question which is, this is a long motion. Pat has given a lot of thought to this. I just want to make sure that it's completely consistent with what the Lobster Board did yesterday, and that there is not some accidental deviation from the conclusion of the Lobster Board through the vote that it took yesterday.

CHAIRMAN GILMORE: Let me go to the Chairman of the Lobster Board and see if you think it's correct.

MR. STEPHEN TRAIN: As long as I'm not accused of accidently agreeing. I believe it fits the tone of what was discussed to the motion made. I just don't think we gave an exact tool and how to get it done.

CHAIRMAN GILMORE: Dave Borden.

MR. BORDEN: I note that the length of this motion was modeled after one of the more illustrious members of the New England Council, Dr. Pierce. He has his own name for motions; they call it a Pierce motion, if it extends past 5,000 words. I totally support the motion; but I would hope that the staff would have the flexibility to scale this Committee down so it doesn't become a monster, unless somebody disagrees with that. Make it as small as you can; but keep it effective.

CHAIRMAN GILMORE: I think we can handle that Dave. Good point; other comments? **Okay is there any objection to the motion? Seeing none; we will adopt that unanimously**. We have one more business point, which is a tasking to the Law Enforcement Committee. Pat.

MR. KELIHER: Yes, I think the Lobster Management Board yesterday. **The motion was approved to task the LEC, Law Enforcement Committee, to look into the ability to enforce the concepts surrounding ropeless fishing.** That motion needs now approval by the Policy Board.

CHAIRMAN GILMORE: We have a motion up. Motion by Mr. Keliher; do we have a second, Dave Borden. **Is there any discussion on the motion? Is there any objection to the motion? Seeing none; we will adopt that unanimously**.

ADJOURNMENT

CHAIRMAN GILMORE:Is there any other business to come before the ISFMP Policy Board? Seeing none; we will stand adjourned.

(Whereupon the meeting adjourned at 12:45 o'clock p.m. on February 8, 2018)

March 16, 2018

James J. Gilmore, Jr., Chair
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Re: Northern Region Appeal of Black Sea Bass Addendum XXX (recreational management in 2018)

Dear Mr. Gilmore,

The states of Massachusetts, Rhode Island, Connecticut, and New York ("Northern Region") hereby appeal the February 8, 2018 decision of the Summer Flounder, Scup, and Black Sea Bass Management Board ("Management Board") in Section 3.1.2.3 of Addendum XXX, the timeframe for specifying regional allocation of the black sea bass recreational harvest limit ("RHL") in 2018.

Background

Under sections 3.1.2.1 and 3.1.2.2 of the draft addendum, the Management Board unanimously selected regional allocation of the RHL between three regions (MA–NY, NJ, and DE–NC) based on historical exploitable biomass (for the primary split between MA–NY and NJ–NC) and historical recreational harvest (for the secondary split between NJ and DE–NC). Then, under section 3.1.2.3, in a highly divisive action, the Management Board hybridized the 2006–2015 and 2011–2015 timeframe options for calculating regional average exploitable biomass and historical recreational harvest by averaging the regional allocations resulting from the two timeframes.

The vote on the timeframe decision was split north/south, with the four jurisdictions of MA–NY voting against the hybrid approach and the six jurisdictions of NJ–NC voting in its favor. The Northern Region unanimously supported the 2011–2015 timeframe option. MA–NY also voted against the addendum's final approval resulting in another four-vote to six-vote outcome.

Addendum XXX's regional allocations and the implications for 2018 management measures, incorporating updated harvest data that have become available subsequent to the Management Board's decision, are shown in Table 1.

Justification for Appeal

<u>Decision not consistent with FMP (appeal criterion #1)</u>

The primary objective of Addendum XXX is to address inequities in recreational black sea bass management that resulted from the ad hoc regional management approach in the preceding six years.[1] Part of that inequity is that the states of DE–NC were frequently held status quo, while the states of MA–NJ took repeated harvest reductions. These northern cuts even incorporated needed reductions from the south in some years. As a consequence, in 2017, the states of DE–NC had a size limit 2.5" lower and a possession limit 5 to 12 fish greater than the states of MA–NY, plus a season longer than all but one state in the Northern Region.

[1] Addendum XXX statement of the problem: "This approach [ad hoc regional management], while allowing the states flexibility in setting their measures, created discrepancies in conservation measures that were not tied to any original plan baseline or goal (e.g., state allocations). Inequities resulted in how much of a harvest reduction states were addressing through their measures, with no accountability for the effectiveness of regulations. Most visibly, the ad hoc approach did not provide uniformity in measures nor in evaluating harvest reductions."

Contrary to the primary objective to reduce disproportionate impacts on states, the management approach for 2018, approved by the Board via Addendum XXX, exacerbates the inequities by allowing large harvest liberalizations for both the Southern Region (DE–NC) and the NJ Region, while imposing a large harvest reduction for the Northern Region (Table 1). We strongly disagree with—and hereby contest—the final addendum's language that the timeframe-averaging approach "creates a more equitable allocation scheme" than the 2011–2015 timeframe approach.

Table 2 provides the regional allocations and implications for 2018 management measures, incorporating updated harvest data that have become available subsequent to the Management Board's decision, that would have resulted from the selection of the 2011–2015 timeframe (under the exploitable biomass/harvest-based allocation approach). NJ and the Southern Region would still be afforded the opportunity to liberalize in 2018 relative to 2017, albeit at more modest rates. For NJ[2], the harvest increase would be +30.63% instead of +46.71%, and for the Southern Region, +6.83% instead of +21.83%. The Northern Region would still face a reduction in 2018 relative to 2017, but at a rate roughly half of that required under Addendum XXX's allocation (-5.45% vs. -11.71%). These results identify the 2011–2015 timeframe as the more appropriate approach to establish more equitable recreational black sea bass measures for 2018, consistent with the primary objective of the addendum.

The appellant states remain committed to the tenet of cooperation that is central to the ASMFC's stewardship of our shared fishery resources. We (and NJ) exhibited this during the six years of ad hoc regional management when we frequently accepted regional harvest reductions that subsidized the management measures allowed for the southern region. The appellant states again demonstrated our willingness to compromise as we worked through sections 3.1.2.1 and 3.1.2.2 of the draft addendum. We recognized that the two-region (MA–NJ & DE–NC) harvest-based allocation option would have provided the most liberal measures possible for MA–NY (regardless of the timeframe selected), a fact that was not overlooked by many of our stakeholders who supported it; yet we looked past this option because of the major impact it would have had on NJ. We also looked past the three-region harvest-based allocation option to support the three-region exploitable biomass-based allocation option, despite the larger percent allocation afforded by the former, because we supported the progressive management approach afforded by the latter. We had hoped that our southern partners would have seen fit to act in this same spirit of compromise by supporting the 2011–2015 timeframe approach.

The equity issue, as set forth in Addendum XXX, has both an inter- and intra-regional component. We have already spoken to the inconsistency of the Board's decision with regard to inter-regional equity. We also note that the larger reduction imposed on the Northern Region makes it exceedingly more difficult for MA–NY to select regulations that achieve intra-regional equity (more on this under appeal criterion #5). Actions such as intra-regional adjustments can be better accommodated when regional harvest reductions, if necessary, are held to modest levels.

<u>Decision not consistent with FMP (appeal criterion #1)</u>

By affording NJ and the Southern Region the opportunity to liberalize, significantly, in 2018, and by requiring the Northern Region to reduce, significantly, in 2018, Addendum XXX is also inconsistent with nearly all objectives of the Fishery Management Plan (FMP).[3]

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[2] The calculation for NJ assumes the Management Board will approve the state's proposal to smooth its large 2017 wave 3 harvest estimate. Otherwise, the effect on NJ of the 2011–2015 timeframe would be a -12.89% reduction instead of a -2.17% reduction.

[3] Amendment 12 Objectives:

- Reduce fishing mortality in the summer flounder, scup, and black sea bass fishery to assume that overfishing does not occur.
- Reduce fishing mortality on immature summer flounder, scup, and black sea bass to increase spawning stock biomass.

The 2016 Benchmark Stock Assessment, which provides estimates of fishing mortality (and other metrics) on a regional basis (MA–NY, NJ–NC), indicates that overfishing is occurring in the southern sub-unit (retro adjusted F of 0.39 in 2015, compared to F_{MSY} proxy of 0.36). A large harvest increase for the southern sub-unit is inconsistent with the FMP objective to assure that overfishing does not occur.

Meanwhile, the northern sub-unit is fishing well below the F_{MSY} proxy (northern retro adjusted F of 0.14). Another harvest reduction for the north is inconsistent with the FMP objective to improve yield from the fishery. The more restrictive measures in the north are effectively subsidizing the more liberal measures in the south. Additionally, too much of the north's fishing mortality rate is resulting from discard mortality due to the misalignment between plentiful stock status and draconian regulations.

Another large harvest reduction for the Northern Region will also force state waters regulations for MA–NY that are even further away from being compatible with federal waters regulations, another FMP objective. While the majority of recreational black sea bass landings in MA–NY are caught in state waters, for some of the northern states in some years, harvest from federal waters is high, ranging up to 50 percent of total landings. It's been seven years since recreational anglers and for-hire operators in MA–NY have been subject to uniform state and federal regulations, which would promote uniform and effective enforcement of regulations, another FMP objective. Of note, the process for selecting the federal waters measures this year deferred to the Addendum XXX process for determining the Southern Region's regulations first, meaning that the federal waters measures can be aligned with the state waters regulations for DE–NC regardless of the specific allocation that Addendum XXX sets for the region.

Lastly, the larger the harvest cut required of the Northern Region the greater the need for MA–NY to implement increasingly complex regulations to try to meet the needs of various stakeholder groups as best as possible. In prior years, this has included sector-specific possession limits, season-specific possession limits, and in-season closures, none of which promote uniform and effective enforcement of regulations, or meet the additional FMP objective to minimize regulations.

<u>Insufficient/inaccurate/incorrect application of technical information (appeal criterion #3)</u>

At the time of the Management Board's decisions on Addendum XXX, only waves 1–5 MRIP harvest estimates were available for 2017, necessitating the incorporation of a wave 6 projection to evaluate the potential management effect of the various allocation alternatives in 2018. Since then, additional 2017 harvest information has become available that dramatically alters the management implications, rendering the information that was available to the Management Board insufficient for decision-making.

Now available are preliminary full-year 2017 harvest estimates from MRIP, as well as a revised 2017 harvest estimate for NJ based on the state's proposal to smooth its large wave 3 MRIP harvest estimate. Replacing the wave 6 projections with the wave 6 harvest estimates has the following effect on the full-year harvest estimates: Northern Region +1.9% (from 2,496,841 to 2,544,638 pounds), NJ -19.9% (from 1,413,999 to 1,131,943 pounds), and Southern Region -2.0% (from 257,943 to 252,783 pounds). NJ's full-year harvest estimate is reduced another -33.3% under its proposed, smoothed harvest estimate of 754,768 pounds.

- Improve yield from these fisheries.
- Promote compatible management regulations between state and federal jurisdictions.
- Promote uniform and effective enforcement of regulations.
- Minimize regulations to achieve the management objectives stated above.

Tables 3 and 4 provide the projected management implications of the 2011–2015 timeframe option and the timeframe-averaging approach that were before the Management Board at the February 8 meeting. We highlight the highly variable implications for NJ as confirmation that the Management Board had insufficient information to determine the appropriate timeframe. The projected outcome of the 2011–2015 timeframe included a -30.27% harvest reduction for NJ (Table 3), which the Board's averaging approach reduced to a projected -21.69% harvest reduction (Table 4). Based on NJ's revised 2017 harvest estimate, the state stands to liberalize +46.71% under the timeframe averaging approach (Table 1), but still a very generous +30.63% under the 2011–2015 timeframe (Table 2).

Less dramatic but still notable are the effects on the Northern and Southern Regions. The Management Board knowingly adopted an option with a projected -10.02% reduction for the beleaguered Northern Region (Table 4), which grows to a -11.71% reduction using the updated information (Table 1), but could be reduced to a -5.45% reduction under the updated 2011–2015 timeframe (Table 2). Meanwhile, the updated 2011–2015 timeframe option would still provide a +6.83% increase to the Southern Region (Table 2), larger than the projected +4.69% increase considered by the Management Board (Table 3).

Insufficient/inaccurate/incorrect application of technical information (appeal criterion #3)

The southern states' argument for the need to include 2006–2010 in the timeframe for determining allocation was predominantly based on the influence of the 2011 year class on the north's black sea bass population (and not the south's) and the expectation for a strong 2015 year class in the southern sub-unit. The contention that the Northern Region's current availability of black sea bass is a year-class effect ignores the best available science.

The results of the peer-review accepted 2016 Benchmark Stock Assessment depict an increasing trend in northern sub-unit biomass beginning well before 2011 (Figure 1). Since the mid-1990s, northern region exploitable biomass has been on a steady positive trajectory from below 1,000 metric tons (mt) to over 15,000 mt in 2015 (22,340 mt after retrospective adjustment). Meanwhile, the southern sub-unit's biomass has fluctuated around 4,000 mt, increasing to about 5,000 mt in 2015 (3,336 mt after retrospective adjustment). By 2015, 87% of the exploitable biomass[4] is estimated to be in the states from NY north, nearly matching the 84% of the coastwide recreational harvest (in pounds) attributed to MA–NY that year. Yet, under Addendum XXX, the recreational allocation provided to the Northern Region is just 61.35%. (On a separate but related issue, the commercial quotas allocated to the states from NY north total just 33% of the coastwide quota, despite the species' aforementioned current distribution.)

Increased black sea bass abundance and availability in the north is consistent with a growing resource and expanded age structure, and with the growing body of scientific research supporting a northward shift in the species' distribution caused by climate change (i.e., increasing water temperature).[5] Sixteen years ago, Amendment 13 to the FMP identified "a shift in abundance of black sea bass to the north" as a potential factor affecting the shift in landings to the north. We are not aware of any research that suggests this poleward shift—reflected by the science and highlighted by the FMP—will diminish or change direction in the near or distant future.

[4] After adjustments for retrospective bias.

[5] e.g., 1) Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, Griffis RB, et al. (2016). A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf. PLoS ONE 11(2): e0146756. doi:10.1371/journal.pone.0146756. 2) Bell, R. J., Richardson, D. E., Hare, J. A., Lynch, P. D., and Fratantoni, P. S. Disentangling the effects of climate, abundance, and size on the distribution of marine fish: an example based on four stocks from the Northeast US shelf. – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsu217.

Given the unidirectional shift in distribution, it stands to reason that application of the most recent years' data in an allocation decision is the most appropriate approach—particularly when it can be done without imposing disproportionate impacts throughout the range (in this case, NJ and DE–NC still having liberalizations). Addendum XXX must be viewed in the context of an evolving management system aimed at addressing the northward shift in the black sea bass resource by adjusting the recreational targets and commercial allocations accordingly. Viewed in this way, the Management Board's decision falls short and is out-of-synch with the direction of the Commission's management program.

The southern states have pointed to indications of a 2015 year class that is strong in their region as justification for a higher allocation to the south. State survey data from the Northern Region indicate that the 2015 year class is also exceptionally strong in the north (Figures 2–4). Interestingly, this trend was not evident in the NJ and VA surveys, according to the Northeast Fisheries Science Center's July 2017 data update on black sea bass. Consider also that the 2016 Benchmark Stock Assessment estimates that the south sub-unit's peak recruitment event occurred with the 1999 cohort. This led to the area's highest exploitable biomass estimates the following two years at a level (roughly 7,000 mt) that the north subunit achieved prior to the 2011 cohort's influence.

In addition, when the Mid-Atlantic Council's Scientific & Statistical Committee last provided its catch advice to the Council and Management Board, there was great uncertainty regarding the status and strength of the 2015 year class. That source of uncertainty is a key factor affecting the lower recreational (and commercial) ACLs in 2018 relative to 2017. If in fact the 2015 year class is as strong as it now appears to be, there may be no biological basis for imposing any reductions in the recreational fishery in any areas in 2018.

Management actions resulting in unforeseen circumstances/impacts (appeal criterion #5)

The Northern Region states have convened to determine the management measures within our region needed to meet the -11.7% reduction in harvest for the region imposed by Addendum XXX. The addendum requires adoption of a set of regional measures that would achieve the regional allocation; from those measures, the states can flex their state-specific measures, within bounds, to establish conservationally equivalent state regulatory programs.

From the onset, it was recognized that the unduly small allocation afforded the Northern Region would have a major, negative impact on the states' efforts to meet the requirements of the addendum. This is borne out by the extremely onerous regulatory standard that has emerged from our efforts: a 4-fish bag limit, 15" minimum size, and 119-day season, running from mid-June to mid-October. It was also understood that this regulatory standard approach would prove highly challenging in our efforts to evenly distribute the Northern Region's required reduction. Indeed, it appears that one state, Connecticut, will be forced to incur a -28% reduction in harvest in 2018 in order to enable the Northern Region to achieve the -11.7% regional reduction and uphold the regulatory standard requirements set forth by Addendum XXX. CT views this as an unforeseen and disproportionate impact. The required reduction and associated impact for CT would be lessened considerably if the 2011–2015 timeframe were implemented.

Corrective Action

Because of the uneven impacts to the regions linked to the timeframe options, and because there are more southern states than northern states on the Management Board, the Northern Region states hereby request reconsideration of the timeframe decision by the ISFMP Policy Board. Such review—by a Board whose membership includes unaffected jurisdictions—is necessary to assess a fair and equitable outcome for all states within the management unit. Based on the ample justification for adopting the 2011–2015 timeframe for regional allocation of the RHL (using the combined

exploitable biomass/harvest approach), as outlined herein, the Northern Region states urge the Policy Board to grant this appeal and to call upon the Management Board to adjust Addendum XXX accordingly. Future utility of the resource-distribution-based approach set forth in the addendum will require the use of the most current data to update the allocation formula in response to new stock assessment results. Inclusion (and averaging) of additional historical years is counter to this progressive management approach.

In addition, the Northern Region requests a Policy Board directive to the Management Board to initiate an addendum or amendment to manage the black sea bass resource by its two areal sub-units. The best available science (the 2016 Benchmark Stock Assessment) supports a sound, science-based management framework (i.e., regional management based on regional reference points) that may not otherwise be advanced given the voting membership of the Management Board. We are concerned that the Management Board's decision on Addendum XXX's timeframe option is synoptic of a larger management issue that needs to be put on a path towards resolution.

We are unaware of other options to gain relief at the Management Board level and commit to complying with the findings of the Policy Board, subject to our right to take further action beyond the ASMFC to seek relief.

Sincerely yours,

Massachusetts Commissioners

Dr. David E. Pierce | Raymond W. Kane | Representative Sarah K. Peake

Rhode Island Commissioners

Jason McNamee | David V.D. Borden | Senator V. Susan Sosnowski

Connecticut Commissioners

Mark Alexander | Dr. Lance L. Stewart | Senator Craig A. Miner

New York Commissioners

James J. Gilmore, Jr. | Emerson C. Hasbrouck, Jr. | Senator Philip M. Boyle

Cc: Robert Beal, Toni Kerns (ASMFC)

Table 1. Addendum XXX Outcome, Using Updated 2017 Harvest Data

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Preliminary 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	61.35%	3.66 million pounds	2,246,562	2,544,638	-11.71%
South: NJ	30.24%		1,107,352	754,768	+46.71%
South: DE-NC	8.41%		307,964	252,783	+21.83%

***** Preliminary full-year 2017 harvest as estimated by MRIP waves 1–6, with NJ's wave 3 harvest estimate smoothed as proposed by the state. Without smoothing, NJ's preliminary 2017 harvest estimate is 1,131,943 pounds, resulting in a -2.17% reduction in 2018.

Table 2. 2011–2015 Timeframe Outcome, Using Updated 2017 Harvest Data

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Preliminary 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	65.79%	3.66 million pounds	2,405,854	2,544,638	-5.45%
South: NJ	26.85%		985,979	754,768	+30.63%
South: DE-NC	7.36%		270,045	252,783	+6.83%

***** Preliminary full-year 2017 harvest as estimated by MRIP waves 1–6, with NJ's wave 3 harvest estimate smoothed as proposed by the state. Without smoothing, NJ's preliminary 2017 harvest estimate is 1,131,943 pounds, resulting in a -12.89% reduction in 2018.

Table 3. Projected Outcome of the 2011–2015 Timeframe in Draft Addendum XXX

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Projected 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	65.7%	3.66 million pounds	2,405,854	2,496,841	-3.64%
South: NJ	26.9%		985,979	1,413,999	-30.27%
South: DE-NC	7.4%		270,045	257,943	+4.69%

* Projected 2017 harvest estimates based on MRIP waves 1-5 plus a wave 6 projection, and no smoothing of NJ's wave 3 harvest estimate.

Table 4. Projected Outcome of the Timeframe Averaging Approach When Adopted by the Management Board

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Projected 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	61.35%	3.66 million pounds	2,246,562	2,496,841	-10.02%
South: NJ	30.24%		1,107,352	1,413,999	-21.69%
South: DE-NC	8.41%		307,964	257,943	+19.39%

* Projected 2017 harvest estimates based on MRIP waves 1-5 plus a wave 6 projection, and no smoothing of NJ's wave 3 harvest estimate.

Figure 1. Comparison of North sub-unit (left) and South sub-unit (right) exploitable biomass estimated by the 2016 Benchmark Stock Assessment. Note the difference in y-axis scale and the increasing trend in the north preceding the 2011 year class.

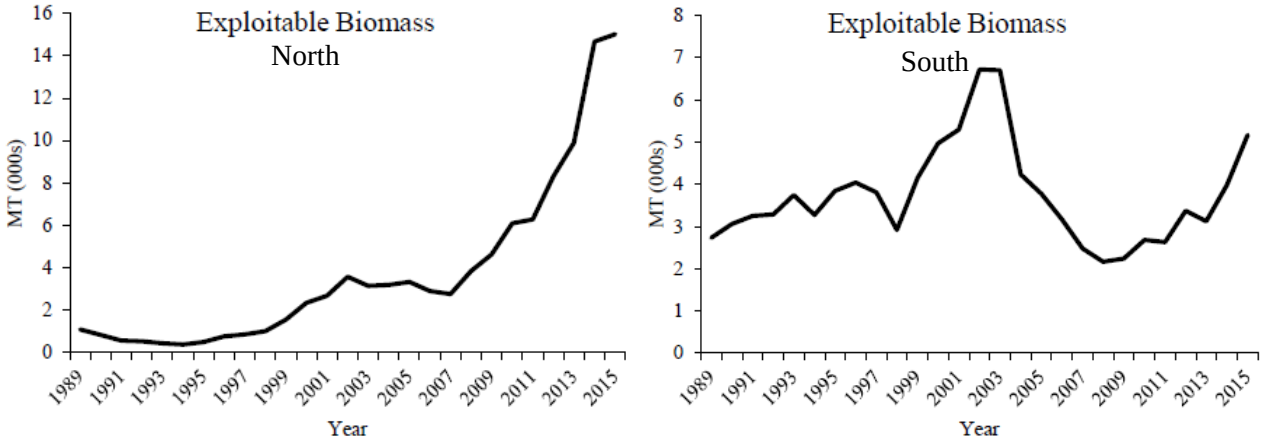


Figure 2. Massachusetts spring trawl survey stratified mean number per tow at age-1, indicating a strong 2015 year class recruiting to the population as age-1 in 2016.

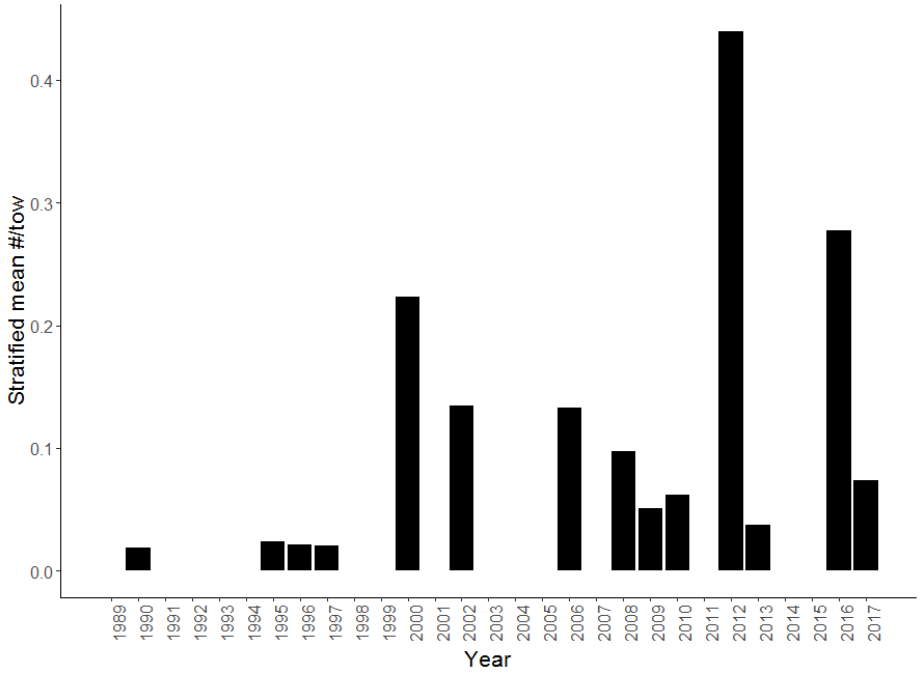


Figure 3. Rhode Island spring trawl survey mean number per tow at age-1, indicating a strong 2015 year class recruiting to the populations as age-1 in 2016.

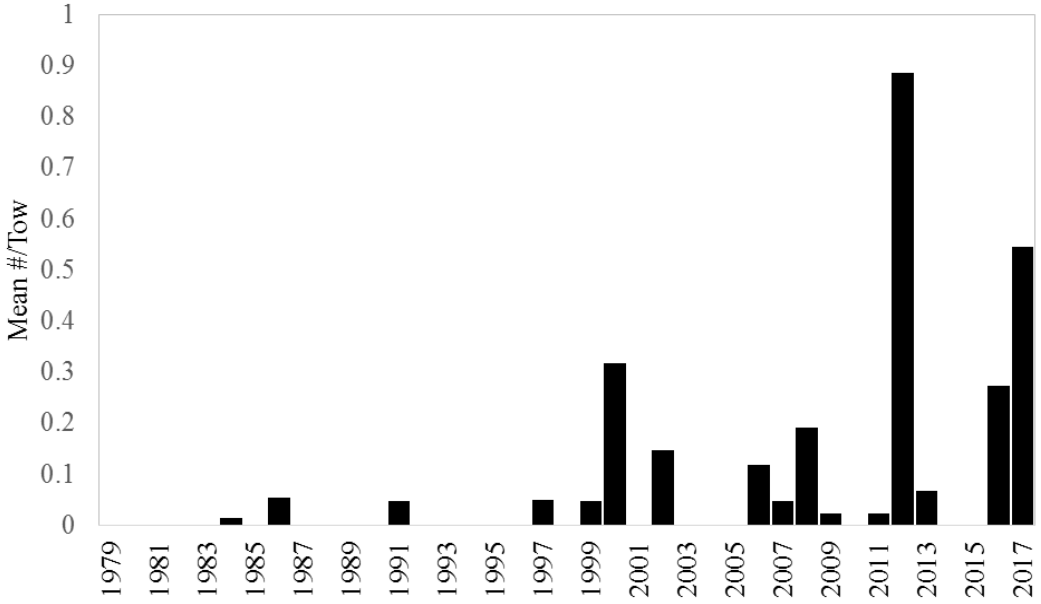
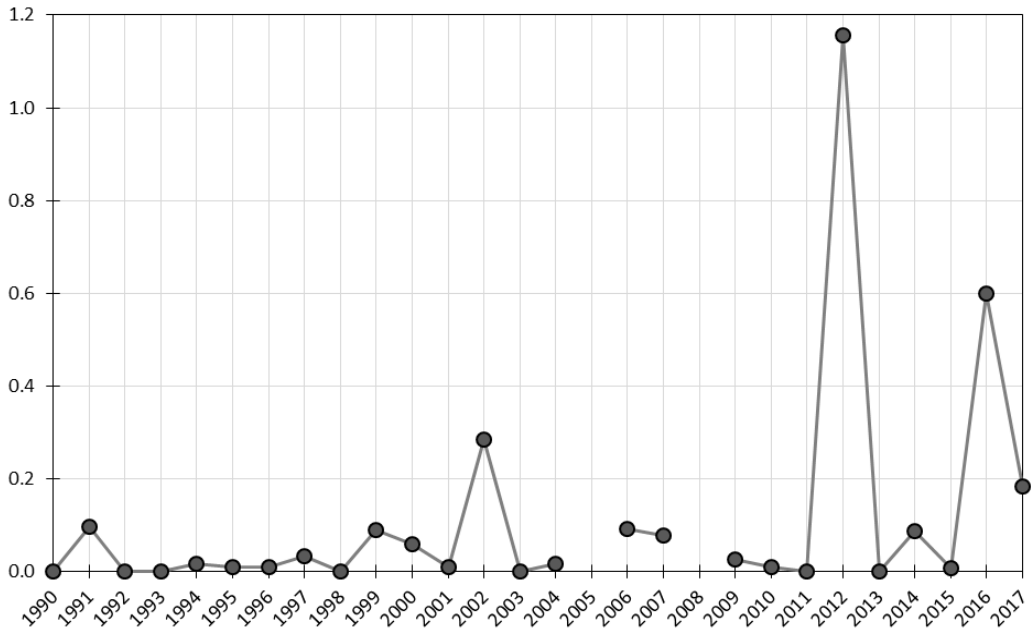


Figure 4. New York small mesh trawl survey mean number per tow at age-1, indicating a strong 2015 year class recruiting to the population as age-1 in 2016.



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James J. Gilmore, Jr. (NY), Chair *Patrick Keliher (ME), Vice-Chair* *Robert E. Beal, Executive Director*

Vision: Sustainably Managing Atlantic Coastal Fisheries

April 3, 2018

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Dear Dr. Pierce, Mr. McNamee, Mr. Aarrestad and Mr. Gilmore:

This letter responds to the March 16, 2018 appeal by the Commonwealth of Massachusetts and the States of Rhode Island, Connecticut and New York (Northern Region) regarding of the Atlantic States Marine Fisheries Commission's (Commission) approval of Addendum XXX (Addendum) to the Summer Flounder, Scup and Black Sea Bass Interstate Fishery Management Plan (FMP). On March 23, 2018, in accordance with the appeals process, a conference call of the Commission's Vice-Chair Pat Keliher, past Chair Doug Grout and Robert Boyles, proxy for Chairman Gilmore, as he is appellant (Leadership), and staff was convened to review the Northern Region appeal. The purpose of the review was to assess the issues the Northern Region raises in its appeal and to determine whether those issues are of the type and substantiality that warrants review by the Interstate Fisheries Management Program (ISFMP) Policy Board.

During the call, it was determined the appeal did meet the qualifying guidelines and, thus, could be forwarded to the ISFMP Policy Board for consideration under appeal criterion one (decision not consistent with FMP) and parts of criterion three (incorrect application of technical data). However, Leadership did not find the appeal met the qualifying guidelines for criterion five (unforeseen circumstances/impacts).

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The appeal referenced criterion one, "Decision not consistent with the FMP." Under this criterion, the appeal argues two points: (1) the allocation method fails to meet the primary goal of the addendum to reduce disproportionate impacts on the states and (2) the significant

reduction required is inconsistent with nearly all objectives of the FMP. See letter from Northern Region Commissioners to ASMFC Chair James J. Gilmore, pp. 2-3 (March 16, 2018).

Leadership concluded the states presented sufficient evidence in their claim to allow for the Policy Board to further consider the Northern Regions claim under criterion one.

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The appeal cited criterion three, "Insufficient/Inaccurate/Incorrect Application of Technical Information." Under this criterion, the appeal states wave 6 data was not available when the Summer Flounder, Scup and Black Sea Bass Management Board (Board) approved the addendum. Further, since approval of the addendum, additional 2017 harvest information became available that dramatically altered the management implications. The appeal also claims the Board's contention that the Northern Region's current availability of black sea bass is a year-class effect ignores the best availability science, which is an insufficient application of the technical information. See letter from Northern Region Commissioners to ASMFC Chair James J. Gilmore, pp. 3-5 (March 16, 2018).

Routinely, the Board has made management decisions on available wave data, setting specifications based on projected wave 6 data. 2017 was not an anomaly in the management process. Leadership found the exclusion of wave 6 data alone does not meet the appeal criterion for insufficient/inaccurate/incorrect data. However, the significant change in New Jersey's harvest estimate from 1.4 million pounds to 754,768 pounds due to the smoothing of data does meet the criterion. Specifically, in making its decision, the Board considered one data point (New Jersey's preliminary harvest estimate) without any indication or discussion about how that data point might change after smoothing. Based on this, Leadership concludes there are grounds for an appeal because the data presented on New Jersey's harvest estimate was insufficient.

Leadership concludes the Northern Region presented sufficient evidence in the appeal to allow for the Policy Board to further consider the claim that the Board ignored the best available science. The appeal presents that the southern states argued the high availability of black sea bass in the north is predominately based on a single year class (2011), which the claim contests is not based on the best available science under criterion 3. Leadership recognizes as black sea bass distributions shift management strategies become more complex. Shifts in the distribution and productivity of stock will likely cause ecological and economic disruptions. As environmental conditions change, the Board may need to revisit, as necessary, the underlying conservation goals and objectives of the FMP.

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The appeal letter cites criterion five, "Unforeseen circumstance/impacts." The appeal claims Connecticut will be forced to take a much greater reduction than the other states within the region. The appeal presents this as an unforeseen and disproportionate impact.

The draft addendum presented a wide range of management options, including example measures, for consideration by the Board. Examples presented in the document had similar changes in magnitude as the Northern Region's current regulatory standard, in addition to options that would have required a larger reduction for Connecticut. These options were likely not ones the state would have voted in favor of, but by inclusion in the draft there was opportunity for the state to consider the impact it would have in comparison to the 2017 regulations based on the example measures provided by staff at the Board meeting. While Leadership agrees Connecticut's reduction is larger than the other states, Leadership does not find this unforeseen.

In light of these findings, Leadership finds there are grounds for the appeal to be considered by the ISFMP Policy Board under two of the three criteria advanced in the Northern Region's letter, specifically criteria one and three. Leadership concludes it is appropriate to provide the Northern Region an opportunity to present its appeal on this issue to the ISFMP Policy Board on May 3, 2018. During that meeting, the ISFMP Director will present background on the Addendum and the Board's justification for its actions. Following this presentation, the Commissioners from the Northern Region will be provided 20 minutes to present their rationale for the appeal and their suggested resolution of the issue. The ISFMP Policy Board will then be provided an opportunity to discuss the issue, consider the corrective action requested by the states, and decide what issues, if any, should be remanded back to the Summer Flounder, Scup and Black Sea Bass Board for corrective action. No public comment will be taken in connection with the appeal.

Thank you for the continued partnership and commitment to the Commission process and actions.

Sincerely,

Patrick Keliher

cc: Raymond Kane, Rep. Sarah Peake, David Borden, Sen. Susan Sosnowski, Dr. Lance Stewart, Sen. Craig Miner, Emerson Hasbrouck, Jr., Sen. Philip Boyle Interstate Fisheries Management Program Policy Board

L18-017

Atlantic States Marine Fisheries Commission

ADDENDUM XXX TO THE SUMMER FLOUNDER, SCUP, BLACK SEA BASS FISHERY MANAGEMENT PLAN

Black Sea Bass Recreational Management in 2018

Approved February 8, 2018

Vision: **Sustainably Managing Atlantic Coastal Fisheries**

Table of Contents

1.0 Introduction

Addendum XXX establishes management of the recreational black sea bass fishery for the 2018 fishing year and beyond. The management unit for black sea bass in US waters is the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border.

Black sea bass fisheries are managed cooperatively by the states through the Atlantic States Marine Fisheries Commission (Commission) in state waters (0-3 miles off shore), and through the Mid-Atlantic Fishery Management Council (Council) and NOAA Fisheries in federal waters (3-200 miles off shore). This Draft Addendum is proposed under the adaptive management/ framework procedures of Amendment 12 and Framework 2 that are a part of the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP).

The Commission's Summer Flounder, Scup, and Black Sea Bass Management Board (Board) approved the following motion on May 10, 2017:

> *Move to initiate an addendum for 2018 recreational black sea bass management with options as recommended by the Working Group and Plan Development Team. Options for regional allocations shall include approaches with uniform regulations (e.g., number of days) and other alternatives to the current North/South regional delineation (MA-NJ/DE-NC) such as those applied for summer flounder, i.e., one-state regions.*

2.0 Overview

2.1 Statement of Problem

The Commission's Interstate Fishery Management Program Charter establishes fairness and equity as guiding principles for the conservation and management programs set forth in the Commission's FMPs. In recent years, challenges in the black sea bass recreational fishery have centered on providing equitable access to the resource in the face of uncertain population size, structure, and distribution. In the absence of an accepted peer reviewed stock assessment, the Board and Council had set coastwide catch limits at conservative levels to ensure sustainability of the resource. Coastwide catch limits set from 2010-2016 were largely based on a constant catch approach used to maintain or increase the size of the population based on historical catch data. For 2016, a Management Strategy Evaluation was considered and approved by the Board and Council to increase both the recreational and commercial catch limits. In recent years, fishery-independent and dependent information and the 2016 benchmark stock assessment have indicated a much higher abundance of the resource than previously assumed. This presented challenges in both restricting recreational harvest to the coastwide recreational harvest limit (RHL) as well as crafting recreational measures that ensured equitable access to the resource along the coast.

Starting in 2011, the Board approved addenda that allowed states to craft individual measures to reduce harvest to the annual coastwide RHL while maintaining state flexibility. After a single year of management by state shares, the Board adopted what became officially known as the ad-hoc regional management approach, whereby the northern region states of Massachusetts

through New Jersey would individually craft state measures aimed to reduce harvest by the same *percent*, while the southern region states of Delaware through North Carolina set their regulations consistent with the measures set for federal waters.

This approach, while allowing the states flexibility in setting their measures, created discrepancies in conservation measures that were not tied to any original management plan baseline or goal (e.g., state allocations). Inequities resulted in how much of a harvest reduction states were addressing through their measures, with no accountability for the effectiveness of regulations. Most visibly, the ad-hoc approach did not provide uniformity in measures nor in evaluating harvest reductions.

2.2 Background

The black sea bass recreational fishery is managed on a "target quota" basis. Fifty-one percent of the total allowable landings are allocated to the recreational sector as the coastwide RHL. Regulations are established each year that are projected to restrict harvest to the RHL; however, due to the timing of when recreational harvest estimates are available, the recreational fishery is not subject to a "quota" closure (like the commercial fishery). The Marine Recreational Information Program (MRIP) is the primary source of recreational catch and effort data used to manage the fishery.

From 1996 to 2010, uniform coastwide size, season, and bag limits were used by the Commission and Council to constrain the recreational fishery to the annual RHL. Over time, the states grew concerned that the coastwide regulations disproportionately impacted states within the management unit; therefore, the Board approved a series of addenda which allowed for state-by-state flexibility, first through state shares in 2011 and then through the ad-hoc regional management approach for 2012–2017. The northern region states have been subject to harvest reductions in all years except 2012 (liberalization) and 2017 (status quo), while the southern region states have been largely status quo. Approximately 96% of the coastwide harvest comes from the northern region states; therefore, the Board has differentially applied the required reductions between the two regions. The states' regulations for 2017 are provided in Table 1.

Table 1. State by State Black Sea Bass Recreational Measures for 2017.

State	Minimum Size (inches)	Possession Limit	Open Season	Total Days Open
Maine	13	10 fish	May 19 - September 21; October 18 - December 31	201
New Hampshire	13	10 fish	January 1 - December 31	365
Massachusetts	15	5 fish	May 20 - August 29	102
Rhode Island	15	3 fish	May 25 - August 31	191
		7 fish	September 1 - September 21; October 22 - December 31	
Connecticut (Private & Shore)	15	5 fish	May 1-December 31	245
CT Authorized Party/Charter Monitoring Program Vessels		8 fish		
New York	15	3 fish	June 27- August 31	188
		8 fish	September 1- October 31	
		10 fish	November 1 - December 31	
New Jersey	12.5	10 fish	May 26 - June 18	157
		2 fish	July 1 - August 31	
		15 fish	October 22 - December 31	
Delaware, Maryland, Virginia, and North Carolina, North of Cape Hatteras (N of 35° 15'N)	12.5	15 fish	May 15 - September 21; October 22 - December 31	201

Note: cells are shared to help with table readability and do not indicate regional alignment.

2.3 Description of the Fishery

Black sea bass are a popular recreational fish in the Mid-Atlantic and Southern New England regions. Most recreational harvest occurs in the states of Massachusetts through New Jersey (Table 2 & 3, Figure 1). In 2016, these five states account for 94% of all black sea bass harvest in the management unit (Maine through Cape Hatteras, North Carolina).

Since 2008, the majority of harvest has occurred in state waters (Table 4). In 2016, 67% of recreational harvest of black sea bass (by weight) occurred in state waters. In general, the majority of harvest from New York north is from state waters, while the majority of harvest from New Jersey south is from federal waters. Also since 2008, harvest by private anglers has surpassed harvest by anglers fishing on charter or party boats (Figure 2). In 2016, an all-time

high of 84% of harvest is attributed to the private mode, including shore-based and private/rental boat harvest.

For much of the last decade, coastwide harvest has exceeded the RHL (Table 5). In 2016, an estimated 5.19 million pounds of black sea bass were harvested, exceeding the 2016 RHL by 2.37 million pounds. RHLs through 2016 approved by the Board and Council were largely based upon a conservative constant catch approach developed by the Council's Scientific and Statistical Committee in the absence of an accepted peer-reviewed stock assessment. Constraining harvest in these years of increasing stock biomass through highly restrictive measures led to repeated exceedances of the RHL and increasingly restrictive measures in the northern region.

As of December 22, 2017, preliminary harvest data for 2017 were only available through October. These data estimate a recreational harvest of 3.7 million pounds for Maine through North Carolina during January–October 2017. This represents a 13% decrease from the same time period in 2016. The proportions of annual harvest per two-month wave in 2016 were used to project an annual harvest estimate for 2017 of 4.17 million pounds, 2.8% below the 2017 RHL of 4.29 million pounds, and 13.9% above the 2018 RHL of 3.66 million pounds. This harvest projection is highly uncertain given the interannual variability in harvest estimates.

Table 2. State-by-state recreational harvest of black sea bass (in numbers of fish), 2006–2016. Harvest data are restricted to the management unit. Source: MRIP, 2017.

State	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ME						0	0				
NH					0		3,195	12,283	0	0	0
MA	105,162	149,434	246,136	430,748	702,138	194,752	519,910	291,678	457,099	342,554	392,239
RI	41,021	44,024	52,303	35,972	160,427	50,203	102,548	74,727	214,463	233,631	254,704
CT	3,470	23,574	59,751	465	15,682	8,378	110,858	109,807	397,033	330,628	435,624
NY	268,526	409,697	259,511	566,483	543,243	274,473	321,516	353,036	469,150	876,630	1,032,604
NJ	530,727	724,591	579,617	583,373	687,451	148,487	734,928	345,337	468,402	310,298	294,312
DE	113,696	93,147	22,621	37,345	21,028	42,961	40,141	36,557	23,879	22,899	24,168
MD	120,803	38,669	26,429	33,082	36,018	47,445	33,080	29,677	68,469	57,631	79,951
VA	83,292	36,152	38,045	114,805	29,718	18,964	4,076	21,295	18,802	38,763	28,913
NC	18,829	8,517	9,353	3,307	10,850	30,975	3,664	8,002	696	1,920	864

Table 3. State-by-state recreational harvest of black sea bass (in pounds), 2006–2016. Harvest data are restricted to the management unit. Source: MRIP, 2017.

State	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ME						0	0				
NH					0		4,587	19,228	0	0	0
MA	156,682	169,853	380,126	621,596	1,052,441	318,384	1,052,050	660,797	1,087,848	718,101	891,441
RI	57,913	65,091	84,536	50,657	246,229	85,903	226,131	144,723	370,530	444,337	564,370
CT	3,686	37,016	90,120	1,025	24,138	13,759	261,163	262,391	586,113	495,675	914,014
NY	476,391	558,204	521,073	878,045	975,622	399,030	545,222	734,729	847,181	1,531,492	2,211,292
NJ	685,525	1,076,468	830,821	768,731	780,116	181,699	993,614	515,176	631,457	428,318	398,482
DE	143,159	137,202	27,389	45,496	29,429	46,233	49,967	44,365	30,962	26,892	31,939
MD	135,906	49,046	33,550	40,553	41,506	51,730	42,175	39,170	87,086	78,052	103,995
VA	112,323	60,093	51,421	145,183	24,702	26,748	2,599	33,660	24,433	63,695	70,188
NC	28,352	21,863	11,489	7,043	16,265	47,310	7,153	9,992	1,180	3,878	1,249

Table 4. Percentage of recreational harvest (by weight) attributed to state waters, 2006–2016; the remaining harvest is attributed to federal waters. Note: North Carolina is omitted because location-specific harvest data for only north of Cape Hatteras are not readily available. Source: MRIP, 2017.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2006-2016 average
ME	-	-	-	-	-	-	-	-	-	-	-	-
NH	-	-	-	-	-	-	100%	100%	-	-	-	100%
MA	96%	100%	98%	100%	100%	96%	100%	95%	88%	100%	94%	97%
RI	77%	97%	91%	99%	82%	95%	92%	69%	79%	75%	83%	82%
CT	100%	100%	100%	100%	100%	100%	100%	93%	93%	97%	95%	96%
NY	73%	48%	91%	86%	93%	94%	100%	63%	81%	73%	49%	72%
NJ	17%	14%	31%	54%	43%	33%	48%	57%	9%	19%	36%	33%
DE	18%	14%	10%	11%	47%	15%	8%	6%	3%	5%	8%	14%
MD	0%	0%	6%	0%	0%	3%	2%	0%	0%	21%	51%	11%
VA	6%	59%	61%	13%	54%	5%	19%	20%	83%	4%	9%	23%
Total	39%	35%	65%	73%	80%	75%	80%	71%	70%	72%	67%	68%

Table 5. Black sea bass recreational harvest relative to the RHL, 2006–2016. Note: Harvest data are restricted to the management unit. Source: MRIP, 2017.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Coastwide Harvest (mil. lb)	1.78	2.18	2.03	2.56	3.19	1.17	3.19	2.46	3.66	3.79	5.19
Coastwide RHL (mil. lb)	3.99	2.47	2.11	1.14	1.83	1.78	1.32	2.26	2.26	2.33	2.82
Percent of RHL harvested	45%	88%	96%	**225%**	**174%**	66%	**242%**	**109%**	**162%**	**163%**	**184%**

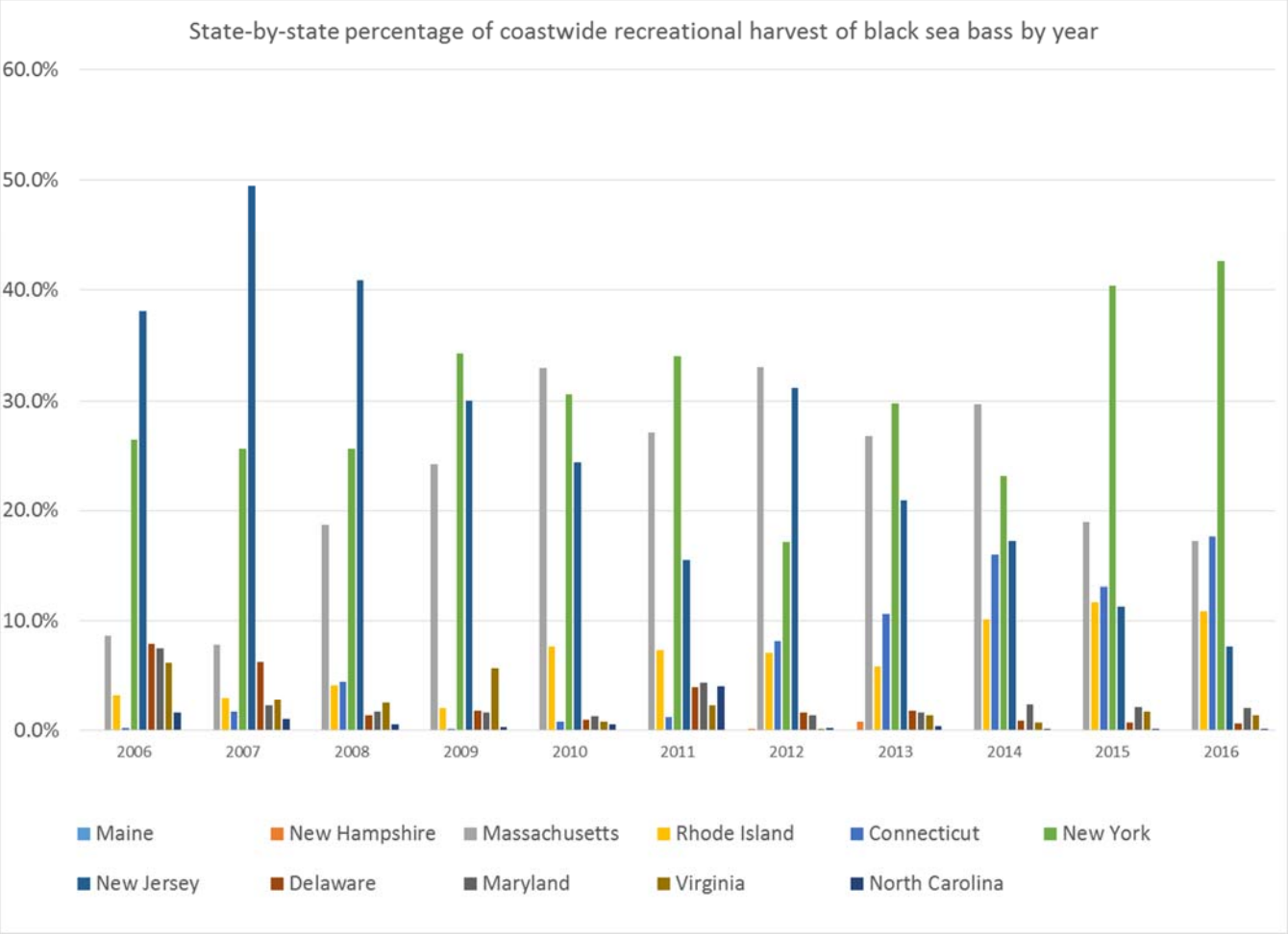

Figure 1. State-by-state contribution (as a percentage) to total recreational harvest of black sea bass (in weight) in the management unit, 2006–2016. Source: MRIP, 2017.

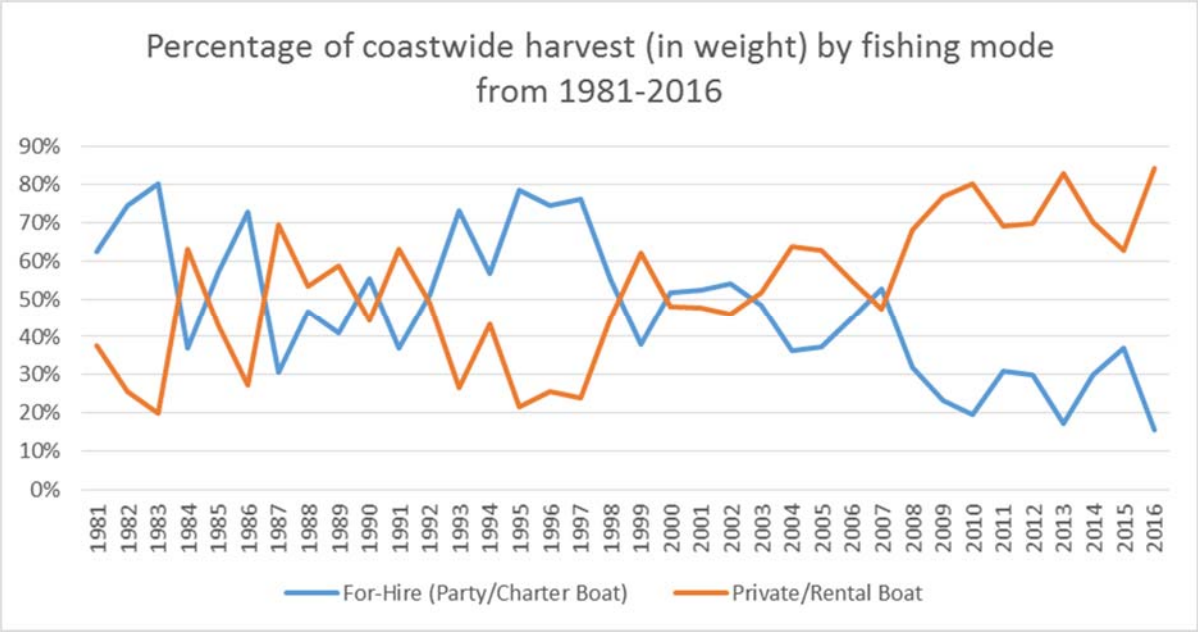

Figure 2. Percentage of coastwide harvest (in weight) by fishing mode from 1981-2016. Private/Rental Boat includes shore mode. Source: MRIP, 2017.

2.4 Status of the Stock

The most recent stock status information comes from the 2016 benchmark stock assessment, which was peer-reviewed and approved for management use in December 2016 (SARC 62). The assessment indicated that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2015, the terminal year of data used in the assessment.

For modeling purposes, the stock was partitioned into two sub-units approximately at Hudson Canyon to account for spatial differences in abundance and size at age. The sub-units are not considered to be separate stocks. Although the stock was assessed by sub-unit, the combined results were used to develop reference points, determine stock status, and recommend fishery specifications.

Spawning stock biomass (SSB), which includes both mature male and female biomass, averaged around 6 million pounds during the late 1980s and early 1990s and then steadily increased from 1997 to 2002 when it reached 18.7 million pounds. Since 2007, SSB has steadily and dramatically increased, reaching its highest level in 2015 (48.89 million pounds). SSB in the terminal year (2015) is considered underestimated, and was adjusted up for comparison to the reference points (Figure 3). The (similarly adjusted) fishing mortality rate (F) in 2015 was 0.27, below the fishing mortality threshold reference point (F_{MSY} PROXY= F40%) of 0.36. Fishing mortality has been below the F_{MSY} PROXY for the last five years. Model estimated recruitment has been relatively constant throughout the time series except for large peaks from the 1999 and 2011 year classes. Average recruitment of age 1 black sea bass from 1989–2015 was estimated at 24.3 million fish with the 1999 year class estimated at 37.3 million fish and the

2011 year class estimated at 68.9 million fish. The 2011 year class is dominant in the northern area (north of Hudson Canyon) and less so in the southern area (south of Hudson Canyon).

Based on the stock assessment, the Board and Council set the 2017 RHL at 4.29 million pounds, an increase of over 52% from the 2016 RHL. Biomass is projected to decline in 2018 as the strong 2011 year class exits the fishery. Consequently, the Board and Council set the 2018 RHL at 3.66 million pounds, an approximate 15% reduction from the 2017 RHL.

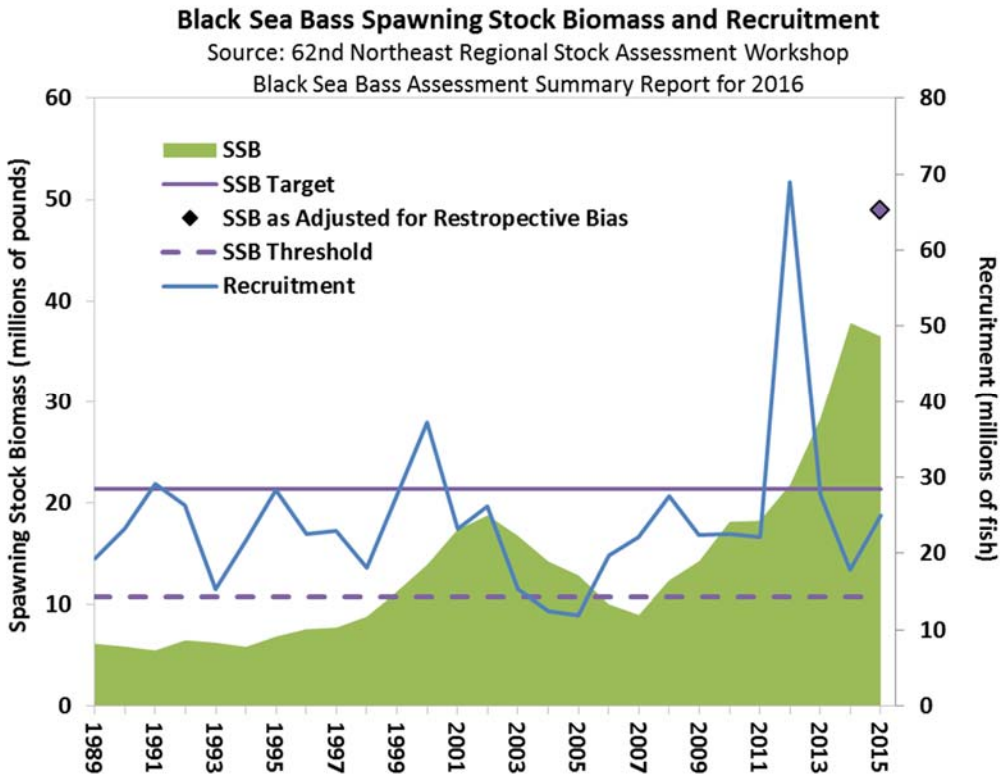

Figure 3. Black Sea Bass SSB and recruitment at age 1 by calendar year.

3.0 Management Program

The management program is only specific to Massachusetts through North Carolina north of Cape Hatteras and does not specify management for the states of Maine and New Hampshire. To date, no recreational black sea bass harvest has been attributed to Maine, and only two years of modest harvest (2012 and 2013) have been attributed to New Hampshire. Neither state is expected to harvest a significant proportion of the RHL in 2018. Both states will maintain their status quo measures in 2018, and monitor their harvests, if any. If either state harvests a significant amount in 2018 or thereafter, the Board will consider their inclusion in the management program.

In October 2017, the Council and Board approved a motion to allow a February 2018 recreational black sea bass fishery for interested states in federal waters. Anglers are limited to

15 fish per day at a minimum size of 12.5". States opting into this February 2018 fishery have declared their participation and specified how they will reduce harvest later in the year to account for their projected Wave 1 harvest.

In February, the Board recommended NOAA Fisheries implement the following measures in federal waters: 15 fish possession limit, 12.5-inch minimum size and season from May 15 – December 31. These recommended measures assume the Commission process will develop measures to constrain harvest to the 2018 RHL. A backstop measure of 14 inches, 5 fish possession limit and a season from May 15 – September 15 would go into effect should the Commission not implement measures to constrain harvest to the 2018 RHL.

3.1 Regional Allocation of Annual RHL

For 2018, a combination of exploitable biomass and historical harvest would determine allocation of the RHL to specified regions (Section 3.1.1). The states in each region would be collectively responsible for developing measures that constrain harvest to their allocation, and account for any state participation in the February 2018 fishery. Regional proposals will be submitted for the Board's consideration and approval following the 2018 ASMFC Winter Meeting. For 2018, measures will be specified by adjusting to the coastwide RHL based on 2017 MRIP harvest estimates; for 2019, the FMP could allow for evaluation and specification based on achieving the coastwide recreational annual catch limit (ACL) (Section 3.3).

3.1.1 Allocation of the RHL

Regional allocation based on exploitable biomass and historical harvest

For the recreational fishery, the management unit will be split into three regions. The northern region would include the states of Massachusetts through New York; New Jersey would constitute a stand-alone region; and the southern region would include the states of Delaware through North Carolina north of Cape Hatteras.

The annual RHL will be allocated initially between the northern and southern regions, with the southern region including New Jersey, based on a time-series average of *exploitable biomass* produced from the 2016 benchmark stock assessment. The estimates of exploitable biomass are derived from the assessment's recreational catch per angler (CPA) effort data, divided by the catchability coefficient (q), for each region. Then, New Jersey's portion of the southern region's *historical harvest* will be applied to the southern region allocation to establish New Jersey's allocation of the coastwide RHL, with the balance constituting the southern region's (DE-NC) allocation of the coastwide RHL.

This provides an alternative to sole reliance on recreational harvest estimates to determine allocations. In recent years, there have been changes to how harvest estimates have been calculated. Additionally, harvest is in part a product of the regulations that have been in place. This approach seeks to address changes in both the resource's distribution and abundance, and the avidity of the recreational angling community targeting black sea bass. A strictly biomass-based allocation approach for New Jersey is not currently possible with the available scientific

information. This hybrid approach (using exploitable biomass and also historical harvest for the states of NJ-NC) recognizes that New Jersey waters essentially straddle the biomass partition at Hudson Canyon, and assumes that New Jersey's harvest levels over time bear some relation to the exploitable biomass available to New Jersey anglers.

3.1.2 Regional Alignment

The following specifies the alignment for regional allocation in 2018.

3 Regions: Massachusetts through New York (northern region); New Jersey as a state-specific region (New Jersey Region); and Delaware through North Carolina north of Cape Hatteras (southern region).

3.1.3 Timeframe for specifying regional allocation

Data from one of the following timeframe options were proposed to be used to set the allocations relative to the 2018 RHL. The option was intended to specify the timeframe for calculating regional average CPA or regional average harvest. The following timeframes were determined to encompass harvest information from two recent time periods to reflect current harvest trends. 2016 was excluded from the timeframe options due to uncertainty in 2016 MRIP harvest estimates, and 2015 being the terminal year of the stock assessment.

A) 2006-2015 (10 years)

B) 2011-2015 (5 years)

Due to disagreement among the states on which timeframe option to select, the Board adopted an averaging approach to the allocations resulting from the above timeframes. This approach creates a more equitable allocation scheme while maintaining the intent to base allocation on a combination of exploitable biomass and historical harvest. The approved regional allocations are provided in Table 6, and the allocations associated with each timeframe option presented in the draft addendum for public comment are provided in Tables A1 and A2 in Appendix I.

Table 6. Regional Allocations of the 2018 RHL. 2017 harvest projected using data through wave 5. Source: MRIP 2017.

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Projected 2017 Harvest (lbs)	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	61.35%	3.66 million pounds	2,246,562	2,496,841	-10.02%
South: NJ	30.24%		1,107,352	1,413,999	-21.69%
South: DE-NC	8.41%		307,964	257,943	19.39%

*3.1.4 Management measures within a region**

Regulatory standard with conservation equivalency allowed: A uniform set of regulations would be developed for a region (a regulatory standard). States within the region could then submit proposals to implement alternative measures deemed conservationally-equivalent to the regulatory standard, although management measures may not exceed a difference of more than 1" in size limit and 3 fish in possession limit from the regulatory standard.

*As noted above, some states may have different measures in February than the rest of the year depending on their participation in the February 2018 recreational black sea bass fishery.

3.3 Specification and evaluation of measures

The Board approved the following, in concept, with delayed implementation pending further refinement by the Board and Council.

Adjusting management measures to the ACL

Given uncertainty in MRIP harvest estimates, this approach constitutes a change from the status quo method of annually evaluating recreational fishery performance based only on harvest against the RHL. It allows for a performance evaluation process that better incorporates biological information and efforts to reduce discard mortality into the metrics used for evaluation and management response by evaluating fishery performance against the ACL. This approach integrates information from the 2016 assessment into the management process, enhances the angling experience of the recreational community, improves the reporting of recreational information, and achieves meaningful reductions in discard mortality to better inform management responses to changes in the condition of the resource.

Initially, recreational measures will be specified based on the most current year's projected *harvest* and fishery performance to manage *harvest* in the subsequent year to the regional allocation of the *RHL* (i.e., projected 2017 harvest used to achieve 2018 RHL). Starting at a date to be determined by the Board, measures will be specified based on the most current year's projected *catch* (including harvest and discards) and fishery performance to manage *catch* in the subsequent year to the regional allocation of the *ACL* (e.g.., 2018 projected catch used to achieve 2019 ACL).

For 2018

The states will collectively develop regional proposals for their 2018 management measures, and submit them for Technical Committee review following the Winter Meeting. The Board will then consider approval of the regional proposals. If states within a region are unable to reach consensus on regional proposals, the measures for the region will be specified by the Board, based on guidance from the Technical Committee. States will implement 2018 regional management measures by March 31, 2018.

For a date to be determined by the Board

The states within a region will collectively develop management measures to achieve their regional allocation of the RHL prior to the beginning of the recreational fishing season. The Board may specify provisions of the regional management measures, such as how much they may change (i.e., size limit, possession limit, season length) from year-to-year in order to achieve the regional harvest allocation.

Fishery performance will be evaluated relative to the ACL. If the coastwide ACL is not exceeded in the previous year, states may demonstrate that maintaining current or similar management measures will constrain total catch to the ACL for the following year. This analysis must be prepared before the Joint ASMFC/MAFMC meeting annually scheduled in December to set recreational specifications for the upcoming year.

If the coastwide ACL has been exceeded in the previous year, it will then be evaluated against a 3-year moving average of the ACL. If the ACL overage exceeds the 3-year moving average of the ACL, the states within a region will develop proposals to reduce their recreational management measures (bag, size, and seasonal limits) for the following year, based on available catch data. These adjustments would take into account the performance of the measure and conditions that precipitated the overage.

In addition, states will develop proposals to implement improved data collection and compliance, and reduced discard mortality, for both private anglers and state-permitted for-hire vessels[1] recreationally targeting black sea bass. State proposals will demonstrate that by the 2020 fishing season, significant improvements would be achieved in the following five parameters:

1) Biological sampling (length and weight)
2) Reduction in refusal rates of dockside MRIP intercepts/interviews
3) Discard composition information (i.e., reason discarded, length)
4) Reduction in discarding relative to 2010-2015
5) Improved compliance with management measures

The Board will also annually review progress made by the states regarding achievement of the five parameters addressed by the state proposals to improve data and reduce discards.

[1] Effective March 12, 2018 as federally permitted for-hire vessels are required to submit electronic Vessel Trip Reports (VTRs) electronically and within 48 hours of ending a fishing trip (reporting all trips and all fish). VTRs from federally permitted vessels are required to report all fish kept or discarded (not just fish the vessel is permitted for) and for all fishing-related trips the vessel conducts. http://www.mafmc.org/newsfeed/2017/mid-atlantic-for-hire-vessel-permitting-and-reporting-electronic-only-submission-requirement-starts-march-12-2018

3.4 Timeframe for Addendum provisions

2 years (2018-2019): All of the options selected in Section 3.1 would constitute the management program for 2018. The Board could take action, through a Board vote, to extend the management program as specified in the addendum for one year, expiring at the end of 2019. After 2019, measures would revert back to the FMP status quo of coastwide measures.

4.0 Compliance

The measures contained in Section 3.0 of Addendum XXX are effective March 31, 2018.

Appendix I. Original Allocation Tables

Regional allocation based on exploitable biomass and historical harvest

Table A1: Regional Allocation based on Exploitable Biomass and Historical Harvest for 2006-2015 (this table was updated in February 2018 based on updated data)

Region	Time series average (2006-2015) CPA by Region	Catchability coefficient (q) scaler (For entire time series)	Regional Allocation % under time series 2006-2015		2018 RHL	Regional Allocation under time series 2006-2015 (lbs)		Projected 2017 Harvest (lbs)	% Change from 2017 harvest to 2018 Allocation	Potential Management		
										Min. Size Limit	Bag Limit (# fish)	Season (# of days)
North: MA-NY	1.09 fish per trip	0.0000528	57%		3.66 million pounds	2,087,270		2,496,841	-16.40%	15"	5	102
South: NJ	1.87 fish per trip	0.0001197	43%	78%*		1,574,608	1,228,194	1,413,999	-13.14%	12.5"	w3: 10 w4: 2 w5-6: 15	140
South: DE-NC				22%*			346,414	257,943	34.30%	12.5"	15	238

*Proportion of southern region allocation based on historical harvest

Table A2: Regional Allocation based on Exploitable Biomass and Historical Harvest for 2011-2015 (this table was updated in February 2018 based on updated data)

Region	Time series average (2011-2015) CPA by Region	Catchability coefficient (q) scaler (For entire time series)	Regional Allocation % under time series 2011-2015		2018 RHL	Regional Allocation under time series 2011-2015 (lbs)		Projected 2017 Harvest (lbs)	% Change from 2017 harvest to 2018 Allocation	Potential Management		
										Min. Size Limit	Bag Limit	Season (# of days)
North: MA-NY	1.51 fish per trip	0.0000528	65.7%		3.66 million pounds	2,405,854		2,496,841	-3.64%	15"	5	119
South: NJ	1.78 fish per trip	0.0001197	34.3%	78.5%*		1,256,024	985,979	1,413,999	-30.27%	w3-5: 12.5" w6: 13"	w3: 10 w4: 2 w5-6: 10	127
South: DE-NC				21.5%*			270,045	257,943	4.69%	12.5"	15	206

*Proportion of southern region allocation based on historical harvest

CHARLES E. SCHUMER
NEW YORK

DEMOCRATIC LEADER

United States Senate
WASHINGTON, DC 20510

April 11, 2018

Mr. Wilbur Ross
Secretary
U.S. Department of Commerce
1401 Constitution Ave NW
Washington, DC 20230

Dear Secretary Ross:

I write to express my strong support for the Northern Region's appeal of the Atlantic States Marine Fisheries Commission's (ASMFC) regional allocation of the black sea bass recreational harvest limit (RHL) for 2018. The current black sea bass recreational fishery regulatory regime is unfair, based on poor science, arbitrary and inequitable for the recreational anglers on Long Island and in the state of New York. Therefore, I strongly urge that, based on additional data and estimates that have recently been made available, you approve no harvest reductions to the black sea bass recreational fishery in the Northern Region. This action is grounded in more precise data, can be sustained by the state of the fishery (Black Sea Bass stocks are 240% above the biomass target), will protect New York anglers and keep the management of the fishery consistent with the goals of the Fisheries Management Plan (FMP) agreed upon by the Mid Atlantic Fisheries Management Council (MAFMC) and the ASMFC.

In an April 3rd letter, the ASMFC agreed with the Commissioners from Massachusetts, Rhode Island, Connecticut, and New York's March 16th appeal to the ASMFC Chair that there was reason to reconsider the large harvest reduction for the Northern Region as established in 'Addendum XXX' for recreational black sea bass management. Specifically, while the primary objective of Addendum XXX is to address inequities in recreational black sea bass management, the management approach approved by the ASMFC allows large harvest liberalizations for the Southern Region and the New Jersey Region, while requiring a reduction of approximately 12% from 2017 in the Northern Region. Currently Black Sea Bass stocks are 240% above the biomass target, yet New York anglers have seen decreases in their allotted take for six of the past seven years.

The ASMFC also agreed that since Addendum XXX was passed, additional data had become available that significantly changed past harvest estimates, which served as grounds for reviewing the regional allocations since "…the data presented on New Jersey's harvest estimate was insufficient." Specifically, Marine Recreational Information Program's (MRIP) wave 6 (harvest from November to December) data is now available, as is a revised full-year harvest estimate for New Jersey based on the state's proposal to "smooth" its large wave 3 harvest estimate, which changes New Jersey's initial harvest estimate from 1.4 million pounds to 754,768 pounds. Simply put, with such a significant change in the harvest estimates, it is clear that the data that the ASMFC initially relied upon to make its decision was insufficient and

inadequate, and thus the decision to reduce harvest limits for New York and the rest of the Northern Region should be revisited.

The fishery's stock continues to grow, however the number of fish each New York angler is allowed to take has decreased. In the past, fisherman have been asked to make sacrifices to rebuild stocks; and now that stocks are plentiful, New York anglers are still being asked to make sacrifices based off of insufficient data and decisions that are inconsistent with the FMP. Again, I urge you to swiftly and favorably rule on the pending Northern Region's appeal and approve no reductions to the black sea bass recreational fishery in New York's region due to insufficient data, and the detrimental impact its mismanagement will cause Long Island and New York anglers. Should you have any questions, please do not hesitate to contact my staff.

Sincerely,

Charles E. Schumer
United States Senator

CC
James J. Gilmore, Chair, ASMFC
Mike Luisi, Chair, MAFMC

Atlantic States Marine Fisheries Commission

Business Session

May 3, 2018
10:00 -10:15 a.m.
Arlington, Virginia

Draft Agenda

The order in which these items will be taken is subject to change;
other items may be added as necessary.

1.	Welcome/Introductions (*J. Gilmore*)	10:00 a.m.
2.	Committee Consent • Approval of Agenda	10:00 a.m.
3.	Public Comment	10:05 a.m.
4.	Review Noncompliance Findings, If Necessary (*J. Gilmore*)	10:10 a.m.
5.	Other Business/Adjourn	10:15 a.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

Atlantic States Marine Fisheries Commission

Summer Flounder, Scup, and Black Sea Bass Management Board

May 3, 2018
10:30 – 11:30 a.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order *(B. Ballou)*	10:30 a.m.
2.	Board Consent • Approval of Agenda	10:30 a.m.
3.	Public Comment	10:35 a.m.
4.	Consider ISFMP Policy Board Recommendation Regarding Massachusetts, Rhode Island, Connecticut and New York Addendum XXX Appeal, If Necessary (*T. Kerns*) **Final Action**	10:45 a.m.
5.	Other Business/Adjourn	11:30 a.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW

Summer Flounder, Scup, and Black Sea Bass Management Board
May 3, 2018
10:30 – 11:30 a.m.
Arlington, Virginia

Chair: Bob Ballou (RI) Assumed Chairmanship: 10/17	Technical Committee Chair: Greg Wojcik (CT)	Law Enforcement Committee Representative: Snellbaker (NJ)
Vice Chair: Adam Nowalsky	Advisory Panel Chair: Vacant	Previous Board Meeting: February 8, 2018 and Conference Call on March 20, 2018
Voting Members: NH, MA, RI, CT, NY, NJ, DE, MD, PRFC, VA, NC, NMFS, USFWS (13 votes for Black Sea Bass; 12 votes for Summer Flounder and Scup)		

2. Board Consent

- Approval of Agenda

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Consider ISFMP Policy Board Recommendation Regarding Commonwealth of Virginia Amendment 3 Appeal, If Necessary (10:45-11:30 a.m.) Final Action

Background

- Addendum XXX to the Black Sea Bass FMP was approved in February 2018 (**Policy Board briefing materials**). The Addendum established changes to the management of the recreation black sea bass fishery including regional allocation of the recreational harvest limit based on a hybrid of exploitable biomass and historical harvest information.
- The states of Massachusetts, Rhode Island, Connecticut and New York are appealing the Board's decision in Section 3.1.2.3 of Addendum XXX, timeframe for specifying regional allocation of the black sea bass RHL of the Addendum (**Policy Board briefing materials**).
- Following the Appeal Process (**Policy Board briefing materials**), Commission leadership reviewed the appeal and determined the appeal should be considered by the ISFMP Policy Board under criterion one (decision not consistent with FMP) and parts of criterion three (incorrect application of technical data) (**Policy Board briefing materials**).

• The Policy Board will consider the appeal at the May 3, 2018 meeting and could make a recommendation to the Summer Flounder, Scup, and Black Sea Bass Board for consideration.
Board actions for consideration at this meeting • Consider ISFMP Policy Board Recommendation Regarding Northern Region Addendum XXX Appeal, if necessary

5. Other Business/Adjourn

March 16, 2018

James J. Gilmore, Jr., Chair
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Re: Northern Region Appeal of Black Sea Bass Addendum XXX (recreational management in 2018)

Dear Mr. Gilmore,

The states of Massachusetts, Rhode Island, Connecticut, and New York ("Northern Region") hereby appeal the February 8, 2018 decision of the Summer Flounder, Scup, and Black Sea Bass Management Board ("Management Board") in Section 3.1.2.3 of Addendum XXX, the timeframe for specifying regional allocation of the black sea bass recreational harvest limit ("RHL") in 2018.

Background

Under sections 3.1.2.1 and 3.1.2.2 of the draft addendum, the Management Board unanimously selected regional allocation of the RHL between three regions (MA–NY, NJ, and DE–NC) based on historical exploitable biomass (for the primary split between MA–NY and NJ–NC) and historical recreational harvest (for the secondary split between NJ and DE–NC). Then, under section 3.1.2.3, in a highly divisive action, the Management Board hybridized the 2006–2015 and 2011–2015 timeframe options for calculating regional average exploitable biomass and historical recreational harvest by averaging the regional allocations resulting from the two timeframes.

The vote on the timeframe decision was split north/south, with the four jurisdictions of MA–NY voting against the hybrid approach and the six jurisdictions of NJ–NC voting in its favor. The Northern Region unanimously supported the 2011–2015 timeframe option. MA–NY also voted against the addendum's final approval resulting in another four-vote to six-vote outcome.

Addendum XXX's regional allocations and the implications for 2018 management measures, incorporating updated harvest data that have become available subsequent to the Management Board's decision, are shown in Table 1.

Justification for Appeal

<u>Decision not consistent with FMP (appeal criterion #1)</u>

The primary objective of Addendum XXX is to address inequities in recreational black sea bass management that resulted from the ad hoc regional management approach in the preceding six years.[1] Part of that inequity is that the states of DE–NC were frequently held status quo, while the states of MA–NJ took repeated harvest reductions. These northern cuts even incorporated needed reductions from the south in some years. As a consequence, in 2017, the states of DE–NC had a size limit 2.5" lower and a possession limit 5 to 12 fish greater than the states of MA–NY, plus a season longer than all but one state in the Northern Region.

[1] Addendum XXX statement of the problem: "This approach [ad hoc regional management], while allowing the states flexibility in setting their measures, created discrepancies in conservation measures that were not tied to any original plan baseline or goal (e.g., state allocations). Inequities resulted in how much of a harvest reduction states were addressing through their measures, with no accountability for the effectiveness of regulations. Most visibly, the ad hoc approach did not provide uniformity in measures nor in evaluating harvest reductions."

Contrary to the primary objective to reduce disproportionate impacts on states, the management approach for 2018, approved by the Board via Addendum XXX, exacerbates the inequities by allowing large harvest liberalizations for both the Southern Region (DE–NC) and the NJ Region, while imposing a large harvest reduction for the Northern Region (Table 1). We strongly disagree with—and hereby contest—the final addendum's language that the timeframe-averaging approach "creates a more equitable allocation scheme" than the 2011–2015 timeframe approach.

Table 2 provides the regional allocations and implications for 2018 management measures, incorporating updated harvest data that have become available subsequent to the Management Board's decision, that would have resulted from the selection of the 2011–2015 timeframe (under the exploitable biomass/harvest-based allocation approach). NJ and the Southern Region would still be afforded the opportunity to liberalize in 2018 relative to 2017, albeit at more modest rates. For NJ[2], the harvest increase would be +30.63% instead of +46.71%, and for the Southern Region, +6.83% instead of +21.83%. The Northern Region would still face a reduction in 2018 relative to 2017, but at a rate roughly half of that required under Addendum XXX's allocation (-5.45% vs. -11.71%). These results identify the 2011–2015 timeframe as the more appropriate approach to establish more equitable recreational black sea bass measures for 2018, consistent with the primary objective of the addendum.

The appellant states remain committed to the tenet of cooperation that is central to the ASMFC's stewardship of our shared fishery resources. We (and NJ) exhibited this during the six years of ad hoc regional management when we frequently accepted regional harvest reductions that subsidized the management measures allowed for the southern region. The appellant states again demonstrated our willingness to compromise as we worked through sections 3.1.2.1 and 3.1.2.2 of the draft addendum. We recognized that the two-region (MA–NJ & DE–NC) harvest-based allocation option would have provided the most liberal measures possible for MA–NY (regardless of the timeframe selected), a fact that was not overlooked by many of our stakeholders who supported it; yet we looked past this option because of the major impact it would have had on NJ. We also looked past the three-region harvest-based allocation option to support the three-region exploitable biomass-based allocation option, despite the larger percent allocation afforded by the former, because we supported the progressive management approach afforded by the latter. We had hoped that our southern partners would have seen fit to act in this same spirit of compromise by supporting the 2011–2015 timeframe approach.

The equity issue, as set forth in Addendum XXX, has both an inter- and intra-regional component. We have already spoken to the inconsistency of the Board's decision with regard to inter-regional equity. We also note that the larger reduction imposed on the Northern Region makes it exceedingly more difficult for MA–NY to select regulations that achieve intra-regional equity (more on this under appeal criterion #5). Actions such as intra-regional adjustments can be better accommodated when regional harvest reductions, if necessary, are held to modest levels.

<u>Decision not consistent with FMP (appeal criterion #1)</u>

By affording NJ and the Southern Region the opportunity to liberalize, significantly, in 2018, and by requiring the Northern Region to reduce, significantly, in 2018, Addendum XXX is also inconsistent with nearly all objectives of the Fishery Management Plan (FMP).[3]

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[2] The calculation for NJ assumes the Management Board will approve the state's proposal to smooth its large 2017 wave 3 harvest estimate. Otherwise, the effect on NJ of the 2011–2015 timeframe would be a -12.89% reduction instead of a -2.17% reduction.

[3] Amendment 12 Objectives:

- Reduce fishing mortality in the summer flounder, scup, and black sea bass fishery to assume that overfishing does not occur.
- Reduce fishing mortality on immature summer flounder, scup, and black sea bass to increase spawning stock biomass.

The 2016 Benchmark Stock Assessment, which provides estimates of fishing mortality (and other metrics) on a regional basis (MA–NY, NJ–NC), indicates that overfishing is occurring in the southern sub-unit (retro adjusted F of 0.39 in 2015, compared to F_{MSY} proxy of 0.36). A large harvest increase for the southern sub-unit is inconsistent with the FMP objective to assure that overfishing does not occur.

Meanwhile, the northern sub-unit is fishing well below the F_{MSY} proxy (northern retro adjusted F of 0.14). Another harvest reduction for the north is inconsistent with the FMP objective to improve yield from the fishery. The more restrictive measures in the north are effectively subsidizing the more liberal measures in the south. Additionally, too much of the north's fishing mortality rate is resulting from discard mortality due to the misalignment between plentiful stock status and draconian regulations.

Another large harvest reduction for the Northern Region will also force state waters regulations for MA–NY that are even further away from being compatible with federal waters regulations, another FMP objective. While the majority of recreational black sea bass landings in MA–NY are caught in state waters, for some of the northern states in some years, harvest from federal waters is high, ranging up to 50 percent of total landings. It's been seven years since recreational anglers and for-hire operators in MA–NY have been subject to uniform state and federal regulations, which would promote uniform and effective enforcement of regulations, another FMP objective. Of note, the process for selecting the federal waters measures this year deferred to the Addendum XXX process for determining the Southern Region's regulations first, meaning that the federal waters measures can be aligned with the state waters regulations for DE–NC regardless of the specific allocation that Addendum XXX sets for the region.

Lastly, the larger the harvest cut required of the Northern Region the greater the need for MA–NY to implement increasingly complex regulations to try to meet the needs of various stakeholder groups as best as possible. In prior years, this has included sector-specific possession limits, season-specific possession limits, and in-season closures, none of which promote uniform and effective enforcement of regulations, or meet the additional FMP objective to minimize regulations.

<u>Insufficient/inaccurate/incorrect application of technical information (appeal criterion #3)</u>

At the time of the Management Board's decisions on Addendum XXX, only waves 1–5 MRIP harvest estimates were available for 2017, necessitating the incorporation of a wave 6 projection to evaluate the potential management effect of the various allocation alternatives in 2018. Since then, additional 2017 harvest information has become available that dramatically alters the management implications, rendering the information that was available to the Management Board insufficient for decision-making.

Now available are preliminary full-year 2017 harvest estimates from MRIP, as well as a revised 2017 harvest estimate for NJ based on the state's proposal to smooth its large wave 3 MRIP harvest estimate. Replacing the wave 6 projections with the wave 6 harvest estimates has the following effect on the full-year harvest estimates: Northern Region +1.9% (from 2,496,841 to 2,544,638 pounds), NJ -19.9% (from 1,413,999 to 1,131,943 pounds), and Southern Region -2.0% (from 257,943 to 252,783 pounds). NJ's full-year harvest estimate is reduced another -33.3% under its proposed, smoothed harvest estimate of 754,768 pounds.

- Improve yield from these fisheries.
- Promote compatible management regulations between state and federal jurisdictions.
- Promote uniform and effective enforcement of regulations.
- Minimize regulations to achieve the management objectives stated above.

Tables 3 and 4 provide the projected management implications of the 2011–2015 timeframe option and the timeframe-averaging approach that were before the Management Board at the February 8 meeting. We highlight the highly variable implications for NJ as confirmation that the Management Board had insufficient information to determine the appropriate timeframe. The projected outcome of the 2011–2015 timeframe included a -30.27% harvest reduction for NJ (Table 3), which the Board's averaging approach reduced to a projected -21.69% harvest reduction (Table 4). Based on NJ's revised 2017 harvest estimate, the state stands to liberalize +46.71% under the timeframe averaging approach (Table 1), but still a very generous +30.63% under the 2011–2015 timeframe (Table 2).

Less dramatic but still notable are the effects on the Northern and Southern Regions. The Management Board knowingly adopted an option with a projected -10.02% reduction for the beleaguered Northern Region (Table 4), which grows to a -11.71% reduction using the updated information (Table 1), but could be reduced to a -5.45% reduction under the updated 2011–2015 timeframe (Table 2). Meanwhile, the updated 2011–2015 timeframe option would still provide a +6.83% increase to the Southern Region (Table 2), larger than the projected +4.69% increase considered by the Management Board (Table 3).

Insufficient/inaccurate/incorrect application of technical information (appeal criterion #3)

The southern states' argument for the need to include 2006–2010 in the timeframe for determining allocation was predominantly based on the influence of the 2011 year class on the north's black sea bass population (and not the south's) and the expectation for a strong 2015 year class in the southern sub-unit. The contention that the Northern Region's current availability of black sea bass is a year-class effect ignores the best available science.

The results of the peer-review accepted 2016 Benchmark Stock Assessment depict an increasing trend in northern sub-unit biomass beginning well before 2011 (Figure 1). Since the mid-1990s, northern region exploitable biomass has been on a steady positive trajectory from below 1,000 metric tons (mt) to over 15,000 mt in 2015 (22,340 mt after retrospective adjustment). Meanwhile, the southern sub-unit's biomass has fluctuated around 4,000 mt, increasing to about 5,000 mt in 2015 (3,336 mt after retrospective adjustment). By 2015, 87% of the exploitable biomass[4] is estimated to be in the states from NY north, nearly matching the 84% of the coastwide recreational harvest (in pounds) attributed to MA–NY that year. Yet, under Addendum XXX, the recreational allocation provided to the Northern Region is just 61.35%. (On a separate but related issue, the commercial quotas allocated to the states from NY north total just 33% of the coastwide quota, despite the species' aforementioned current distribution.)

Increased black sea bass abundance and availability in the north is consistent with a growing resource and expanded age structure, and with the growing body of scientific research supporting a northward shift in the species' distribution caused by climate change (i.e., increasing water temperature).[5] Sixteen years ago, Amendment 13 to the FMP identified "a shift in abundance of black sea bass to the north" as a potential factor affecting the shift in landings to the north. We are not aware of any research that suggests this poleward shift—reflected by the science and highlighted by the FMP—will diminish or change direction in the near or distant future.

[4] After adjustments for retrospective bias.

[5] e.g., 1) Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, Griffis RB, et al. (2016). A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf. PLoS ONE 11(2): e0146756. doi:10.1371/journal.pone.0146756. 2) Bell, R. J., Richardson, D. E., Hare, J. A., Lynch, P. D., and Fratantoni, P. S. Disentangling the effects of climate, abundance, and size on the distribution of marine fish: an example based on four stocks from the Northeast US shelf. – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsu217.

Given the unidirectional shift in distribution, it stands to reason that application of the most recent years' data in an allocation decision is the most appropriate approach—particularly when it can be done without imposing disproportionate impacts throughout the range (in this case, NJ and DE–NC still having liberalizations). Addendum XXX must be viewed in the context of an evolving management system aimed at addressing the northward shift in the black sea bass resource by adjusting the recreational targets and commercial allocations accordingly. Viewed in this way, the Management Board's decision falls short and is out-of-synch with the direction of the Commission's management program.

The southern states have pointed to indications of a 2015 year class that is strong in their region as justification for a higher allocation to the south. State survey data from the Northern Region indicate that the 2015 year class is also exceptionally strong in the north (Figures 2–4). Interestingly, this trend was not evident in the NJ and VA surveys, according to the Northeast Fisheries Science Center's July 2017 data update on black sea bass. Consider also that the 2016 Benchmark Stock Assessment estimates that the south sub-unit's peak recruitment event occurred with the 1999 cohort. This led to the area's highest exploitable biomass estimates the following two years at a level (roughly 7,000 mt) that the north subunit achieved prior to the 2011 cohort's influence.

In addition, when the Mid-Atlantic Council's Scientific & Statistical Committee last provided its catch advice to the Council and Management Board, there was great uncertainty regarding the status and strength of the 2015 year class. That source of uncertainty is a key factor affecting the lower recreational (and commercial) ACLs in 2018 relative to 2017. If in fact the 2015 year class is as strong as it now appears to be, there may be no biological basis for imposing any reductions in the recreational fishery in any areas in 2018.

Management actions resulting in unforeseen circumstances/impacts (appeal criterion #5)

The Northern Region states have convened to determine the management measures within our region needed to meet the -11.7% reduction in harvest for the region imposed by Addendum XXX. The addendum requires adoption of a set of regional measures that would achieve the regional allocation; from those measures, the states can flex their state-specific measures, within bounds, to establish conservationally equivalent state regulatory programs.

From the onset, it was recognized that the unduly small allocation afforded the Northern Region would have a major, negative impact on the states' efforts to meet the requirements of the addendum. This is borne out by the extremely onerous regulatory standard that has emerged from our efforts: a 4-fish bag limit, 15" minimum size, and 119-day season, running from mid-June to mid-October. It was also understood that this regulatory standard approach would prove highly challenging in our efforts to evenly distribute the Northern Region's required reduction. Indeed, it appears that one state, Connecticut, will be forced to incur a -28% reduction in harvest in 2018 in order to enable the Northern Region to achieve the -11.7% regional reduction and uphold the regulatory standard requirements set forth by Addendum XXX. CT views this as an unforeseen and disproportionate impact. The required reduction and associated impact for CT would be lessened considerably if the 2011–2015 timeframe were implemented.

Corrective Action

Because of the uneven impacts to the regions linked to the timeframe options, and because there are more southern states than northern states on the Management Board, the Northern Region states hereby request reconsideration of the timeframe decision by the ISFMP Policy Board. Such review—by a Board whose membership includes unaffected jurisdictions—is necessary to assess a fair and equitable outcome for all states within the management unit. Based on the ample justification for adopting the 2011–2015 timeframe for regional allocation of the RHL (using the combined

exploitable biomass/harvest approach), as outlined herein, the Northern Region states urge the Policy Board to grant this appeal and to call upon the Management Board to adjust Addendum XXX accordingly. Future utility of the resource-distribution-based approach set forth in the addendum will require the use of the most current data to update the allocation formula in response to new stock assessment results. Inclusion (and averaging) of additional historical years is counter to this progressive management approach.

In addition, the Northern Region requests a Policy Board directive to the Management Board to initiate an addendum or amendment to manage the black sea bass resource by its two areal sub-units. The best available science (the 2016 Benchmark Stock Assessment) supports a sound, science-based management framework (i.e., regional management based on regional reference points) that may not otherwise be advanced given the voting membership of the Management Board. We are concerned that the Management Board's decision on Addendum XXX's timeframe option is synoptic of a larger management issue that needs to be put on a path towards resolution.

We are unaware of other options to gain relief at the Management Board level and commit to complying with the findings of the Policy Board, subject to our right to take further action beyond the ASMFC to seek relief.

Sincerely yours,

Massachusetts Commissioners

Dr. David E. Pierce | Raymond W. Kane | Representative Sarah K. Peake

Rhode Island Commissioners

Jason McNamee | David V.D. Borden | Senator V. Susan Sosnowski

Connecticut Commissioners

Mark Alexander | Dr. Lance L. Stewart | Senator Craig A. Miner

New York Commissioners

James J. Gilmore, Jr. | Emerson C. Hasbrouck, Jr. | Senator Philip M. Boyle

Cc: Robert Beal, Toni Kerns (ASMFC)

Table 1. Addendum XXX Outcome, Using Updated 2017 Harvest Data

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Preliminary 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	61.35%	3.66 million pounds	2,246,562	2,544,638	-11.71%
South: NJ	30.24%		1,107,352	754,768	+46.71%
South: DE-NC	8.41%		307,964	252,783	+21.83%

***** Preliminary full-year 2017 harvest as estimated by MRIP waves 1–6, with NJ's wave 3 harvest estimate smoothed as proposed by the state. Without smoothing, NJ's preliminary 2017 harvest estimate is 1,131,943 pounds, resulting in a -2.17% reduction in 2018.

Table 2. 2011–2015 Timeframe Outcome, Using Updated 2017 Harvest Data

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Preliminary 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	65.79%	3.66 million pounds	2,405,854	2,544,638	-5.45%
South: NJ	26.85%		985,979	754,768	+30.63%
South: DE-NC	7.36%		270,045	252,783	+6.83%

***** Preliminary full-year 2017 harvest as estimated by MRIP waves 1–6, with NJ's wave 3 harvest estimate smoothed as proposed by the state. Without smoothing, NJ's preliminary 2017 harvest estimate is 1,131,943 pounds, resulting in a -12.89% reduction in 2018.

Table 3. Projected Outcome of the 2011–2015 Timeframe in Draft Addendum XXX

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Projected 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	65.7%	3.66 million pounds	2,405,854	2,496,841	-3.64%
South: NJ	26.9%		985,979	1,413,999	-30.27%
South: DE-NC	7.4%		270,045	257,943	+4.69%

* Projected 2017 harvest estimates based on MRIP waves 1-5 plus a wave 6 projection, and no smoothing of NJ's wave 3 harvest estimate.

Table 4. Projected Outcome of the Timeframe Averaging Approach When Adopted by the Management Board

Region	Regional Allocation %	2018 RHL	2018 Regional Allocation (lbs)	Projected 2017 Harvest (lbs)*	% Change from 2017 Harvest to 2018 Allocation
North: MA-NY	61.35%	3.66 million pounds	2,246,562	2,496,841	-10.02%
South: NJ	30.24%		1,107,352	1,413,999	-21.69%
South: DE-NC	8.41%		307,964	257,943	+19.39%

* Projected 2017 harvest estimates based on MRIP waves 1-5 plus a wave 6 projection, and no smoothing of NJ's wave 3 harvest estimate.

Figure 1. Comparison of North sub-unit (left) and South sub-unit (right) exploitable biomass estimated by the 2016 Benchmark Stock Assessment. Note the difference in y-axis scale and the increasing trend in the north preceding the 2011 year class.

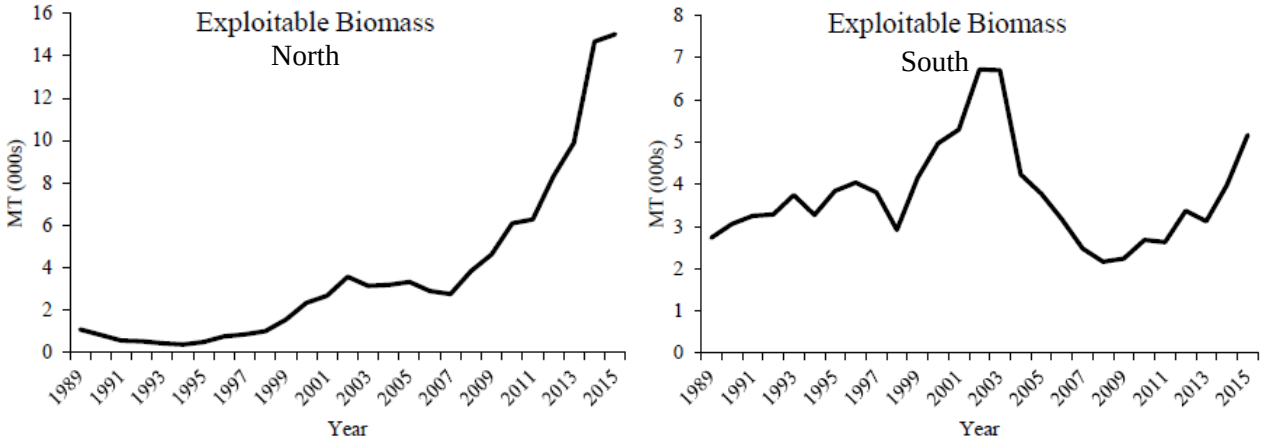


Figure 2. Massachusetts spring trawl survey stratified mean number per tow at age-1, indicating a strong 2015 year class recruiting to the population as age-1 in 2016.

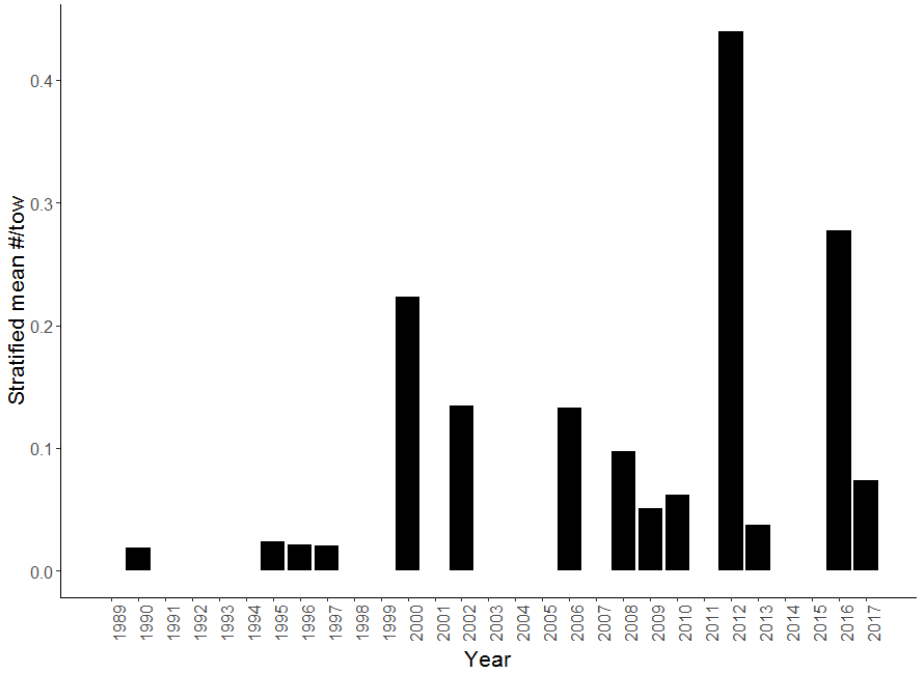


Figure 3. Rhode Island spring trawl survey mean number per tow at age-1, indicating a strong 2015 year class recruiting to the populations as age-1 in 2016.

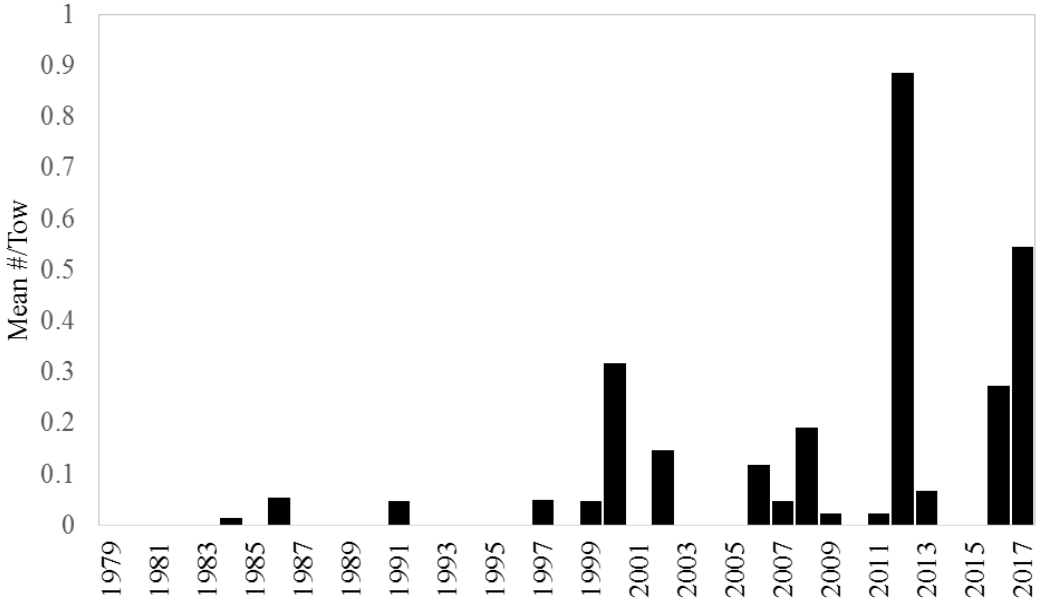
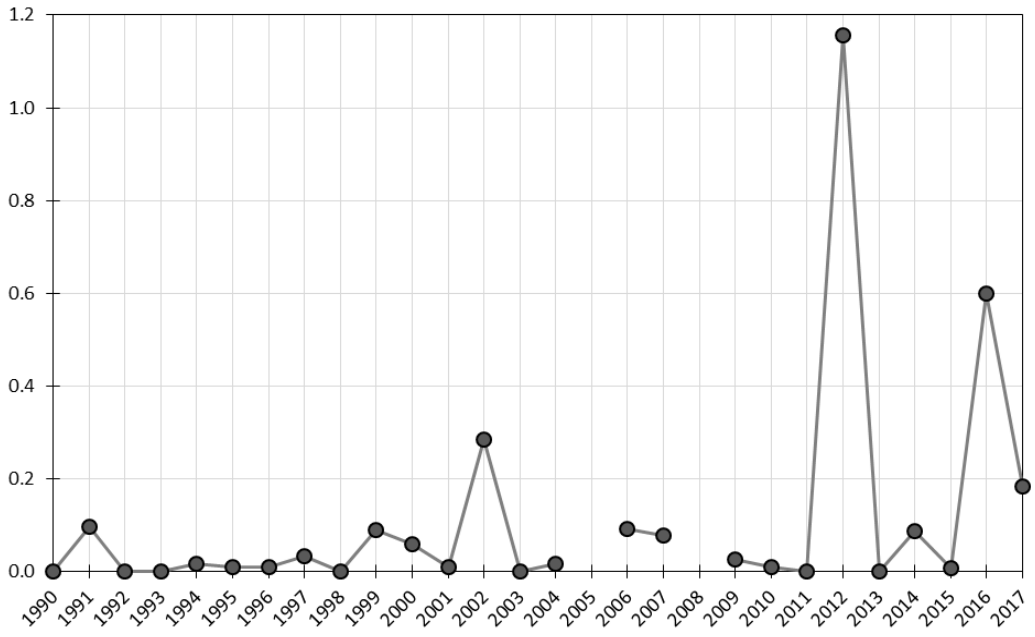


Figure 4. New York small mesh trawl survey mean number per tow at age-1, indicating a strong 2015 year class recruiting to the population as age-1 in 2016.



t nt c St te r ne F er e omm on
1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

James J. Gilmore, Jr. (NY), Chair *Patrick Keliher (ME), Vice-Chair* *Robert E. Beal, Executive Director*

Vision: Sustainably Managing Atlantic Coastal Fisheries

April 3, 2018

David Pierce
Director
MA DMF
251 Causeway Street #400
Boston, Massachusetts 02114

Peter Aarrestad
Director
Fisheries Division CT DEEP
79 Elm Street, 6th Floor
Hartford, Connecticut 06106

Jason McNamee
Chief, Marine Resource Management
RIDEM
3 Fort Wetherill Road
Jamestown, Rhode Island 02835

James Gilmore
Director
NYS DEC Division of Marine Resources
205 N. Belle Mead Road, Suite 1
East Setauket, New York 11733

Dear Dr. Pierce, Mr. McNamee, Mr. Aarrestad and Mr. Gilmore:

This letter responds to the March 16, 2018 appeal by the Commonwealth of Massachusetts and the States of Rhode Island, Connecticut and New York (Northern Region) regarding of the Atlantic States Marine Fisheries Commission's (Commission) approval of Addendum XXX (Addendum) to the Summer Flounder, Scup and Black Sea Bass Interstate Fishery Management Plan (FMP). On March 23, 2018, in accordance with the appeals process, a conference call of the Commission's Vice-Chair Pat Keliher, past Chair Doug Grout and Robert Boyles, proxy for Chairman Gilmore, as he is appellant (Leadership), and staff was convened to review the Northern Region appeal. The purpose of the review was to assess the issues the Northern Region raises in its appeal and to determine whether those issues are of the type and substantiality that warrants review by the Interstate Fisheries Management Program (ISFMP) Policy Board.

During the call, it was determined the appeal did meet the qualifying guidelines and, thus, could be forwarded to the ISFMP Policy Board for consideration under appeal criterion one (decision not consistent with FMP) and parts of criterion three (incorrect application of technical data). However, Leadership did not find the appeal met the qualifying guidelines for criterion five (unforeseen circumstances/impacts).

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The appeal referenced criterion one, "Decision not consistent with the FMP." Under this criterion, the appeal argues two points: (1) the allocation method fails to meet the primary goal of the addendum to reduce disproportionate impacts on the states and (2) the significant

reduction required is inconsistent with nearly all objectives of the FMP. See letter from Northern Region Commissioners to ASMFC Chair James J. Gilmore, pp. 2-3 (March 16, 2018).

Leadership concluded the states presented sufficient evidence in their claim to allow for the Policy Board to further consider the Northern Regions claim under criterion one.

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The appeal cited criterion three, "Insufficient/Inaccurate/Incorrect Application of Technical Information." Under this criterion, the appeal states wave 6 data was not available when the Summer Flounder, Scup and Black Sea Bass Management Board (Board) approved the addendum. Further, since approval of the addendum, additional 2017 harvest information became available that dramatically altered the management implications. The appeal also claims the Board's contention that the Northern Region's current availability of black sea bass is a year-class effect ignores the best availability science, which is an insufficient application of the technical information. See letter from Northern Region Commissioners to ASMFC Chair James J. Gilmore, pp. 3-5 (March 16, 2018).

Routinely, the Board has made management decisions on available wave data, setting specifications based on projected wave 6 data. 2017 was not an anomaly in the management process. Leadership found the exclusion of wave 6 data alone does not meet the appeal criterion for insufficient/inaccurate/incorrect data. However, the significant change in New Jersey's harvest estimate from 1.4 million pounds to 754,768 pounds due to the smoothing of data does meet the criterion. Specifically, in making its decision, the Board considered one data point (New Jersey's preliminary harvest estimate) without any indication or discussion about how that data point might change after smoothing. Based on this, Leadership concludes there are grounds for an appeal because the data presented on New Jersey's harvest estimate was insufficient.

Leadership concludes the Northern Region presented sufficient evidence in the appeal to allow for the Policy Board to further consider the claim that the Board ignored the best available science. The appeal presents that the southern states argued the high availability of black sea bass in the north is predominately based on a single year class (2011), which the claim contests is not based on the best available science under criterion 3. Leadership recognizes as black sea bass distributions shift management strategies become more complex. Shifts in the distribution and productivity of stock will likely cause ecological and economic disruptions. As environmental conditions change, the Board may need to revisit, as necessary, the underlying conservation goals and objectives of the FMP.

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The appeal letter cites criterion five, "Unforeseen circumstance/impacts." The appeal claims Connecticut will be forced to take a much greater reduction than the other states within the region. The appeal presents this as an unforeseen and disproportionate impact.

The draft addendum presented a wide range of management options, including example measures, for consideration by the Board. Examples presented in the document had similar changes in magnitude as the Northern Region's current regulatory standard, in addition to options that would have required a larger reduction for Connecticut. These options were likely not ones the state would have voted in favor of, but by inclusion in the draft there was opportunity for the state to consider the impact it would have in comparison to the 2017 regulations based on the example measures provided by staff at the Board meeting. While Leadership agrees Connecticut's reduction is larger than the other states, Leadership does not find this unforeseen.

In light of these findings, Leadership finds there are grounds for the appeal to be considered by the ISFMP Policy Board under two of the three criteria advanced in the Northern Region's letter, specifically criteria one and three. Leadership concludes it is appropriate to provide the Northern Region an opportunity to present its appeal on this issue to the ISFMP Policy Board on May 3, 2018. During that meeting, the ISFMP Director will present background on the Addendum and the Board's justification for its actions. Following this presentation, the Commissioners from the Northern Region will be provided 20 minutes to present their rationale for the appeal and their suggested resolution of the issue. The ISFMP Policy Board will then be provided an opportunity to discuss the issue, consider the corrective action requested by the states, and decide what issues, if any, should be remanded back to the Summer Flounder, Scup and Black Sea Bass Board for corrective action. No public comment will be taken in connection with the appeal.

Thank you for the continued partnership and commitment to the Commission process and actions.

Sincerely,

Patrick Keliher

cc: Raymond Kane, Rep. Sarah Peake, David Borden, Sen. Susan Sosnowski, Dr. Lance Stewart, Sen. Craig Miner, Emerson Hasbrouck, Jr., Sen. Philip Boyle Interstate Fisheries Management Program Policy Board

L18-017

CHARLES E. SCHUMER
NEW YORK

DEMOCRATIC LEADER

United States Senate
WASHINGTON, DC 20510

April 11, 2018

Mr. Wilbur Ross
Secretary
U.S. Department of Commerce
1401 Constitution Ave NW
Washington, DC 20230

Dear Secretary Ross:

I write to express my strong support for the Northern Region's appeal of the Atlantic States Marine Fisheries Commission's (ASMFC) regional allocation of the black sea bass recreational harvest limit (RHL) for 2018. The current black sea bass recreational fishery regulatory regime is unfair, based on poor science, arbitrary and inequitable for the recreational anglers on Long Island and in the state of New York. Therefore, I strongly urge that, based on additional data and estimates that have recently been made available, you approve no harvest reductions to the black sea bass recreational fishery in the Northern Region. This action is grounded in more precise data, can be sustained by the state of the fishery (Black Sea Bass stocks are 240% above the biomass target), will protect New York anglers and keep the management of the fishery consistent with the goals of the Fisheries Management Plan (FMP) agreed upon by the Mid Atlantic Fisheries Management Council (MAFMC) and the ASMFC.

In an April 3rd letter, the ASMFC agreed with the Commissioners from Massachusetts, Rhode Island, Connecticut, and New York's March 16th appeal to the ASMFC Chair that there was reason to reconsider the large harvest reduction for the Northern Region as established in 'Addendum XXX' for recreational black sea bass management. Specifically, while the primary objective of Addendum XXX is to address inequities in recreational black sea bass management, the management approach approved by the ASMFC allows large harvest liberalizations for the Southern Region and the New Jersey Region, while requiring a reduction of approximately 12% from 2017 in the Northern Region. Currently Black Sea Bass stocks are 240% above the biomass target, yet New York anglers have seen decreases in their allotted take for six of the past seven years.

The ASMFC also agreed that since Addendum XXX was passed, additional data had become available that significantly changed past harvest estimates, which served as grounds for reviewing the regional allocations since "…the data presented on New Jersey's harvest estimate was insufficient." Specifically, Marine Recreational Information Program's (MRIP) wave 6 (harvest from November to December) data is now available, as is a revised full-year harvest estimate for New Jersey based on the state's proposal to "smooth" its large wave 3 harvest estimate, which changes New Jersey's initial harvest estimate from 1.4 million pounds to 754,768 pounds. Simply put, with such a significant change in the harvest estimates, it is clear that the data that the ASMFC initially relied upon to make its decision was insufficient and

inadequate, and thus the decision to reduce harvest limits for New York and the rest of the Northern Region should be revisited.

The fishery's stock continues to grow, however the number of fish each New York angler is allowed to take has decreased. In the past, fisherman have been asked to make sacrifices to rebuild stocks; and now that stocks are plentiful, New York anglers are still being asked to make sacrifices based off of insufficient data and decisions that are inconsistent with the FMP. Again, I urge you to swiftly and favorably rule on the pending Northern Region's appeal and approve no reductions to the black sea bass recreational fishery in New York's region due to insufficient data, and the detrimental impact its mismanagement will cause Long Island and New York anglers. Should you have any questions, please do not hesitate to contact my staff.

Sincerely,

Charles E. Schumer
United States Senator

CC
James J. Gilmore, Chair, ASMFC
Mike Luisi, Chair, MAFMC

Atlantic States Marine Fisheries Commission

South Atlantic State/Federal Fisheries Management Board

May 3, 2018
11:45 a.m. – 2:15 p.m.
Arlington, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order (*P. Geer*)	11:45 a.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from February 2018	11:45 a.m.
3.	Public Comment	11:50 a.m.
4.	Addendum I to the Black Drum Fishery Management Plan for Final Approval (*M. Schmidtke*) **Final Action** • Review Options and Public Comment Summary • Review Committee Reports • Consider Final Approval of Addendum I	12:00 p.m.
5.	Lunch	12:30 p.m.
6.	Consider Management Action Based on Technical Committee/Plan Review Team Recommended Updates to the Annual Traffic Light Analyses for Atlantic Croaker and Spot (*M. Schmidtke*) **Possible Action**	1:00 p.m.
7.	Updates on SEDAR 58 Cobia Stock Identification Workshop and Board Tasking of Cobia Technical Committee from February 2018 (*M. Schmidtke*)	1:30 p.m.
8.	Review Draft Terms of Reference and Schedule for the SEDAR 58 Atlantic Cobia Stock Assessment (*M. Schmidtke*)	1:40 p.m.
9.	Discuss Questions from the South Atlantic Fishery Management Council Regarding Possible Transfer of the Atlantic Migratory Group Cobia Fishery Management (*M. Schmidtke*)	1:45 p.m.
10.	Other Business/Adjourn	2:15 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia 22202; 703.486.1111

MEETING OVERVIEW

South Atlantic State/Federal Fisheries Management Board Meeting
Thursday, May 3, 2018
11:45 – 2:15 p.m.
Arlington, Virginia

Chair: Pat Geer (GA) Assumed Chairmanship: 02/18	Technical Committee (TC) Chairs: Atlantic Croaker: Chris McDonough (SC) Black Drum: Harry Rickabaugh (MD) Cobia: Steve Poland (NC)	Law Enforcement Committee Representative: Capt. Bob Lynn (GA)
Vice Chair: Vacant	Advisory Panel Chair: Tom Powers (VA)	Previous Board Meeting: February 7, 2018
Voting Members: NJ, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS, SAFMC (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from February 7, 2018

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Addendum I to the Black Drum Fishery Management Plan (FMP) for Final Approval (12:00 – 12:30 p.m.) Final Action

Background

- In October, 2017, the Board initiated an Addendum that would allow Maryland's commercial fishery for black drum to be re-opened in the Chesapeake Bay.
- In February, 2018, the Board approved Draft Addendum I to be distributed for Public Comment. (**Briefing Materials**)
- Written comments were received through March 23, 2018, and a public hearing was held in Maryland. (**Briefing Materials**)

Presentations

- Summary of Draft Addendum I and Public Comment by M. Schmidtke

Board actions for consideration at this meeting

- Consider final approval of Draft Addendum I to the Black Drum FMP.

5. Lunch (12:30-1:00 p.m.)

6. Consider Management Action Based on Technical Committee/Plan Review Team Report on Recommended Updates to the Annual Traffic Light Analyses (TLA) for Atlantic Croaker and Spot (1:00 – 1:30 p.m.) Possible Action

Background

- In May, 2017, the Board directed the Atlantic Croaker TC and Spot Plan Review Team (PRT) to conduct exploratory analyses to potentially incorporate additional indices and adjustments into the TLAs for Atlantic croaker and spot.
- The TC/PRT submitted a memo listing recommended updates for each TLA in February, 2018. (**Briefing Materials**)
- In February, 2018, the Board decided to postpone action related to this memo until the May meeting.

Presentations

- Summary of TC/PRT Recommended Updates to Atlantic Croaker and Spot TLAs by M. Schmidtke

Board actions for consideration at this meeting

- Consider use of the TC/PRT-recommended updates to the annual TLAs.

7. Updates on SEDAR 58 Cobia Stock Identification Workshop and Board Tasking of Cobia TC from February 2018 (1:30 – 1:40 p.m.)

Background

- In April, 2018, a Cobia Stock Identification Workshop was held in Charleston, SC. This workshop evaluated the boundary between the Gulf of Mexico and Atlantic stocks, which is currently at the Georgia-Florida border. Preliminary results of the workshop do not refute this boundary.
- In February, 2018, the Board tasked the TC with evaluating the best method by which to determine the harvest impact of management measures. The TC met via conference call in April, 2018, to discuss an approach and timeline for accomplishing this task.

8. Review Draft Terms of Reference and Schedule for the SEDAR 58 Atlantic Cobia Stock Assessment (1:40-1:45 p.m.)

Background

- Beginning in fall of 2018, a benchmark stock assessment of Atlantic cobia will be conducted through the SEDAR process. Draft terms of reference and a proposed schedule for this assessment have been developed. (**Briefing Materials**)
- As a partner in Atlantic cobia management, the Commission is able to review and recommend edits to the draft terms of reference and schedule.

9. Discuss Questions from the South Atlantic Fishery Management Council Regarding Possible Transfer of the Atlantic Migratory Group Cobia Fishery Management (1:45 – 2:15 p.m.)

Background

- In March, 2018, the South Atlantic Fishery Management Council (SAFMC) sent a letter to the Commission requesting information on how the Commission would request Atlantic cobia be managed in federal waters upon approval of Amendment 31 to the SAFMC's Coastal Migratory Pelagics (CMP) FMP, which would remove Atlantic cobia from the CMP FMP. (**Briefing Materials**)
- The Commission has replied with a letter stating that the SAFMC's questions will be discussed at the May meeting, with a formal reply from the Commission being made available to SAFMC prior to their June 2018 meeting. (**Briefing Materials**)

10. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SOUTH ATLANTIC STATE/FEDERAL FISHERIES MANAGEMENT BOARD

The Westin Crystal City
Arlington, Virginia
February 7, 2018

Draft Proceedings of the South Atlantic State/Federal Fisheries Management Board Meeting
February 2018

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February 2018

ATTENDANCE

BOARD MEMBERS

Heather Corbett, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Roy Miller, DE (GA)
John Clark, DE, proxy for David Saveikas (AA)
Craig Pugh, DE, proxy for Rep. William Carson (LA)
Rachel Dean, MD (GA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Lynn Fegley, MD, proxy for D. Blazer (AA)
John Bull, VA (AA)
Joe Cimino, VA, Administrative proxy
Cathy Davenport, VA (GA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
David Bush, NC, proxy for Rep. Steinburg (LA)
Doug Brady, NC (GA)
Steve Murphy, NC (AA)
Michelle Duval, NC, Administrative proxy
Robert Boyles, SC (AA)
Ross Self, SC, proxy for Sen. Cromer (LA)
Patrick Geer, GA, proxy for Rep. Nimmer (LA)
Spud Woodward, GA (AA)
Doug Haymans, GA (GA)
Jim Estes, FL, proxy for J. McCawley (AA)
Marty Gary, PRFC
Wilson Laney, USFWS
Roy Crabtree, NMFS
John Carmichael, SAFMC

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Steve Poland, Cobia Technical Committee Chair
Chris McDonough, Atl. Croaker Technical Committee Chair

Staff

Toni Kerns
Robert Beal
Mike Schmidtke

Guests

Rachel Baker, NOAA
James French, VA
Joseph Gordon, PEW
Bill Gorham, Southern Shores, NC
Angela Giuliano, MD DNR

The South Atlantic State/Federal Fisheries Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Wednesday February 7, 2018, and was called to order at 12:45 o'clock p.m. by Chairman Pat Geer.

CALL TO ORDER

CHAIRMAN PAT GEER: (Meeting in progress) Additions to the agenda at this time. I would like to recommend one at the end of the meeting to discuss a Vice-Chair. Maybe if somebody is eager to jump up and do it that's great; otherwise we're going to have to get a Vice-Chair at some point by the next meeting. Toni says just to do it next time, okay never mind.

All right we won't have to do that so no additions to the agenda.

APPROVAL OF PROCEEDINGS

CHAIRMAN GEER: As far as the approval of the proceedings from the October, '17 meeting, are there any changes to that? Hearing none; we'll consider by consent that the agenda and the proceedings are approved. Is there anybody who wants to speak from the general public about issues not on the agenda? I saw one hand. There will be an opportunity to speak on the issues themselves; so we'll let you come up at that time.

PUBLIC COMMENT

CHAIRMAN GEER: Things that are not on the agenda, I don't see anybody.

CONSIDER THE APPROVAL OF STATE IMPLEMENTATION PLANS FOR THE INTERSTATE COBIA FMP

CHAIRMAN GEER: Moving on, the fourth item on the agenda is to consider the Approval of State Implementation Plans for the Interstate Cobia FMP. We're going to do a final action today.

TECHNICAL COMMITTEE REPORT

CHAIRMAN GEER: The Technical Committee, Steve Poland is going to give the report; and that starts on Page 42 of the supplemental document that we have if you want to follow through, it's in there. Steve you have the floor.

MR. STEPHEN POLAND: This is the first time I've had a chance to address the South Atlantic Board; so my name is Steve Poland. I'm a fisheries biologist with the North Carolina Division of Marine Fisheries; and I am the first unfortunate soul to be anointed with the cobia TC Chair responsibility.

Today I'll just real quickly review the requirements in the Interstate Fisheries Management Plan for cobia; and review the Technical Committee guidelines that the TC developed when reviewing state implementation plans. Then review each states implementation plan; starting with de minimis states and then getting into the states that have more of a stake in the fishery.

The Interstate FMP for cobia is a complementary plan with the South Atlantic Fishery Management Council; coastal migratory pelagics FMP. The coastal migratory pelagics FMP is currently managing the Atlantic migratory group of cobia; so cobia north of the Florida/Georgia line up to New York, under Framework Amendment 4 to the coastal migratory pelagics FMP.

Framework Amendment 4 established a 36 inch fork length and one fish per person up to six-fish-per-vessel vessel limit for the recreational sector, and maintained commercial regulations of 33 inch, two fish per person, and up to six fish per vessel for the commercial sector. Being a complementary plan the fishery in the Atlantic migratory group is managed under federal ACL, so 620,000 pounds for the recreational fishery and 50,000 pounds for the commercial fishery. The Interstate FMP allows for states to declare de minimis status for their recreational fisheries; if their landings are less than 1

percent of the coastwide landings over two of the previous three years, or between 2014 and 2016.

De minimis states may select to either match regulations from a neighboring state or the nearest state. All states that are declaring de minimis in this FMP have the option to adopt Virginia's regulations. De minimis states may also adopt a one fish per person and a minimum size limit of 29 inches or greater for their fishery.

Two options there either adopt an adjacent state or just adopt a one fish regulation with no season. For non de minimis states, so states that land greater than 1 percent of the coastwide landings. For recreational measures they must implement size and bag limits consistent with Framework Amendment 4, so 36 inch fork length or 40 inch total length, if the state so wishes to manage their fishery with a total length, and a one fish per person possession limit.

The states are allowed to manage the fishery in their waters with a vessel limit up to six fish per vessel; and a season. The vessel limits and seasons can be adjusted in state waters to achieve recreational harvest targets established in the interstate plan. These recreational harvest targets are based on the historic coastwide proportion. The landings apply to the federal ACL for Atlantic migratory group cobia for the recreational fishery.

In the implementation plans, states must demonstrate that their proposed seasons and vessel limit options constrain recreational harvest to their state's target. Real quick, before we get into the review of the Implementation Plan, I just wanted to go over some of the guidelines the TC used when evaluation the Implementation Plans.

The TC decided to standardize analyses for all states; using a timeframe of 2011 to 2015 landings, and average weights from the Southeast Fisheries Science Center. Later on when I reviewed the Virginia implementation plan, they put forward an option to use their own state derived average weights, and I'll discuss that in a little more detail when we get there.

The Technical Committee also discussed at length issues surrounding MRIP uncertainty. We investigated different estimate weighting approaches and smoothing that other TCs have investigated; but ultimately decided that the three-year average included in the Interstate Fishery Management Plan or three-year-monitoring period included in this Interstate Fishery Management Plan accounts for uncertainty in these MRIP estimates.

This is still something that the TC would be interested in looking into further. Now we'll get into the review for the de minimis states; and I'm starting the furthest north with New Jersey, and I'll just move down the coastline. New Jersey provided information or provided data to show that they meet the de minimis status, so less than 1 percent of coastwide landings for New Jersey.

Their proposed management options were to match Virginia's regulations for vessel limit, size and season. TC recommendation was to approve the New Jersey implementation plan. Delaware also presented landings data; to show that they meet the de minimis status and proposed two options. Before I go any further, several states submitted multiple options that upon approval could be taken to their respective stakeholders and delegations for feedback and a final decision. There are other states that put forward multiple options; even up to seven options. We'll review those when we get to them. But Delaware, two options first. No season, 29 inch fork length and one fish, and the second option to match Virginia's regulations, and the TC recommended to approve both those options for Delaware.

Maryland provided information or sufficient information; to declare de minimis status and proposed to match Virginia's regulations. TC

approved Maryland's implementation plan. The Potomac River Fisheries Commission, no landings were presented to justify the de minimis status, however the TC discussed this at length and determined just basically looking at landings in the Chesapeake and the fact that the Potomac River Commission is any landings from that water body are either captured in Virginia and Maryland.

The TC felt comfortable granting them de minimis status or suggesting that they receive de minimis status. They put forward two options as well; no season, 29 inch fork length and a one fish per person, or Option 2, match Virginia regulations. The TC approved both those implementation options for Potomac River Fisheries Commission.

All right, now we're getting into the four states that have the larger stakes in this fishery and do not qualify for de minimis status. I'll first start with Virginia. Virginia submitted seven options for review. Three options included analyses with Southeast Fisheries Science Center weights, and VMRC average weights. All seven options included analyses with these two average weight calculations.

VMRC is currently in discussions with the staff at Southeast Regional Office to consider their average weights in the future; and if Southeast Regional Office is fine with that Virginia will monitor their average weights in the future. Presented here are the seven, season and vessel limit options that Virginia put forward with the associated predicted landings; using the two average weight estimates.

The next-to-the-last column shows projected landings using Southeast Fisheries Science Center average weight, and the last column provides projections using the VMRC average weights. The TC reviewed each option individually and provided or approved all the options with some conditions. Options 1, 2, and 5 were approved conditionally; pending a decision on the VMRC average weights, and Options 3, 4, 6 and 7 were approved across the board.

I also want to note that Options 1, 2, and 5 that are approved conditionally for VMRC weights, are conditional approved for Southeast Fisheries Science Center weights, meet the TC guidelines and meet the recreational harvest targets for the VMRC weights. The conditional aspects of Options 1, 2, and 5 are just based on if VMRC weights are considered appropriate. North Carolina presented two options for consideration. Option 1 and Option 2 both carry no season.

Option 1 a for-hire vessel limit of four fish per vessel, and a private vessel limit of two fish per vessel, and Option 2, a for-hire three fish per vessel and a private two fish per vessel option. Predicted landings from Option 1 exceeded the harvest target for North Carolina by approximately 20,000 pounds. North Carolina provided justification in their implementation plan for this projected overage, and acknowledged that projected harvest exceeded the harvest limit, but cited that under harvest from 2017, based on previous North Carolina projections make up for the 20,000 pounds over. Option 2, predicted landings were about 34,000 pounds below the harvest target for North Carolina; and the TC did not recommend approval for Option 1 for North Carolina, but did recommend approval for Option 2, citing that Option 1 projected landings exceeded the recreational harvest limit. South Carolina will match federal regulations and maintain a three fish per vessel limit from June 1 to April 30, within the southern cobia management zone, and a closure for the month of May in the southern cobia management zone.

South Carolina did not provide their analysis for projected landings; but TC discussion looking at historical landings from the states, and the fact that the fishery had been closed for the previous two years, and the fact that matching federal regulations would mean that regulations in South Carolina would be more strict than in

years past. The TC recommended approval for South Carolina.

Likewise Georgia did not provide a specific analysis for TC review; but did provide a March 1, October 31 season, and a six fish per vessel limit, and also noted that Georgia DNR has the authority to close all or any portion of state waters for up to six months if deemed necessary. If Georgia DNR felt that landings were going to outpace their recreational harvest limit, Georgia DNR could close it.

The TC had a similar discussion for Georgia as we did for South Carolina; looking at historic landings and the fact that federal measures will be more strict than measures in the past in Georgia. The TC recommended approval for the Georgia management measures. Also included in the implementation plans were commercial measures.

All states provided appropriate regulatory language to show compliance with commercial measures. To note, South Carolina cobia is considered a game fish, so there is no commercial harvest for cobia in South Carolina. All the state's commercial measures either met or were more strict than commercial measures included in the Interstate Fishery Management Plan, and the TC approved all commercial measures that were presented. With that this is the only picture in the slides; so questions.

CHAIRMAN GEER: Let's start with Roy and then go to Michelle.

MR. ROY W. MILLER: This question is related to the de minimis states that indicated that they would adopt Virginia's regulations. Does that imply the 36 inch size minimum for recreational fisheries? Because in the state of Delaware, the proposal was made for a 29 inch fishery, so if a state says we'll mirror Virginia, which size limit is that? The reason I'm inquiring is of course we share internal waters with the state of New Jersey.

CHAIRMAN GEER: Go ahead, Mike.

DR. MIKE SCHMIDTKE: Roy, it would be either/or. It would be either the 29 inch one fish or adopting everything of Virginia; so it would be the 36 inch and whatever the vessel limits, the season of Virginia.

CHAIRMAN GEER: Michelle.

DR. MICHELLE DUVAL: I did just want to note a typo in the presentation; which indicated that Option 2 presented by North Carolina was three fish per vessel for the for-hire sector and two fish per vessel for the private sector, and that is incorrect. It should be one fish per vessel for the private sector. I have many other comments and several questions; but I just wanted to get that out there first.

CHAIRMAN GEER: While we're on that subject. Georgia is going to go to a one fish bag limit. It was in our document; but didn't get into the report. Are there any other corrections while we're at it; to the document, further discussion, any other questions for Steve, Mike? Let's go with Robert and then Michelle.

MR. ROBERT H. BOYLES, JR.: Not a question, but just looking at our colleagues from the South Atlantic Council, as the South Atlantic Council looks at actions to remove cobia from the federal fishery management unit. Just to highlight to this Board that note South Carolina regulations are largely adopting by reference those federal regulations.

I would plead with my colleagues on the South Atlantic Council, as well as NOAA Fisheries that we have an orderly retreat; should that be the decision that the Council's make, to give us time to legislate as we have to do, the appropriate measures should cobia be removed from the fishery management unit.

DR. DUVAL: Maybe just a quick question for Steve. If I understand the Technical Committee discussed some of the smoothing techniques that have been under discussion at the black sea bass, summer flounder and scup Technical

Committee, and appreciate that we're looking at a three-year evaluation timeframe.

I guess my concern is, and I'm probably going to ruffle a few feathers here, but black sea bass is not a rarely intercepted species, I mean by no means. You all want to see some rarely intercepted species, come on down to the South Atlantic and we've got a good half dozen that we can show you.

I'm concerned that these techniques are not going to be available to the TC for further consideration. In the South Atlantic the Council asked last year for both the 2015 and the 2016 recreational cobia harvest estimates to be recalculated; looking at some alternative techniques that the South Atlantic Council's SSC had seen.

The response that we received was that there just wasn't sufficient time to do that in time for our September meeting last year and that the Agency was committed to looking at these types of techniques via a workshop-based approach for specific fisheries. You know I can certainly understand that. But I think you know the biggest difficulty here that we face, and again this is something that the South Atlantic Council has been bringing up for at least the past five or six years is that we have two competing versions of best scientific information from NMFS.

We have the MRIP weight estimation procedure, and then we have the Southeast Fisheries Science Center weight estimation procedure, and the only common denominator between those two is the use of numbers of fish. As you saw, it was numbers of fish that was actually used to determine the state-specific-harvest targets. I am interested in, and you know I'm not going to make a motion at this time but I reserve the right to do so, to have the TC evaluate the potential impact with some of these management measures in numbers of fish. I mean there is at least a 65,000 pound spread for North Carolina; between the preliminary 2017 harvest estimates based on Science Center weights versus the preliminary harvest estimates based on MRIP weights. You know this is something that the Council has brought forward for a number of years.

It impacts many more species than just cobia; and it's going to have a cascading effect once the recalibrated effort estimates come through. Now, the Commission is caught in the middle of this as well. I think numbers of fish is the most accurate way to do things. I was looking at some of the summer flounder proposals that that Board will be reviewing tomorrow.

All of those calculations, with regard to liberalization, are also done in numbers of fish. Granted, those proposals are only working under a single set of potential weight estimates, but this is also a jointly managed species, not a complementary management plan, but a jointly managed species that's also managed under an annual catch limit and the recreational harvest limit. I would urge that the Board consider that. I think the other thing that I'm just going to put the Board on notice about is with regard to the options for North Carolina.

I suspect that our Commission, which is meeting next week, is likely to put forward some additional options that they would like the Technical Committee to possibly review. You know we went out to our stakeholders and our advisory committee's right after the Board approved the fishery management plan in October; to solicit input on a range of options, both season and vessel limit options.

We informed our Commission at their meeting in November that it was highly unlikely that any option that did not meet the recreational harvest target, was unlikely to be recommended for approval by the Technical Committee. We also urged them to consider moving forward several options as Virginia has done. I fully expect that there might be a call for TC review of a few additional options prior to April 1, so with that I'll shut up for a while.

CHAIRMAN GEER: Is there any other discussion? Joe.

MR. JOE CIMINO: Thank you, Steve, nice job. The Virginia options that are conditional, I guess it is a question, maybe it's to staff and not Steve. Is it possible that we can have a discussion here and maybe clear this up on whether or not we can go forward with all seven options?

DR. SCHMIDTKE: I would say that that is really dependent on what we would hear from the Southeast Regional Office; as far as the TCs recommendation. I mean the Board has the Board's decision; they have the TCs recommendation as advice. But the Board is able to make their decision.

CHAIRMAN GEER: Follow up, Joe?

MR. CIMINO: Yes, second bite. My understanding is you know one of the concerns isn't that Virginia may be able to give a decent projection of what the catch would be. It's more to the accountability measures here, since the Southeast Regional Office will also be making projections to figure out closures. I think we may hear that that isn't necessarily the case. Therefore, I would propose that we get a shot at this; allowing us to use the average weights that we feel are much more robust than using what the Science Center was forced to use, which is a single average weight for a five-year period, because it took five years to get just 30 fish with weights to provide an average weight, which looks fairly high.

My guess is that as our APAIS samplers are out there and get more samples, we're going to see something more representative of what we've been using. I'm not looking to the Science Center to say that they will do what we do; but all I'm looking for here is the ability to go forward for one year with the projections that we have been using.

CHAIRMAN GEER: Roy.

DR. ROY CRABTREE: The question of are we doing projections for this year. We do not intend to do any projections for this year. We're looking at the Interstate Management Plan to be the mechanism of constraining catches. We're going to leave the EEZ open; until the last state closes. I suppose at that point we would close federal waters.

We're not planning to do any projections at this point. As to the issue of the Virginia weights versus the Center methodology, I mean the Center methodology is what we have normally used region wise when we do projections. But it is true, and I've looked the samples sizes at least for the carcass drop off program in Virginia, are quite a bit larger than the MRIP data.

I think some of the concern is that there could be unknown biases in a carcass drop off program caused by angler behavior and all of those kinds of things. If you wanted to, I think we could ask the Science Center to review that data; but it's difficult for me to look at it and make a judgment as to which dataset is really better. There certainly is a larger sample size with the carcass drop off program; but then there are issues with potential biases there. It's not clear that anyone is going to be able to resolve those.

CHAIRMAN GEER: Michelle.

DR. DUVAL: This is a quick question for Roy. You said the intent would be to close federal waters once the last state season has closed. I'm just noting that the option for North Carolina that the TC recommended approval of is there is no season. That was the tradeoff; in terms of feedback from the public.

They much preferred to see an open season throughout the year, trading that off for a lower vessel limit, because the fish are in our waters for such a short period of time. If we maintain that option or maintain options that do not have a season closure; is your plan to still keep federal waters open with that?

DR. CRABTREE: Right now that is the plan. I guess if one of the non de minimis states remains open until the end of the year, we would remain open. Then depending on the success of interstate plans at constraining catches and stay with the ACL, we would come back to that again next year, I suppose.

CHAIRMAN GEER: Robert.

MR. BOYLES: Just for the Board's knowledge. We have no mechanism to close absent federal action. I think what Dr. Crabtree is saying, is we can plan on the fishery being open year round, if that is the course of action. The only way we can close our waters is under a federal closure under Magnuson or legislative action, and our legislature will adjourn in May.

CHAIRMAN GEER: Is there any other discussion? Oh, I see a lot of hands go up. Okay let's start with Lynn.

MS. LYNN FEGLEY: This is a bit of a different issue. But I just wanted to bring it up for clarity to the Board; and my colleague Joe Cimino can help me with this. The Virginia regulations, which we have proposed to match, have two additional if you will "above and beyond measures," they have a no gaffing provision, and they also have a provision where only one fish on the vessel can be greater than 50 inches.

The state of Maryland doesn't have any authority to regulate gaffing. But the question before the Board is, if we're matching Virginia's regulations, is the sentiment that we should also implement the only one fish exceeding 50 inches? I think that in part we feel that this is something that Virginia has done above and beyond the ASMFC requirements, and so that it is something extra that they're doing, and we wouldn't be obligated to do that.

But I think for the record, it would be very good for this group to agree that the state of Maryland and any other state, New Jersey or Delaware that matches Virginia, would match the season and the size and the creel, and not be obligated to do the two other things, if that made any sense at all.

CHAIRMAN GEER: I believe that was the intent, but we're checking on it right now. Toni.

MS. TONI KERNS: I think that if a state, their intent is to mirror one of their neighboring states, but if there is a regulation in there that they can't implement, such as the gaffing. You know if we just state that on the record that you can't do that. Then if there is an intention to not include one of the size limits; then I think it would just need to be considered by the Board.

If there is no disagreement by the Board then we can move forward with that; especially if it's something like a trophy fish or something additional. As long as you're sticking with the bag limits and the minimum size limits, it should be okay. But I just think that we should make sure that is clear on the record that that is what a state is going to be doing.

CHAIRMAN GEER: Lynn, follow up?

MS. FEGLEY: I was just going to ask if you think you need a motion just let me know.

CHAIRMAN GEER: I don't know. I mean it couldn't hurt, I mean it just couldn't hurt to have it, I mean on the record.

MS. FEGLEY: Okay, I'll take a shot at it. I would move that de minimis states who are mirroring Virginia regulations for cobia, mirror the season, size, and creel of Virginia but not the trophy fish provision of only one fish exceeding 50 inches total length or fork length, total length.

CHAIRMAN GEER: Lynn, did you want to include vessel limit on that as well?

MS. FEGLEY: Yes, I think that was creel, but yes absolutely.

CHAIRMAN GEER: Bag and vessel limit; and do not include gaffing?

MS. FEGLEY: Well for the record, I guess it wouldn't, because the state of Maryland, we have no authority to go there anyway. We couldn't do that if the motion passed or failed. We can do the size limit, but we cannot do anything about gaffing.

CHAIRMAN GEER: Okay and you want to do the 50 inch limit, the trophy fish in there as well. That is something that wasn't in the requirements of this FMP development, so that was kind of a new thing. Do we have a second for this motion, first? I see Jim's hand going up hesitantly. Discussion on this, Jim Estes seconded, I'm sorry. All right some discussion, Joe.

MR. CIMINO: Yes, I think really the intent should have been here. It was difficult for this Board, because the de minimis stuff was kind of a moving target as we were in between votes and public hearings. But I really think that wording should have originally stated that any state taking the adjacent non de minimis state's, when it said all regulations I would think that would mean all regulations that held that non de minimis state in compliance to the FMP; anything additional to compliance with the FMP. If Virginia dropped any of those they wouldn't be held out of compliance. I don't see why any other state should.

CHAIRMAN GEER: Is there any other discussion on this motion? Adam.

MR. ADAM NOWALSKY: I don't know how often we'll have to deal with changing these regulations; but for clarity's sake, would this be only for the current measures that we're contemplating now, or would the expectation be that this motion would cover us in the future as well, should Virginia continue to have these additional provisions?

CHAIRMAN GEER: Good question, I would assume so. I mean until we have other changes that go forward, these would be the conditions. Lynn.

MS. FEGLEY: I'm sorry for making this complicated. Just to Adam's point. I wonder should the motion be more general, more similar to what Joe just said that states that are mirroring Virginia, mirror only those regulations that keep the non de minimis state in compliance with the FMP. That would cover us for future incidences when a non de minimis state does something other. You know if Virginia decides it's going to be 60 inches, then we would still be covered.

CHAIRMAN GEER: But that would also take out the trophy fish, correct?

MS. FEGLEY: Well, so I think the point is that if Virginia were to drop that 50 inch provision, they would still be in compliance with the FMP. The idea here is what are the de minimis states mirroring? They are mirroring we think the intent was to mirror the regulations that keep the non de minimis state in compliance with the FMP. Anything that non de minimis state does above and beyond, those states are not committed to do.

CHAIRMAN GEER: Okay, any other questions or discussion on this? Is there any opposition to this? I mean it's pretty straightforward, I think for the most part. Go ahead, Toni.

MS. KERNS: I think that the record indicates there is the motion here, and then there is the verbal record of what the Board is trying to do. I think between the two we'll be good to move forward for the future.

CHAIRMAN GEER: **All right, so hearing no opposition at all; approved by consent**. Moving on, so we've got that taken care of. Now we have to – Michelle, you had your hand up for a while and I apologize.

DR. DUVAL: Yes I guess it seems like we're sort of moving towards a motion to approve the implementation plans, and before we got there

I did want to swing back to this issue of two competing versions of best science available with regard to weights. We're caught in the middle. I don't know if someone on staff can provide additional clarification for why the cobia TC would not be able to use numbers of fish to evaluate the impact of proposed management measures.

You know I just see this as being a potentially more accurate means of doing so; given what I've put forward about how the different summer flounder recreational proposals have been put forward, and given that that is also a fishery that is managed under an ACL as well, because otherwise I'm prepared to make a motion to direct the TC to also evaluate the impact of the management measures based on numbers of fish.

DR. SCHMIDTKE: Michelle, just from listening to TC discussions, as far as how they went about the evaluation process. The initial thought was keeping in the complementary nature of the plan; since the landings that are going to be evaluated from this plan are going to be evaluated on the federal side in pounds that the TC wanted to maintain that.

I think that, I mean, you certainly have the right to task the TC to do a further analysis in numbers. There may be difficulties, as far as coming up with applicable average weights. That question may come up again to glean the numbers that would be an appropriate proxy for the harvest targets for each state.

That would be one thing that the TC would need to discuss and evaluate. The other issue that I would just want to keep in mind is that right now the scheduled implementation date is for April 1; and that was something that you had spoken of previously with, you know, regards to North Carolina potentially going back for more stakeholder input, and submitting additional plans.

We would have to talk about the timing of how that would all work, and whether we can have some flexibility in implementation dates; something like that. But as it stands right now, we've been shooting for an April 1 implementation date, which is why we've had the deadlines that we've had for the plans to be submitted and reviewed.

CHAIRMAN GEER: Follow up, Michelle?

DR. DUVAL: I think I'm not suggesting that different numbers be used. I mean we have state-specific allocations that were actually derived based on MRIP numbers; because the TC felt that numbers was the most accurate currency with which to provide the different options that the Board considered for state-specific-harvest targets.

I think my concern is that consistency between how we're doing things from one Board to another. If summer flounder is managed under an annual catch limit that is set in pounds. But all these state-specific proposals are being evaluated in numbers of fish; how does that work and why can we not take a similar type of approach here?

I'm looking at things like the numbers of fish for North Carolina's 2017 harvest are below the harvest target that was used to set our state-specific allocation in pounds. When I think about states like South Carolina and Georgia that don't have as many intercepts, you know those intercepts make a big difference when it comes to the estimated weight.

Maybe that's not a decision that could be implemented right now. But I think that is separate from my request, or maybe notice to the Board that North Carolina might be coming forward with additional options within its implementation plan, just like Virginia has seven different options.

You know those have been either recommended for approval by the TC, or conditionally approved. I expect that Virginia, once they get their stakeholder input. You know whatever option they select they will

simply inform this Board and that will be sort of the final option contained in their implementation plan, so two slightly different issues.

CHAIRMAN GEER: Toni.

MS. KERNS: I just wanted to clarify that for summer flounder, scup and black sea bass, the quota does start off in pounds; and then it gets converted to numbers of fish, and then it gets converted back to pounds again. That does happen within the joint nature of the plan. It's a difference between how the two regional offices work.

I can't necessarily tell you why that is, Michelle, but I can just at least give you that information. But it does start off in weight, gets converted based on the average weight from MRIP for the coast, and then comes back to pounds again to make sure that we haven't exceeded the quota.

CHAIRMAN GEER: Michelle.

DR. DUVAL: Just a follow up, so that's a coastwide average weight that is used to convert the ACL from pounds into numbers of fish?

MS. KERNS: To my understanding, yes.

DR. DUVAL: It's interesting, because when I've had some of these conversations with the staff at MRIP with regard to potential evaluation of, I guess alternative techniques whereby you might look at averaging catch rates over, and I realize catch rates are different than average weights. But averaging catch rates across a region, I've been told that each state is basically a strata; and so that can have positive or negative impacts on how that comes out. It is interesting to me that it's an average weight; based on the entire coast for summer flounder. I will leave it at that.

CHAIRMAN GEER: Michelle, do you want to make a recommendation or a motion to the TC for that task that you just mentioned?

DR. DUVAL: I mean I would like to recommend that the TC, when they are evaluating the state's implementation plans that they also be allowed to consider the impacts of the management measures in numbers of fish, as well as pounds.

CHAIRMAN GEER: That's not going to happen before April 1.

DR. DUVAL: I understand that. But I think moving forward, we need to acknowledge that we've got you know these two competing views. This is nothing Roy hasn't heard before at the South Atlantic Council; so he knows that I'm not picking at him. But the Board is caught in the middle of two competing versions of best science; and there has been no action on the part of the Agency that I can see to actually address this, and it's extremely frustrating.

CHAIRMAN GEER: Michelle, the TC wants some specific direction; so if you can put together a motion on that what you would like them to look at.

DR. DUVAL: Sure, I'll wing it here. If Lynn can do it, I can do it. I move that we direct the TC to evaluate state specific management options in pounds and numbers of fish. Is that specific enough?

CHAIRMAN GEER: I apologize for putting you on the spot like that.

DR. DUVAL: That's okay.

CHAIRMAN GEER: I've got people in both ears over here. All right, any discussion on that? Joe.

MR. CIMINO: Yes to that end. I think when we see what the Science Center has to work with, we realize that there might be additional data out there, or just the traditional way of pooling may not be the only way to pool what's out there. I think maybe if the TC has some time and flexibility here, looking at even maybe

regional pooling, which I guess actually the Science Center did for South Carolina and Georgia got stuck with a single average weight.

CHAIRMAN GEER: Jim.

MR. JIM ESTES: Just because I think you need it; I enthusiastically second Michelle's motion.

CHAIRMAN GEER: Thank you very much, Mr. Estes. Michelle.

DR. DUVAL: I guess maybe given what Joe has said, would it be better to expand this to include in that direction or that recommendation to the TC to not only evaluate state-specific-management options in pounds and numbers of fish, but also provide that direction to use alternative techniques, such as those being considered by the black sea bass TC. I mean is that what you were getting at, Joe?

MR. CIMINO: Yes to some extent. I think the Board is here, being handed decisions to make on these projections. At least for the last three years they've kind of been jumping around, and a lot of that has to do with sample size, right? If we have more tools in the chest to say where these projections may end up, and I would sure like to at least be able to look at them.

CHAIRMAN GEER: Michelle.

DR. DUVAL: I apologize, Mr. Chairman, I was having a sidebar with Toni and I wasn't paying attention. Could you please?

MR. CIMINO: My answer was yes.

CHAIRMAN GEER: I mean does anybody have any problems with us tasking the TC to do this? Michelle.

DR. DUVAL: Not a problem certainly, but I think just in regards to input from staff that you know this is not a task that is going to be completed prior to April 1, and I can't tell you how much that bums me out. But I understand that. **You know Toni's input is a suggestion to recommend that the TC evaluate the best method by which to determine the harvest impact of our management measures. Am I phrasing that appropriately?**

MS. KERNS: Yes.

CHAIRM GEER: Adam.

MR. NOWALSKY: You mentioned does this apply just to cobia, and while cobia harvest in New Jersey is minimal. Sitting here on the South Atlantic Board, I've cautioned numerous times, don't go down the road of summer flounder and black sea bass management. It doesn't work.

Every year we've looked at this very issue in New Jersey, where black sea bass and summer flounder are larger to our north; and so we're losing out in numbers of fish, based on this average coastwide number. The states to the south are in the same boat; metaphorically speaking, no pun intended.

I wonder if this issue, maybe this is an issue we shouldn't be working on specifically here. But maybe this is an issue that should go to the Policy Board and look at all of our recreational species; because it's an issue across all of them. There are a number of us that are involved with multiple species.

I'm glad to hear that my voice did not fall on deaf ears, or if otherwise you've been burnt by the system yourself too many times, to realize you've got to do something different here. But I don't think this applies to just cobia management. Maybe it's a first step we do this here; but I might offer some consideration that this task might be elevated higher, to accommodate other species. Maybe we get even more information for this Board that helps us in doing so.

CHAIRMAN GEER: Is there any further discussion? Michelle.

DR. DUVAL: I think I've been informed that we have the flexibility within the FMP to use some of the techniques; understanding what Adam has just said that they're being considered by the black sea bass Technical Committee, in terms of smoothing techniques and things like that, that we already have that flexibility within the FMP. Perhaps it's the more general language of recommending that the TC evaluate the best method by which to determine the impact of the management measures on harvest.

I apologize, Mr. Chairman for making such an issue of this. But it is an issue. It absolutely is an issue. I think we've been frustrated at the Council level in the South Atlantic with regard to the slow pace of addressing two competing versions of best science; in terms of weight estimation procedures. You know I appreciate Adam's bringing up that this is also an issue for other species.

That was kind of the response that we got back, you know from the folks in the MRIP program that when we asked for recalculated 2015 and 2016 harvest estimates for cobia. That they wanted to take a more comprehensive approach to this, so I don't know where that is in the planning stages, given everything else that the folks in that program have going on. But I am hopeful that at some point it will yield some fruit, and that it will be useful for more than just cobia.

CHAIRMAN GEER: Mike and then Toni.

DR. SCHMIDTKE: Michelle, just for some direction for the TC, because one of the things that was very obviously in the considerations of the TC in evaluating these implementation plans, was kind of the best way to evaluate with respect to a complementary plan between the Commission and the Council.

Would the task that is on the board right now, would that be for the TC to have, I guess a bit more freedom to shoot for that kind of best scientific advice, you know to give, you know outside of a complementary nature. If they're considering what is in the long term future; obviously the Regional Office isn't making projections for this year.

But in considering the long term future of how the Regional Office would be evaluating landings; that kind of constrains how the TC would evaluate. When it's stated best method by which to determine the harvest impact, I guess what are the constraints? Are we constraining ourselves to that complementary plan in this analysis, I guess?

DR. DUVAL: I don't think necessarily, because I would hope that if there is a method that arises; and I'm thinking about the length/weight regressing that Virginia did. I certainly wish we had that type of information in North Carolina; where we could have taken a similar approach. But rather than the pooling approach that is currently taken by the Science Center.

Perhaps some type of length/weight regression would be a better approach. It's a sort of long-winded way of saying no; I don't think that the best method coming forward should necessarily be constrained by the complementary nature of the plan. I would hope that our federal partners would be equally amendable to what is the best method or alternatives for a most appropriate method for this species.

CHAIRMAN GEER: Toni, did you have?

MS. KERNS: I think that Mike covered most of my concerns. I just want to make sure that the TC could come back to the Board and provide advice. At some point this may be a longer task than just between now and May. It just depends on how much evaluation they need to do; and we want to make sure they have enough time to thoroughly flush through this. Then also I think potentially work a little bit with the Science Center. Hopefully we could get somebody from the Science Center to join the TC during these discussions.

I think it might help have a better understanding of how they're using the weights; in order for them to determine what the best scientific information is. Then just for future, since these plans that we are putting place and the Board may want to reconsider these implementation plans for future years, I don't know. But these plans that we're adopting now are supposed to be until the end of the next assessment, I believe.

CHAIRMAN GEER: Roy.

DR. CRABTREE: Yes, and I agree with Toni that it would be good to have someone from the Science Center involved in some of this. I think where this goes depends partly on what the Council decides to do; whether we're going to go down the path of complementary plans, or whether they remove it from the FMP.

If they remove it from the FMP, then it's up to you as a group to decide how we do it. Right now, we will estimate the poundage of cobia landed this year, based on the Science Center weight method and the MRIP estimates. If we keep complementary plans, then we want to make some change to how we do that. I think that's something that also would need to come up at the Council meetings.

We potentially need to change the accountability measures, or reflect somehow in the Plan if we're going to use some alternative measures. If we want to use numbers, I don't see a reason why we couldn't shift to the ACL to be in numbers; but that would need to be reflected in the fishery management plan, and we would have to work with the Beaufort Lab, to figure out what the best way to make those kinds of conversions would be.

CHAIRMAN GEER: Are there any other comments or discussion? **All right, I'm going to read the motion. Move to recommend that the TC evaluate state specific management options in pounds and numbers of fish, and to provide directions to use alternative techniques such as in the black sea bass fishery. Evaluate the best method (i.e. pounds or numbers of fish) by which to determine the harvest impact of the management measures.** Motion by Dr. Duval and seconded by Mr. Estes. Do I hear an opposition to this? Hearing none; they want some cleaning up of it.

EXECUTIVE DIRECTOR ROBERT E. BEAL: I think the wording on the board captures kind of two different ideas that were moving around during the Board discussion. I think part one and part two are either/or, rather than both included in the motion. Jessica was just trying to capture all the ideas by the Board, and hoped it would coalesce into one coherent motion. But I'm not sure we're there yet. Michelle has her hand up. Maybe she can get us out of this.

DR. DUVAL: I think perhaps the second clause that says evaluate the best method (i.e. pounds or numbers of fish) by which to determine the harvest impact of the management measures, and since we know that we already have the authority within the existing fishery management plan to bring in the types of smoothing techniques that are being considered by the black sea bass Technical Committee. It doesn't necessarily bear specific mention in this motion right now. Is that okay with everyone?

CHAIRMAN GEER: Jim, you were the seconder; are you okay with this? Adam.

MR. NOWALSKY: I just wanted to add that when you're talking about using numbers of fish here, I would assume the reason is to get to the fact that different states have different weights. That is one of the goals here, I assume?

DR. DUVAL: It is really because we are trapped between two different methods for determining what the average weight is for the different states. There is what comes out of MRIP, when you go to countmyfish.noaa.gov and do a query, and you're going to get a different answer when the Science Center provides you the estimate of harvest and weight. That is what this numbers of fish is

getting at. Both of those methods start with numbers of fish. Where they diverge is in the final weight that is attributed to a state's harvest.

CHAIRMAN GEER: Are you okay with that, Adam? All right hearing no other discussion I want to bring this forward for a vote. The motion is move to recommend that the TC evaluate the best method (i.e. pounds or number of fish) by which to determine the harvest impact of the management measures. Motion by Dr. Duval, seconded by Mr. Estes, is there any opposition to this? I see everyone shaking no.

We've kind of gone down a rabbit hole with this a little bit. But it is important, it is very important. Hearing no opposition the motion is carried. Before we go back to making a motion on the TCs recommendation, I want to open the floor for public comment. Sir, would you please come to the microphone and say your name and your affiliation please, and then you'll have three minutes.

MR. JONATHAN FRENCH: Thank you, my name is Jonathan French, Mr. Chair. I am a recreational fisherman from here in Northern Virginia, and I frequently cobia fish in both Virginia and North Carolina. I'm speaking today to request that the Technical Committee reconsider, or this Board reject the Technical Committee recommendation to reject Option 1 for North Carolina.

The reason is that 2015 MRIP data was used in the estimate, 2015 MRIP data represented a 400 percent increase over the previous year in Virginia, a 349 percent increase in catch over the average for the previous seven years, and North Carolina was a similar outlier, a 170 percent increase over the average harvest.

It was a significant statistical outlier. I work in the health data quality field, and if we used a data point that was three sigmas outside of the standard deviation for making health care decision, we would be fired. The years 2013, 2014 and 2017 were all within the standard deviation for the previous 7 year average. I believe that the Technical Committee should adopt National Academy of Science's standards for data quality in making this decision, and utilize 2013, 2014, and 2017 catch data for evaluating Option 1.

With regards to some of Michelle's comments, I support working collaboratively, although I do hope that Atlantic states ultimately take over full management of cobia, and we can start to work around some of these tripping points that have been discussed here today. With that I'll defer the rest of my time, thank you.

CHAIRMAN GEER: Thank you very much, Mr. French. Is there anyone else with public comment? Yes, please come to the microphone and state your name. You'll have three minutes.

MR. BILL GORHAM: I'm Bill Gorham from Outer Banks North Carolina. I'm the owner of Bowed Up Lures, a custom cobia jig lure manufacturer. I've been part of this process and the regulatory process for cobia now going on three years. The state of North Carolina stakeholders were adamantly against this complementary plan. Clearly the federal FMP is not big enough for all the states involved.

What is clear by what has been approved by the TC is that North Carolina recreational fishermen will get one fish per boat. I found out about this Friday of last week, and given the overwhelming outreach to me, I woke up at four o'clock this morning and drove here to voice, and ask that alternate data points be looked at to save our season, because at one fish per boat it will have devastating effects on not only northeastern North Carolina, but southeastern North Carolina.

Cobia is a vital spring fishery for us. It's a destination location; and at one fish they're just not going to come, especially when states to your north or south have far less restrictive

measures. I would also like to put on the record that during this entire debate and battle, we from North Carolina have always fought for the common good of all states, not the benefit of just ourselves.

We have tried to be educated in the process, do what's right, believe in the process, and champion the process. It's with my personal regret that I don't think there is any way that we cannot not fight to not go ahead with this, and we'll continue to reach out to ASMFC, and our state representatives to make sure this doesn't see the light of day. Thank you.

CHAIRMAN GEER: Thank you very much sir, and thank you for coming today. All right, we're at that point where is there any further discussion? David.

MR. DAVID E. BUSH, JR.: Just very quickly. This motion as it is would not only evaluate the methods and management measures that were proposed, but even those that were previously denied. Am I understanding that correctly?

CHAIRMAN GEER: Yes, it would. Okay, so what is the Board's pleasure with the TCs recommendations for the Implementation Plans? I'm not hearing anything. I mean we have a final action today on this. That is where we're standing right now. Jim.

MR. ESTES: I have a question about the timing. Michelle mentioned that they would like to take this back out to their stakeholders. We're supposed to have this implemented by April the 1st, and then I guess presuming what they hear from the stakeholders, they would like to maybe run some more options back to the TC. Is there possibly time to do that for us?

CHAIRMAN GEER: Mike.

DR. SCHMIDTKE: For the states that submitted several options, because there were quite a few that submitted several, for the states that submitted multiple options, intending to take them back out to their stakeholders after approval; that is basically what would be done today by the Board is to allow those states that set of options.

For example, I believe Delaware had either of the de minimis options that they would then make a final decision on before April 1. If the Board were to take the TCs recommendation of approval for both of those options, then they could do either one of the two. Similarly for Virginia, the TCs recommendation is for conditional approval.

Therefore, the Board consent if the Board was to take the TCs recommendation, would have to wait for some type of statement from Southeast Regional Office, Southeast Fisheries Science Center on those average weighting techniques, and that would tell what the range of options would be for Virginia.

As far as the issue of submitting additional options, and the TC review of those. The TC may be able to review those and potentially provide a recommendation before April 1st. The issue would be that those options would then also need to come before the Board; and the Board would have to make a final decision on those options, and the Board doesn't meet again until May.

CHAIRMAN GEER: Toni.

MS. KERNS: One of the things that we do in the Summer Flounder, Scup, and Black Sea Bass Plan is that a state sometimes want to go forward with a slightly different version of a management proposal that they brought forward. They use the same methodology that they used in their original plans that got approved by the Board.

It still has to come back to staff. Staff sometimes will run that past the TC Chair, just to make sure the methodology seems to be the same. But that is an option that we have done in other Boards. If this Board is comfortable with that then that is something that could be provided as an option for states to do.

If it's a completely different methodology that the state uses, then we have in the past in other Boards run that past the TC, and then we've done an e-mail vote for the Board to consider something different. But you would have to confirm that that is something that the Board is comfortable with before moving forward in that direction.

CHAIRMAN GEER: Robert.

MR. BOYLES: We did have extensive discussion about implementation date of April 1st, when we approved this plan, so with that I would move that we approve the state implementation plans for the cobia fishery management plan as recommended by the Technical Committee.

CHAIRMAN GEER: Seconded by Mr. Haymans; discussion on that Joe.

MR. CIMINO: Yes, and I guess this goes to staff, because I tried to pay close attention to what the TC was working with, and they felt they had to take a hard stance on these projections. Of course North Carolina's projections show that if you use numbers they would actually get there. I don't think it's a radical proposal.

Virginia's options that are conditional, get us there if we use what we really believe is a more realistic average weight. I think moving forward with this plan, this Board was talking about soft targets in three years. I do kind of have a problem with this; because I feel like maybe the TC felt that they had to give us that hard stance, but I don't necessarily know that the Board has to do that here.

CHAIRMAN GEER: Adam.

MR. NOWALSKY: Once again this isn't something that impacts New Jersey; but this is déjà vu all over again. What winds up happening when you go ahead and treat these numbers to the number? You wind up driving up fish size. You wind up increasing discards. You wind up driving people out of the fishery.

Do not make the mistake again. The variability in these estimates, we're talking about North Carolina's plan as evaluated. This is not meant to discredit the work of the TC. They were given a job. They looked at it, they did the evaluations. They gave us the information. It's now on us to make a decision what we're going to do with them. I'll make it easy. **I'm going to move to substitute to approve all of the state implementation plans as presented here today.**

CHAIRMAN GEER: Okay a second to that motion, David. David.

MR. BUSH: As I understand it here, these are going to be rolling on a three-year average. If these numbers are totally out of whack, they're going to have at least some time, I shouldn't say recuperate, but there will be an opportunity for things to change to reflect what went wrong in the first year if it's substantial.

I don't think we would be wrong to at least start it out. Every one of the recommendations out there for the most part is based on pretty sound science; although the origin of that science is where there is some disagreement or something. But I think there is plenty of opportunity to make course corrections if we go forward as is.

CHAIRMAN GEER: Doug.

MR. DOUG HAYMANS: I was going to ask a question; Roy, if that's okay. That is Roy, if this Board doesn't approve this plan at this meeting, is federal waters going to remain open in May?

DR. CRABTREE: That would create a problem for us and I'm not prepared to say one way or another. But our keeping state waters open has been contingent on this plan going into effect. That puts the opening in a lot of jeopardy, I think.

CHAIRNMAN GEER: Doug, follow up.

MR. HAYMANS: Based on that I cannot support the substitute motion, because both us and South Carolina will be back in the position of not having a fishery if federal waters were to close this May.

CHAIRMAN GEER: Michelle.

DR. DUVAL: I think just to provide some clarification to the comments that I made earlier; that I expected that our Commission which meets next week was likely to request TC review of additional options. We provided them with a menu of options. We provided stakeholders with a menu of options when we went out to our advisory committees in October.

The option that came forward from the Commission, we recommended to the Commission that they select more than one option so that it could be reviewed, and they elected not to do that. I think what I was suggesting was not to not implement something by April 1st, but to allow for Technical Committee review, you know via conference call, by any additional options that our Commission might choose to forward for analysis after their meeting next week.

You know not to not implement something, I mean right now North Carolina waters are closed to harvest by proclamation. They are closed through April 30th. Our Commission certainly has the option of moving forward with the option that the TC recommended approval of in the interim. But that is what I was talking about when I said our Commission might want to move a couple more options from the menu that they had forward for additional TC review, not that there wouldn't be something in place by April 1st. I hope that clarifies things.

CHAIRMAN GEER: I think it does. Any other discussion on this, we have a substitute motion on the floor. I'm going to read it again. Move to substitute to approve all state implementation plans as presented today; that includes the ones that were contingent, which the three in Virginia which were contingent on approval, and the one in North Carolina that the TC did not recommend. All the other plans were approved, is that correct? Do I hear any opposition to that? Okay, let's start with Robert.

MR. BOYLES: I'm opposed to the substitute motion.

CHAIRMAN GEER: Doug, do you want to add anything to that; same thing. Robert.

MR. BOYLES: Mr. Chairman, I think a little bit of context may be in order here. The recreational ACL for cobia is 620,000 pounds that was exceeded quite a bit the last two years. Last year, two years ago I should say, the state of South Carolina moved to close what we believed to be a spawning aggregation, during the months when you could go literally fish for cobia from a canoe. Our anglers were very strident in advocating for strong management measures; and as a result in 2016, we had that spawning season closure.

That was of course we had a spawning season closure in 2017 as well, but 83 percent of South Carolina's cobia, excuse me 100 percent of cobia landed in South Carolina are recreational. As was referenced earlier, it's a game fish in South Carolina; and 83 percent of the fish that are landed in South Carolina come from federal waters. I appreciate my colleague from Georgia's question of Dr. Crabtree. You know if we can't be assured of some kind of fishery, there is just no way I can support this motion.

I think we have to keep in context that the whole purpose for this Interstate Fishery Management Plan for cobia was recognizing that we have a shared resource, to some degree, and the degree to which is arguably arguable, but it is a shared resource. At the same time we have to put some kind of constraints on this catch; and so I would just encourage the Board to keep that in mind, the

context. As a result I can't support the substitute motion.

CHAIRMAN GEER: Okay, Spud.

MR. A.G. "SPUD" WOODWARD: I want to sort of follow up on the question that Doug gave for you, and I apologize for putting you on the spot like this. But sort of the next generation is okay, in absence of the plan that it puts NOAA Fisheries in an awkward position, that is making a decision about opening the EEZ. If this body were to approve implementation plans that are projected by the TC to exceed the target harvest, is that going to do likewise?

DR. CRABTREE: I think the consequences of that play more into next year. But we would look at it; but it's not clear. I mean I didn't support the motion because it bothers me to approve plans that the Technical Committee is saying don't meet our requirements. Now maybe further look and investigation of some of these resolves that problem. But at this point it hasn't been. Yes, we get in a difficult position if everyone's analysis shows we're going to exceed the ACL. I hope we can avoid that.

CHAIRMAN GEER: All right, seeing no other hands. Doug Brady, I'm sorry.

MR. W. DOUGLAS BRADY: Well I think Spud's question, but basically if we approve Adam's motion I was trying to get to what the impact would be. At one point I heard that it would close potentially the federal, it would close the federal waters I guess. Then I just heard that may or not be the case. I'm just trying to make sure that I understand and hopefully the Commission does, if we approve this motion where is the danger in doing so?

CHAIRMAN GEER: Roy.

DR. CRABTREE: Well if I understand the motion correct, the plans would go into effect, you just would have approved some plans that your Technical Committee said aren't in compliance with the very plan that you've set up. That is what is bothering me. But the plans would still go into effect, if I'm reading this right.

CHAIRMAN GEER: That's the way I interpret it as well. I see a lot of hands go up. Let's go with Joe and then Adam.

MR. CIMINO: I just kind of wanted a clarification on that. Is that what we're really saying is that they wouldn't in one year meet a three-year-soft target. I mean because that is what the TC is evaluating, is if they meet that number exactly for the following year. But the intention of the plan was to give us more flexibility than that.

CHAIRMAN GEER: Mike.

DR. SCHMIDTKE: I guess addressing that point. While there would need to be that three-year-time period to evaluate whether any management changes would be required of a given state if they were to exceed their three-year target, one of the things that the TC discussed is if the initial plans that go into effect are projected to go above that target, how would states be, I guess motivated, to change in the next year?

Like let's say that these plans are in place for three years. Then we would be projecting ourselves. Excuse me; the plan would be projected to be exceeded. I guess the TC kind of was going from that angle that the implementation plans that have been submitted would likely be in place for three years; to provide some stability to the fishery, you know consistent regulations from year to year, and then be reevaluated after that three-year period, as far as whether regulations should change.

CHAIRMAN GEER: Joe, follow up?

MR. CIMINO: I do need to. I definitely wanted this on the record at some point; and I guess I'll do it here, because if the TC is really looking at what we've done. You know in Virginia in 2016, you know we weren't looking for a free-for-all.

We put in some regulations that we thought were great that would have been approved by the TC to have a projection of 300 and some odd thousand pounds.

That year's harvest estimate was over 900,000 pounds just for Virginia. The very next year our Commission liberalized regulations, and we came in under target at 260,000 pounds. I don't see how the TC could say that that one year's measures are going to produce the same exact harvest estimate each year.

CHAIRMAN GEER: I had David and then Adam and then Robert.

MR. BUSH: Again, this is a three-year average. I can't remember off the top of my head what the measures that would go into place after the three years of you blowing the quota out of the water. But you have the opportunity to make adjustments in your three-year window, to keep your states under.

I mean maybe there should be a review yearly. How did everybody do? What management measures are you going to tweak or change to get you where you need to be? However that needs to take place, but this soft-target idea was also meant to give state's flexibility on how they manage this fishery. They've got the three years and the numbers are close. Give us an opportunity to try it, because we obviously know there is a question about the numbers already.

CHAIRMAN GEER: Adam.

MR. NOWALSKY: I believe what I've heard so far is that failing to implement this plan, the plans for the states is what would result in federal waters not opening. Not putting forth a state regulation that may result in overharvesting a target by tens of thousands of pounds of fish potentially. I would offer that that number and I haven't looked at it myself. But I can say with a high degree of confidence that the numbers we're talking about in these implementation plans is probably well within the confidence interval of these catch estimates. A few minutes ago by consent, this Board approved looking at the other approaches that other boards are using for dealing with recreational catch.

Approving these implementation plans that are well within these confidence intervals, in my opinion is completely consistent with the past Board action from a few minutes ago, about look at how other boards that have dealt with recreational fisheries and MRIP variability for a longer time, are doing things to improve the process, and I stand by this motion.

CHAIRMAN GEER: Then Robert.

MR. BOYLES: Adam is right. I think you know where I am, and maybe Mr. Chairman I might suggest a path out of this corner, perhaps. We adopted, I believe unanimously, I believe, this FMP in October. The Policy Board adopted it, agreed to it in November with an implementation date of April 1st. I recognize the uncertainty.

I recognize the challenges that we have that our public commenter's mentioned regarding applicability of the statistics. Mr. Chairman, however the fact remains is that we've had the Technical Committee do what we asked them to do, to review these implementation plans, and they have some reservations.

Therefore, I reiterate with respect to Mr. Nowalsky and Mr. Bush. I can't support this motion. I prefer my motion, and remind the Board that there is the avenue of conservation equivalency through which states can seek Technical Committee review of specific proposals designed to achieve the goals of the FMP. I would urge the Board to reject on the basis of the Technical Committee's recommendation the substitute motion, and urge passage of the original motion. Thank you.

CHAIRMAN GEER: Thank you very much, Robert, thank you for everybody. It's time to bring this to a vote**.** Substitute motion on the

floor is to move to substitute to approve all the state implementation plans as presented today. Motion by Mr. Nowalsky and Mr. Bush, can I see hands?

You want a minute, okay two minutes to caucus. Okay, are we ready? North Carolina, are we ready? **All right on the substitute motion, move to substitute to approve all state implementation plans as presented today. Motion by Mr. Nowalsky, and seconded by Mr. Bush. All those in favor raise your hand; all those opposed, any null votes, abstain, one. The motion fails 4 to 6 to 0 to 1. That brings us back to the main motion**.

Move to improve the state implementation plans for cobia FMP as recommended by the TC; motion by Mr. Boyles and seconded by Mr. Haymans. Again, all those in favor of this motion raise your hand; all those opposed, null votes, abstentions. The motion carries unanimously 11 to 0, 0, 0. Okay, we got that taken care of.

DRAFT ADDENDUM I FOR THE BLACK DRUM FISHERY MANAGEMENT PLAN FOR PUBLIC COMMENT

CHAIRMAN GEER: Moving on to the next item on the agenda is Draft Addendum I for the Black Drum Fishery Management Plan to go out to public comment. Mike is going to try to get us back on schedule.

DR. SCHMIDTKE: We kind of looked over an initial proposal from Maryland at the last meeting, so I'll give very brief background onto what motivated this addendum and go through the draft options. Timeline, last October Maryland submitted a proposal to reopen their commercial fishery in the Chesapeake Bay for black drum.

The Board initiated Addendum I to the black drum FMP. Right now we would be considering Draft Addendum I for public comment. Maryland has historically had a commercial fishery in the Chesapeake Bay that went from May through early June. There were no commercial harvest restrictions until 1994. At that point a 16 inch total length minimum size and an annual Chesapeake Bay quota were instituted.

During the time period from '73 to '97, about 11,000 pounds of annual average harvest were collected by the commercial fishery. A tagging study was initiated in the 1990s that closed the sale of black drum that were caught in Chesapeake Bay for Maryland, but the Department of Natural Resources bought black drum from pound net fishermen during that time for that study. In '99 the tagging study ended, as well as the buy-back program, after which the Chesapeake commercial fishery remained closed for the state of Maryland.

In 2013 the South Atlantic Board approved the black drum FMP, which continued this closure in perpetuity. The current reference points from the 2015 stock assessment have a harvest target of 2.12 million pounds, a harvest threshold of 4.12 million pounds, and a status of not overfished and overfishing not occurring for the coastwide black drum stock.

In 2016 total harvest was 1.53 million pounds. Here we see a table that is just showing the regulations for different states along the coast; recreational and commercial. The highlighted portion indicates the closure in Chesapeake Bay for the state of Maryland; and there is, as you can see on the table, there is no such regional closure that is required by the FMP for another state.

Just one thing to note, it was brought up in the last meeting; but there is commercial harvest that does occur in the Chesapeake Bay for the state of Virginia. The two options that are presented in this draft addendum, one is status quo; in which the current FMP remains in place, and the Chesapeake Bay remains closed to commercial harvest by Maryland.

The second option is to reopen Maryland's commercial fishery for black drum in the

Chesapeake Bay with a 10-fish-daily-vessel limit, and a 28-inch-minimum-total-length-size limit. The rationale for Option 2 is stated within the draft addendum, but to summarize the bottom line, in terms of impact on coastwide harvest, addition of the average or maximum harvest from the time this fishery was in operation would increase the 2016 coastwide harvest by 0.8 percent or 2.8 percent respectively. Given this small amount of projected harvest and the current stock status at the 2017 annual meeting the black drum TC advised the Board that this amount of harvest would not be likely to result in overfishing of the stock. With that I'll take any questions.

CHAIRMAN GEER: Lynn.

MS. FEGLEY: Thank you Mike for that. I wanted to add for the record that this is something that is of interest to our commercial sector in the state of Maryland. We also in Maryland, we will be taking this back out to our constituents to have a full discussion. For us the most important thing is as we embark on this process, to know that the Commission is onboard that this is approved.

If it's not approved we wouldn't have those discussions. The point to that is that that creel limit of 10 represents a maximum. It's an up to 10 fish, because at the end of the day what the state of Maryland could implement is something less than that. I just wanted the Board to be aware that what this represents is sort of the ceiling. We may do what the addendum says, or we could at the end of the day do something less.

CHAIRMAN GEER: Are there any questions for Mike or Lynn; any further discussion? We're ready for a motion on this?

MS. FEGLEY: I could do that Mr. Chair.

CHAIRMAN GEER: Okay, you have the floor.

MS. FEGLEY: **Sorry. I would move to approve the Draft Addendum I to the Black Drum Fishery Management Plan for public comment.**

CHAIRMAN GEER: Motion by Lynn Fegley, second the motion by Spud Woodward**. Any further discussion; is there any opposition? Seeing no opposition the motion carries.**

TECHNICAL COMMITTEE AND PLAN REVIEW TEAM REVIEW OF THE ANNUAL TRAFFIC LIGHT APPROACH FOR ATLANTIC CROAKER AND SPOT

CHAIRMAN GEER: Moving on to the next topic is review the TC's Plan Review Team for Annual Traffic Light Approach for Atlantic Croaker and Spot; and Chris, you have the floor.

MR. CHRIS McDONOUGH: We're going to look at some proposed changes to the traffic light analysis that we currently use now for spot and croaker. Just to give you a little bit of background. Spot and croaker underwent a benchmark assessment in 2017. However, they were not endorsed by the Peer Review Panel for management, due in part to the conflicting signals that were occurring between abundance and the harvest time series, as well as some issues with the bycatch estimates with the shrimp fishery.

Both species are currently monitored using the annual traffic light approach, which was established in 2014. Basically that approach assigns a color to categorize relative levels of the indicators on the condition of either the fish population, which is the abundance metric, or the fishery, which is a harvest metric.

Management action if both abundance and harvest were tripped for two consecutive years for spot and three consecutive years for croaker. Moderate concern would be the red proportions of 30 percent, and significant concern was red proportions of 60 percent or greater, the concerns that the TC had with the TLA and the way it has been working.

It was still superior to the way we did it prior to the TLA. However, the TLA still hadn't really triggered any management action; despite declining trends in the harvest that has been occurring all up and down the coast, to some of the lowest values that we've seen currently. Also several of the abundance indices that were used in the assessment are not currently part of the TLA, so that needed to be reevaluated. A TLA Subcommittee was formed to look at the available data for spot and croaker. The main things they looked at were redeveloping the indices, and splitting them by age; looking at recruitment indices and then adult indices separately, because there are differences in the way that two run, depending whether you're talking about what the fishery metric has in it and what the abundance indices have.

Then reconsider which of those indices should be considered and used in the traffic light. The spot landings and this is through 2016, continued to decline through last year or two years ago I guess now. However, the adult indices are exhibiting high abundance years that don't reflect or aren't seen in the fishery statistics, or the landings rather. The same is true with croaker. You see that continued decline in recent years.

Whereas, the higher abundances that occur in certain years in the adult indices from the fishery independent surveys don't show up in the fishery, or aren't reflected in the fishery very well. After examining all that the conclusions that the Subcommittee came to was that looking at the age split indices that the recruitment signals amongst most of the different surveys, tended to be fairly similar, but the declines as they occurred, occurred in the Chesapeake area first and then have showed up last in the surveys that occur further offshore.

The SEAMAP and the NMFS survey, the NMFS is the Northeast Fisheries Science Center trawl survey. Both of those are primarily driven by the recruitment signal; even with the age-split indices, because they have a relatively high proportion of ages 0s and 1s in them. There were some differences in regional exploitation in the fishery, in the harvest itself.

Then the SEAMAP index it was found that in the past we've always used, the fall is the season that we've looked at. But in examining across seasons to reevaluate it, we found that the spring survey actually tracked the adult year class better; because you have a much lower likelihood of seeing young of the year and juveniles at that time of year.

The four options that the TC was looking at to adapt or change the TLA were first of course the status quo, no change at all. The second was a coastwide traffic light, but using revised indices. The third is a regional approach, broken between the South Atlantic and the Mid-Atlantic with the same revised indices in those different areas.

Then the fourth approach that we looked at was examining relative exploitation. That we're going to talk about a little bit more in a bit. But that was the one option I'm going to talk about briefly, and then we're not going to talk about any more, because the TC that is not an avenue that we're going to go down. But we did look at it.

Okay for the current traffic light, which is the 2016, which would be the status quo. Harvest and commercial or the harvest metric, you know individually tripped. You can see it tripped in 2010, '12, '13, and then '15 and '16. The adult composite for NMFS and SEAMAP hasn't tripped since 2007. Because neither of those has tripped at the same time within current years, no management concern was triggered.

Now just to touch a bit on the relative exploitation, the current TLA metric wasn't reflecting the declines that we're seeing in abundance. But it's felt that some of that could be addressed in the index selection as it's used. Relative exploitation essentially uses the landings for the harvest standardized by annual

relative mean of one of the fishery dependent surveys; depending on the region and which survey you decide you want to use for it, for that area of the coast to gauge the relative levels of exploitation in the fishery. Now under that years of high abundance can only be interpreted as a good situation if harvest is also relatively high.

It can be used to address the situation where declines in abundance are counteracted by increasing proportions of the abundance or the amount of fish that are removed. One of the issues with that method though is that you need some kind of a protective measure, in case abundance and harvest declined at approximately the same rate. Then you're not going to see changes, because it's going to kind of be a fairly steady state.

The relative exploitation method was fairly conservative; and the TC felt that it would need a little bit more work to determine if that was even an appropriate reference point at this point. The consensus that the TC came to was to continue on with the traffic light, but using age-adjusted-index form, because one it's fairly consistent with what we've been using up until now, and a pretty straightforward measure. Okay so now to go back to our other options. The first is the coastwide option; and this is with a revised indices.

Now with the revised indices, this is including the NMFS Index, ChessMMAP Survey, North Carolina DMF Program, Trawl Program 195, and then the SEAMAP Index. It also uses a 2002 to 2012 reference period. The reference period had to be changed; the previous one was 1989 to 2012. The reason we change over to 2002 to 2012 is because that is the timeframe for the ChesMMAP survey, and in order to use the method you need to use the same timeframe within all the surveys.

Then management in this case would be triggered if two out of the three terminal years have been tripped; based on previous guidelines. That is two out of three, not two consecutive. The inclusion of ChesMMAP in this case made the index more sensitive, causing it to trip at a more moderate level. In the adult TLA it tripped in 2002 to 3, 2008, 2014, and 2016; which reflects a bit more what with the decline seen in the harvest metric.

Now as I said before, there were some differences in the regional landings. Long term trends were similar in that they were both declining. However, abundance trends were varied between regions, which led us into that idea of looking at comparing relative exploitation. Coastwide landings are pretty much driven by the Mid-Atlantic region, which represents the bulk of the landings for spot.

In the South Atlantic, while not as variable annually does follow that general declining trend. If we look at these on a regional basis, so this is looking at it regionally. This is for the Mid-Atlantic first here. The revised indices, in this case we're using the NMFS survey and ChesMMAP. The adult composite shows more of a decline than the previous just the NMFS survey alone would.

Within it tripping from 2002 to 2005, 2010, '12, and then in the last three years 2014 through '16. Then the harvest composite showed moderate concern in 2012 and the last two years, 2015, '16. Under this scenario, the survey actually would have triggered for moderate concern at both 2015 and 2016. For the South Atlantic the revised indices here are the North Carolina Program 195 and the SEAMAP survey. You see elevated concern in the harvest metric on the bottom, 2010, '12 and '13, and 2016. But you only see the adult composite index tripping at the higher red levels; the last time in 2009, in terms of occurring annually. For the South Atlantic in the last couple years, compared to the Mid-Atlantic, it would not have tripped. The recommendations that the TC is making for the spot traffic light would include incorporating indices from ChesMMAP, the North Carolina DMF Program 195 survey, as well as the continued use of NMFS and SEAMAP.

The use of an age-revised index for each of the surveys where we're using the adult portion of each of the surveys, and those would be estimated using annual age length keys, as well as the length frequency data. In order to get good estimates of what proportion of the index are those adult fish, which would be age one plus in the case of spot, and then using regional metrics to characterize the fishery.

With the separation being the North Carolina/Virginia border using ChesMMAP and the NMFS survey in the Mid-Atlantic, and then the North Carolina Program 195 and the SEAMAP survey in the southern zone. We would continue to utilize the traffic light for the recruitment; as well as the annual southeastern shrimp trawl fishery discard estimates as advisory and information purposes, just because we would still want to examine those to see how they match up with the trends with the adults, changing the reference time period from 2002 to 2012.

That is so we can keep up with it and include the ChesMMAP Index. Then finally change the triggering mechanism in accordance with the current 30 and 60 percent thresholds for red; if both abundance and harvest thresholds are exceeded in any two of the three terminal years. This is so that if you get high variability from year to year, which occurs more often with spot, because it's a short-lived species.

You can get one year of really high abundances, and that drops down and it drags out and you may not trigger. This way it gives us a bigger window that we can consider if we want to take management options or not. Okay and that is it for spot, now we do the same things with croaker. I'm going to essentially just go right back to the options that we did with croaker before.

Okay for the status quo to the current 2016 traffic light harvest metric trip. For the six consecutive years harvest levels have dropped for croaker. The Adult Composite Index for NMFS and SEAMAP did not trip; as those numbers have gone up. Overall no concern was triggered actually since '93, going back to the last time when the croaker levels in the independent surveys had been that low.

Now to look if we examine this with the revised indices, like we did with spot we're using a 2002 to 2012 reference period, so that it matches up with ChesMMAP. In this case we're using NMFS, ChesMMAP, SEAMAP, and SCDNR Trammel net survey, which was another adult survey in the southern portion over the southeast coast.

With these adults were these their age is two plus. In this case management would be triggered if two out of the three, I'm sorry that should be three out of the four terminal years are tripped, based on the previous guidelines for croaker. Now with the harvest traffic light, you see definite moderate concern throughout most of the '80s and early '90s, and then in recent years as it's kicked up from 2013 to 2016, as landings have gone down. Then the adult time series was a moderate concern in 2002 and 2008 through 2016. This is primarily due to the addition of the ChesMMAP Index, which has shown that decline that has really occurred in the Chesapeake, and does reflect or is more in consensus with the harvest metric. Regionally, there are differences between the Mid-Atlantic and the South Atlantic.

Recent years Mid-Atlantics tend to have the higher harvest rate, although that wasn't always the case. During the '80s the South Atlantic actually had higher croaker landings; although the scalar differences occur, but the overall trend is fairly similar between the regions. When we look at these regionally, this first one this is the Mid-Atlantic.

This is using NMFS and ChesMMAP. The adult composite had concern for a lot of years, 2002 to 2003 and then 2008 through 2016. Again, this is mainly due to really low catch levels in the Chesapeake that really drove those red proportions up. Then for the harvest index you see concern in recent years, although 2014

through 2016 was over that 30 percent threshold.

In recent years for croaker in the Mid-Atlantic that moderate concern under using those revised indices, would have been triggered in both 2015 and 2016. In the South Atlantic the adult composite was cause for concern more in the mid '90s, early 2001, 2004 and 2011, and then the harvest metric which caused concern mainly in recent years through the decline from 2012 through 2016.

The adult composite for the southern region for croaker, this is using SEAMAP and the South Carolina Trammel Net Survey, for recent years was below that 30 percent threshold. In the case of the South Atlantic, there would have been no concern triggered for croaker. The TC recommendations for the croaker TLA fall along the same lines of spot; include incorporation of the ChesMMAP Survey, as well as the SCDNR Trammel Net Survey into the adult composite characteristic.

In addition to continuing to use the NMFS fall survey and the SEAMAP survey. This one would also use the age-revised indices using age-length keys and length compositions in order to estimate the adult proportion; which in the case of croaker is the ages two plus that are caught in each of these surveys.

Use of a regional metric to characterize the fishery north and south of the Virginia/North Carolina border, this has to do mainly as with spot again, with differences in the fishery characteristics, not necessarily that there is biological differences across those. We would continue to utilize the recruitment indices; traffic light as well as the shrimp trawls fishery bycatch estimates as advisory indices and comparison in each annual exercise.

Establish a reference time period of 2002 to 2012, and then change the triggering mechanism such that management action would be triggered according to the current 30 percent red or 60 percent red thresholds, if both the abundance and the harvest thresholds are exceeded in any three of the four terminal years. With that and I tried my hardest to get us back on schedule.

CHAIRMAN GEER: You did a great job, Chris.

MR. McDONOUGH: I'll take questions.

CHAIRMAN GEER: Are there any questions for Chris? I have Joe and then I have Chris and Roy.

MR. CIMINO: It was a great job. I feel right now like I'm in full support of the TC recommendations. I just don't know where that last step for each one brings us. Changing those two trigger mechanisms, and I'm sorry I was trying very hard to follow along, but what status does that put us in for each of these species?

MR. McDONOUGH: You mean whether or not management concern has been triggered, basically?

MR. CIMINO: Yes, if we went through with all the recommendations.

MR. McDONOUGH: That would mean that management concern has been triggered and in that case one of the things that makes it a little hard is the fact that since we kind of just finished the stock assessment and it wasn't accepted. We're kind of left with a "what do we do now" kind of thing. But I think it would need, the TC would then have to come up with some recommendations to possibly, what do we have to do to get those abundances back up?

There aren't a lot of restrictions on croaker and spot as a whole in most of the states, and so you know there are some bag limits. I forgot, I think one state has a size limit. I mean there are things that could be implemented, but that would be the next step. It's like okay if we're going to do this and there is a problem, okay what do we do now?

I mean up until now spot and croaker are kind of one of those species. They are always there, and everything eats them, including us. But there definitely have been some issues. We would have to come up with a next step. We hadn't gotten there; we just need to see where we're going to go with it.

CHAIRMAN GEER: Chris.

MR. CHRIS BATSAVAGE: Thanks Chris and I'll apologize in advance if I missed this in your report. But did the Technical Committee discuss any issues or concerns with the regional traffic light approaches? In terms of data uncertainty, with you only have a couple independent indices for each region, as opposed to having four I guess if you looked at it coastwide.

Any differences in the traffic light assessments for the regions may also be clouded by just availability of fish at that time. You know with the fish kind of showing a progressive shift north or just some variation between whether there is a higher abundance of spot and croaker in the Mid-Atlantic versus the South Atlantic in a given year.

MR. McDONOUGH: Yes, we had multiple discussions on all those points. We examined, what was it like 20, we examined almost all the datasets that were used in the assessment, you know went back and looked at all of them. Generally the way they were getting picked had to do with the area coverage, consistency in overall trends.

Some of the surveys, you know if it were more geographically isolated and didn't match up with anything else. They didn't necessarily take away, but they don't add anything to the analysis either so they weren't used. There are some issues with availability in the changes, like the NMFS survey. You know years ago when we used that when they used to sample much further inshore in their strata that they used. We looked at the NEAMAP survey pretty hard, but the NEAMAP started in 2007, and there is still not quite enough data for it to be, at least for the traffic light system particularly with croaker, given their life span.

It's going to get used in the future eventually. Then there are some issues with, so whether or not the fish are there when they're sampling in consistency from year to year within a given survey, what part of the month they're sapling each year. We did look at all that stuff and you know we tried to go forward with the best fits that we could see that made the most sense.

CHAIRMAN GEER: Lynn and then Roy.

MS. FEGLEY: To follow on Joe's comments. I'm curious about the process. Would it require an addendum or an amendment? Would we have to initiate an new plan to adopt this new traffic light, and then based on that we would wind up having to initiate management, and could that happen in the same addendum or amendment or what are the process steps?

CHAIRMAN GEER: Go ahead, Mike.

MR. McDONOUGH: I'll address the first part. The second part I may have to kick to Toni. Taking all of the TCs recommendations would require initiating an addendum for each species, for spot and for croaker. As far as being able to take management action in the midst of that process, I'm not sure.

MS. KERNS: So Lynn, staff talked about this a little bit and what we thought would be the best path forward. If it is the Board's inclination to move forward with these recommendations and adopt a new TLA approach, and we know that it does trigger management action for the Mid-Atlantic States. We thought that it would be best to incorporate the new year's data that would come in August, and so that it would be something that we could incorporate into one single document.

In order to give the PDT and the TC time to figure out what types of management response that we would need, and the Board to give

direction to those groups that we could include it in both, but the management document wouldn't come out until August at the earliest. To address both in one document, because we did not budget to do two documents this year. Since the public would probably want to see the most recent year's data, we thought it would be best to hold off until we had that information this summer.

CHAIRMAN GEER: Could we hold off until the May meeting to decide if we want to approve this or not; because a lot of folks have just seen this today for the first time or have just read this recently and haven't had a chance to digest it all.

MS. KERNS: We could definitely hold off until then. The one drawback to that is then we wouldn't be able to start tasking the TC and the PDT to start thinking about how we would respond to a management trigger. What types of management actions would the Board want the TC to think about and evaluate? Depending on where the Board wants the PDT to go, maybe the time between May and August might not be enough time to develop those management options. It just depends on the direction that the Board takes.

CHAIRMAN GEER: What is the Board's pleasure; hearing nothing?

MS. KERNS: I should say that you know we're not on any time crunch, so if the document doesn't get approved until annual meeting to go out for public comment. I don't think that that is problematic.

CHAIRMAN GEER: Does that sound like a course of action on this? I see head nodding. It's a lot to digest. Having those new numbers would be good as well. It said possible action and with that in mind I'm going to say let's table this until the next meeting. Go ahead, Toni.

MS. KERNS: I just want to be clear; I'll turn to Mike and Chris for this. But I don't believe we would have new numbers until August worked up, until the August meeting, so it would probably be helpful if the Board digested this new information, came back in May and at least indicated to the PDT and the TC that this is something that they wanted to move forward with. Then in August we could at least come back with updated TLAs and then possible direction on how to respond for management.

CHAIRMAN GEER: Yes folks, because we're running out of time here, and the last thing I want to do is to keep the Striped Bass Board waiting on us; because I'm sure they've got a lot of work to do. If that is the Board's direction they want to go. I see head nodding. We'll take it home, show it to your TC members and we'll discuss this in the May meeting.

2017 FMP REVIEW AND STATE COMPLIANCE REPORTS FOR SPOT AND SPANISH MACKEREL

CHAIRMAN GEER: The next item on the agenda was the Compliance Reports for spot and Spanish mackerel, and there were no compliance issues in there so we're just going to send that out as e-mails for approval on that so we can move on.

OTHER BUSINESS

CHAIRMAN GEER: That would bring us to, is there any other business at this time? Robert.

MR. BOYLES: Mr. Chairman, just quick in accordance with Amendment 2, the Red Drum Plan, I wanted to let the Board know that South Carolina is seeking legislative approval to reduce fishing mortality on red drum. We are seeking approval from the legislature to reduce our bag limit, which is currently at three, down to two.

We expect this to be a reduction in fishing mortality, so it will not increase fishing mortality, so I'm not looking for the Board's approval as the requirements of Amendment 2. But I just wanted to let the Board know that we're working in that direction.

ADJOURNMENT

CHAIRMAN GEER: Is there any other business before this Board? Hearing none; meeting is adjourned.

(Whereupon the meeting adjourned at 2:55 o'clock p.m. on February 7, 2018)

Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM I TO THE BLACK DRUM FISHERY MANAGEMENT PLAN

Vision: Sustainably Managing Atlantic Coastal Fisheries

May 2018

Public Comment Process and Proposed Timeline

In October 2017, South Atlantic State/Federal Fisheries Management Board (Board) approved a motion to initiate the development of an addendum to the Interstate Fishery Management Plan (FMP) for black drum to consider reopening Maryland's commercial fishery for black drum in the Chesapeake Bay. This draft addendum presents background on the Atlantic States Marine Fisheries Commission's (ASMFC) management of black drum, the addendum process and timeline, and a statement of the problem. This document also provides black drum management options for public consideration and comment.

A Public Comment period was held from February 7 through March 23, 2018. Comments were submitted via email and one public hearing was held in the state of Maryland. Comments and a summary of the public hearing will be provided to the Board prior to their decision on Final Approval of Draft Addendum I in May, 2018.

The development of Draft Addendum I to the Black Drum Fishery Management Plan follows the general process outlined below. Tentative dates are included to illustrate the timeline of the addendum process.

October 2017: Board Approved Draft Addendum Development

↓

October 2017-January 2018: Draft Addendum for Public Comment Developed

↓

February 2018: Board Approved Draft for Public Comment

↓

February 7 – March 23, 2018: Public Comment Period

↓

May 2018: Board Review, Selection of Management Measures, and Final Approval **(Current step)**

↓

TBD: Implementation of Provisions of Addendum I

1.0 Introduction

The Atlantic States Marine Fisheries Commission's (ASMFC) South Atlantic State/Federal Fisheries Management Board (Board) approved the Interstate Fishery Management Plan for Black Drum (FMP) in June 2013 (ASMFC, 2013). The goal of the FMP is to provide for an efficient management structure to implement coastwide management measures in a timely manner. ASMFC maintains the primary management authority for black drum in state and federal waters. The management unit for black drum extends throughout the species range along the U.S. Atlantic coast, from Gulf of Maine through Florida, but black drum within this range are primarily caught from New Jersey through Florida.

Draft Addendum I proposes reopening Maryland's commercial black drum fishery in the Chesapeake Bay.

2.0 Overview

2.1 Statement of the problem

Draft Addendum I responds to a proposal from the state of Maryland to reopen their commercial fishery for black drum in the Chesapeake Bay. The FMP requires states to maintain the commercial restrictions that were in place at the time of the FMP's approval. At the time of the FMP's adoption, Maryland's commercial black drum fishery in Chesapeake Bay was in the midst of a closure that was originally intended to be temporary but, after approval of the FMP, has been continued in perpetuity. Maryland has proposed reopening this fishery with daily vessel and minimum size restrictions.

2.1.2 Background

During the late 1990s, the state of Maryland began a tag and release program for black drum in order to gather critical life history, migration, and recreational harvest data for the species. This program compensated commercial watermen for black drum encountered in pound nets. The watermen were prohibited from taking the fish, but were paid for fish that were tagged and released from their nets. In 1998, the tagging program ended, but the verification of black drum caught, and compensation for their release, continued in 1999. The compensation program was eliminated prior to the start of the 2000 season, but commercial harvest was not reinstated. Commercial watermen would periodically request reinstatement of harvest, but this never became a priority issue and commercial harvest remained closed. In 2013, the fishery was formally and permanently closed when ASMFC approved the Interstate Fishery Management Plan for Black Drum (ASMFC, 2013), which states in section 4.2: "In order to avoid the establishment of any new commercial fisheries for black drum, all states shall maintain their current level of restrictions, i.e. no relaxation of current commercial fisheries management measures." As a result of this language in the plan, Maryland's black drum fishery in the Chesapeake Bay was frozen in a commercial moratorium, which is the most conservative management for black drum among the Atlantic states (Table 1).

Table 1. Black drum regulations for 2016. The states of New Jersey through Florida are required to meet the requirements in the FMP. All size limits are total length.

State	Recreational		Commercial			Notes
	Size limit	**Bag limit**	**Size limit**	**Trip Limit**	**Annual Quota**	
ME - NY	-	-	-	-	-	
NJ	16" min	3/person/day	16" min	10,000 lbs	65,000 lbs	
DE	16" min	3/person/day	16" min	10,000 lbs	65,000 lbs	
MD	16" min	1/person/day 6/vessel (Bay)	16" min		1,500 lbs Atlantic Coast	**Chesapeake Bay closed to commercial harvest**
VA	16" min	1/person/ day	16" min	1/person/ day*	120,000 lbs	*without Black Drum Harvesting and Selling Permit
NC	14" min - 25" max; 1 fish > 25" may be retained	10/person/ day	14" min - 25" max	500 lbs		
SC	14" min - 27" max	5/person/day	14" min - 27" max	5/person/day		Commercial fishery primarily bycatch
GA	14" min	15/person/ day	14" min	15/person/ day		
FL	14" min - 24" max; 1 fish >24" may be retained	5/person/day	14" min - 24" max	500 lbs/day		

3.0 Management Options

Option 1: Status quo. Current FMP remains in place.

Option 2: Reopen Maryland's commercial fishery for black drum in the Chesapeake Bay with a 10 fish daily vessel limit and a 28 inch minimum total length size limit.

Maryland's proposal indicates that the vessel and size limits of Option 2 would result in an effective daily trip limit of approximately 500 pounds, allowing comparable harvests to states like North Carolina and Florida, which currently have 500 pound per day commercial limits. The Black Drum Technical Committee (TC) has reviewed the following rationale for these limits and recommended that reopening of this fishery under the restrictions proposed by Option 2 would not likely result in overfishing of the stock. The TC also recommends that, in addition to fulfilling commercial reporting requirements of the FMP, biological monitoring of black drum caught by

this fishery should be conducted to collect valuable stock assessment information such as length, weight, and age.

Vessel Limit Rationale: Maryland DNR conducted a tagging study from 1995-1997 in which 457 black drum were weighed. Mean weight for fish over 28 inches was 46.6 pounds, indicating a ten-fish limit would be similar to a 500 pound per day limit. More so, in this tagging study, 91 percent of the weights were taken in 1997, which appeared to be a year in which mean length of landed black drum (1,104 mm total length, n = 900) may have been higher than normal. Since 1993, Maryland DNR has conducted an ongoing pound net survey which infrequently encounters black drum (n = 131). When they are encountered, mean length in the pound net survey was observed to be 883 mm (35 inches) total length from 1993-2016. The fact that smaller black drum were encountered in the pound nets also suggests that 10 fish harvested from pound nets will often weigh less than 500 pounds per day.

Size Limit Rationale: The 28-inch total length size limit represents the length of 100% maturity and would ensure no increase in harvest mortality on immature black drum. Tagging study and pound net survey length frequencies indicate 3% and 37% of black drum, respectively, would have been discarded if a 28-inch size limit had been in place. Again, the broader time period of the pound net survey takes more inter annual variability into account, making it likely, that in the long term, the higher discard rate is more accurate.

Estimated Impacts of Option 2: From 1973-1997, the time period for which landings by area are available in Maryland, Chesapeake Bay commercial black drum harvest ranged from zero to 41,552 pounds, with an annual average harvest of 11,475 pounds. The majority of these landings were taken in pound nets. There were no commercial harvest restrictions from 1973-1993. A 16-inch minimum total length size limit and 30,000 pound annual Chesapeake Bay commercial quota was implemented from 1994-1997. Compared to the 2015 total coast-wide harvest of 1,486,327 pounds, the addition of Maryland's historical average or maximum Chesapeake Bay harvest would lead to an estimated increase in coast-wide harvest of 0.8% or 2.8%, respectively. Option 2 is more restrictive than the regulations that were in place from 1973 to 1997, so impacts of Maryland harvest to the coast-wide total would likely be on the low end of this range.

The 2015 coast-wide benchmark stock assessment (data through 2012) indicated the stock was not overfished and overfishing was not occurring (ASMFC, 2015). The current total harvest target is 2.12 million pounds and the threshold is 4.12 million pounds. In 2016, total harvest was 28% below the target (1.53 million pounds), indicating additional landings from reopening the Maryland Chesapeake Bay commercial harvest, at the proposed level, would unlikely result in exceeding the target in the future and would very unlikely lead to overfishing.

4.0 Compliance

If approved by the Board, to implement this Draft Addendum, Maryland must submit regulatory language that complies with this Draft Addendum by XXXX, 2018, with implementation scheduled for XXXX, 2018. Maryland would also annually report additional landings from this fishery, in accordance with the requirements of the FMP.

5.0 References

ASMFC. 2013. Interstate Fishery Management Plan for Black Drum. Arlington, VA. http://www.asmfc.org/uploads/file/BlackDrumInterstateFMP_June2013.pdf.

ASMFC. 2015. Black Drum Stock Assessment for Peer Review. Atlantic States Marine Fisheries Commission, Stock Assessment Report. 352 p. http://www.asmfc.org/uploads/file//54ecf837BlackDrumStockAssmt_PeerReviewReports_Feb2015.pdf.

Summary of Public Comment on Draft Addendum I to the Black Drum Fishery Management Plan

In February and March of 2018, a Public Comment period was conducted for Draft Addendum I to the Black Drum Fishery Management Plan (FMP). During this period, emailed comments were received and one public hearing was held in the state of Maryland. This document summarizes comments received via email and at the public hearing.

Management Options

Option 1: Status quo. Current FMP remains in place.

Option 2: Reopen Maryland's commercial fishery for black drum in the Chesapeake Bay with a 10 fish daily vessel limit and a 28 inch minimum total length size limit.

Emailed Public Comment Summary

The Public Comment period for Draft Addendum I to the Black Drum FMP ended on March 23, 2018, and 14 comments were received. Copies of written comments are included in Briefing Materials for the ASMFC South Atlantic Board Spring 2018 meeting.

Thirteen (13) comments (12 from individuals and 1 from Coastal Conservation Association Maryland) expressed support for Option 1 (status quo). Nine (9) of these comments referenced the low commercial value of black drum due to poor meat quality of larger fish and expressed that black drum are more valuable in the largely catch and release recreational fishery. Five (5) comments expressed concern specifically with the harvest of large black drum, citing potential loss of spawning productivity or reduced numbers of large black drum, which are targeted by the recreational fishery, due to their long lifespan and slow growth after maturity. Four (4) comments expressed concern about potential interference with recreational fishing opportunities due to the location of commercial pound nets or potentially reduced availability of black drum in Chesapeake Bay resulting from opening commercial harvest. Three (3) comments expressed concern with the status of the stock, citing declining abundance, and the potential for Option 2 to result in overfishing or localized depletion within Chesapeake Bay. Three (3) comments referenced black drum as a valued and necessary recreational alternative to fishing for striped bass. Two (2) comments expressed concern with enforceability of Option 2 due to pound nets' ability to potentially catch more than the allowed number of fish with discarding of excess fish not always able to occur quickly, increasing discard mortality. One (1) of these comments suggested that any black drum harvest should be focused on smaller fish. One (1) comment suggested that a pilot study should be conducted to predict the effects of Option 2.

One (1) individual comment expressed support for Option 2 (reopening Maryland's commercial fishery in Chesapeake Bay). This comment additionally suggested limiting the gear to only pound nets.

Black Drum Draft Addendum I Public Hearing Summary
Annapolis, Maryland
March 15, 2018
5 Attendees

Meeting Staff: Dr. Michael Schmidtke (ASMFC), Lynn Fegley (MD DNR), Erik Zlokovitz (MD DNR)

Meeting Participants: Ed O'Brien (ASMFC, Maryland Charter Boat Association), David Sikorski (Coastal Conservation Association [CCA] Maryland)

Following staff presentation of the options of the Draft Addendum, some clarifying questions were asked concerning characteristics of the historical fishery and current stock status. No comments were provided on either of the two options in the Draft Addendum or alternative management options. **David Sikorski** noted that he would be developing a written comment on behalf of CCA Maryland.

Black Drum Draft Addendum I

Atlantic States Marine Fisheries Commission
March 15, 2018
Maryland

-- PLEASE PRINT CLEARLY --

Name	Company/Organization	City, State
ED O'BRIEN	MCBA	Chesapeake Beach
DAVID SHEARER	CCA MARYLAND	BALTIMORE, MD
Staff-- ERIK ZLOTNIK	MDDNR	Annapolis, MD
Staff LYNN FEGLEY	MDDNR	Annapolis, MD

COASTAL CONSERVATION ASSOCIATION MARYLAND

RECREATIONAL ANGLERS WORKING TO CONSERVE, PROMOTE, AND ENHANCE MARYLAND'S MARINE RESOURCES

March 23, 2018

Mr. Michael Schmidtke
Atlantic States Marine Fisheries Commission
1050 North Highland Street, Suite 200A-N
Arlington, VA 22201

RE: Draft Addendum 1 to the Black Drum FMP Public Comment

Mr. Schmidtke:

Thank you for the opportunity to provide comment on Draft Addendum 1 to the Black Drum FMP which is currently being considered by the South Atlantic State/Federal Fisheries Management Board. CCA Maryland supports OPTION 1: Status Quo.

The Chesapeake Bay has a long standing recreational fishery (private and for hire/charter) for large black drum. MRIP data for the species shows a large amount of uncertainty of catch, but anecdotal information tells us that the fishery is regionally popular. Many anglers pursue these fish for the enjoyment of catching them, and most learn that release is the best option, after attempting to eat any large black drum.

Overharvest and disease have decreased oyster habitat in Chesapeake Bay, and nutrient loading and pollution continually lead to "dead zones". Recent work by Maryland DNR has shown that benthic habitat, which includes clams, worms, and other important forage for species like black drum has been lost in portions of the lower bay. Participants in recreational fishery have experienced a decline in angling opportunities, and the abundance of fish populations due to these conditions, and have concerns on future performance of the recreational fishery. Generally speaking, striped bass are the most available and popular species in Chesapeake Bay, and a decline in the abundance of species like croaker, spot, weakfish, red drum, and black drum have been noted by anglers in the region in the last many years. Without a clear solution to improve habitat and water quality conditions, any further impact on these recreationally important species should be avoided.

The perception of value of a fishery can vary greatly amongst stakeholders, but the value of the recreational fishery which pursues black drum in Chesapeake Bay far outweighs the value of the proposed commercial harvest allowance. A recent ASMFC summary of commercial landings noted a dockside value of $0.45 for black drum. In comparison, a charter fishing trip varies from $450-650 for a half day trip, and as much as $1200 for a full day trip. At this time, these trips are limited to one fish per person and a maximum

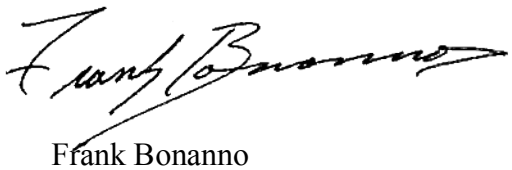
of 6 fish per boat, and as stated previously, not all trips result in black drum harvest, and instead, the experience of catching and releasing the large adult fish.

As a long-lived species, black drum grow quickly in their juvenile stage, and growth rates greatly decrease as they become mature. Large fish are important for the production of offspring and take a great deal of time to replace once removed. The black drum management system should avoid the harvest of these older fish, and focus on the harvest of more quickly replaceable smaller fish.

CCA Maryland also has concerns of the enforceability of this proposal for harvest with pound nets. Enforcement coverage and funding is already limited in Chesapeake Bay, and due to the schooling nature of black drum, they are often caught by pound nets in numbers above those proposed by this action. The nets which often catch black drum are also close to where the recreational fishery targets the fish, and could lead to new conflicts which can undermine the existing, and economically valuable recreational fishery.

Given these many points, CCA Maryland respectfully requests that OPTION 1: Status Quo is selected for the Draft Addendum 1 to the Black Drum FMP.

Regards,



Frank Bonanno
Chairman
CCA Maryland

Tina Berger

From: Douglas Clark <dublinlaundry1@gmail.com>
Sent: Thursday, March 22, 2018 7:41 PM
To: Comments
Subject: Black Drum

Considering management of the Black Drum Fishery in the Chesapeake, I support Option1 (status quo). Comparing the low economic value for the commercial watermen to the much higher value to charter captains and recreational fishermen, this is a no brainer. These large fish are better left enjoyed by recreationals which will do much more to support local economy.

Douglas Clark
3322 Thomas Bridge Road
Street, Maryland 21154
410-688-1999

Tina Berger

From: Larry Jennings <larryjennings@comcast.net>
Sent: Thursday, March 22, 2018 12:02 PM
To: Comments
Subject: black Drum Amendment 1

I strongly oppose the opening of the Black Drum fishery to commercial harvest as a short-sighted, greedy attempt ignore what's best for Black Drum and states' potential economic advantage.
Black Drum grow very large and live for decades making their breeding stock of old, fat, fertile females exceptionally important. These would be the first to be harvested by a commercial fishery yet Black Drum are well known to be infected by worms as they age making their meat unfit for commercial, retail sale and likely to sold for bait or other low value sale.
As a target for recreational anglers, Black Drum, are superb big fish that will test your tackle and stamina for a bruising battle that you will never forget. Whether from their own boats or commercial charter boats, these catch and release fish are the epitome of the ethic that they are far too valuable to only be caught once and these fish can be caught and released every year for decades and still keep spawning to help the spawning stock biomass to continue to grow.
Please support OPTION 1 – STATUS QUO to keep our management of Black Drum protected for the betterment of this fish, recreational anglers and Maryland's economic interests.

Larry Jennings
960 Woodland Circle
Annapolis, MD 21409
410-757-4074
larryjennings@comcast.net

Tina Berger

From: Saigo Takamori <paintboat@hotmail.com>
Sent: Wednesday, March 21, 2018 5:31 PM
To: Comments
Subject: Black Drum, commercial proposal

By all means consider an opening for the commercial fishery to catch Black Drum.
It has been too long that the fishery has been kept from such fish when they get caught in devices such a pound nets.
Hope this will become a reality.
I am all for this.

Marc Castelli.

Sent from Mail for Windows 10

Tina Berger

From: fygraphics@comcast.net
Sent: Wednesday, March 21, 2018 4:07 PM
To: Comments
Subject: Black Drum Draft Addendum I

Dear Dr. Schmidtke.

I am writing to you in opposition to reopening Black Drum to commercial fishing in the Chesapeake Bay. I have fished the Bay my entire life and feel that this fishery is not truly sustainable and should continue to be off limits to commercial fishing. Capture (and release) mortality is always an issue as well, causing unintended, and sometimes, considerable loss.

I appreciate the opportunity to express my concern.

Sincerely,
Fran Younger
Lusby, MD

Tina Berger

From: Jamie Simering <lacyskittles2006@icloud.com>
Sent: Friday, March 09, 2018 3:08 PM
To: Comments
Subject: Black drum

Sent from my iPhone. I've been fishing the Chesapeake Bay all my life and have only hooked 1 black drum but could not land it. They are so few and far between you wanna open the commercial fishery back up. Why would you do that? I wanna see this fishery come back strong and help take some pressure off the striped bass cause that's really about the only solid fishery besides perch the bay has to offer. Let these fish be or you will end up wiping them out once again. Please do not destroy this fishery before it has even had the chance to come back!! Thanks

Tina Berger

From: John & Charlene Conolly <jsccrc@comcast.net>
Sent: Friday, March 09, 2018 2:17 PM
To: Mike Schmidtke
Cc: LYNN FEGLEY
Subject: Black Drum Draft Addendum 1

After reviewing the subject FMP, I feel that Option 1, retaining the current closed commercial season should be chosen. These fish have little commercial value and make poor table fare. The larger fish often contain worms as I have witnessed. There is a far greater economic value in the recreational fishery, to include charter boats, which is primarily a catch and release fishery based on my observations.

V/R,
John Conolly

Tina Berger

From: Morgan Kupfer <mkupfer32@gmail.com>
Sent: Monday, March 05, 2018 9:49 PM
To: Mike Schmidtke
Subject: Black Drum Draft Addendum I

As a long time fisherman in the Chesapeake and conservationist, I believe Black Drum Draft Addendum I should be tossed aside as it is not in the best interest of the fish and does not make sense for the species.

Morgan Kupfer
(410) 212-7015
mkupfer32@gmail.com

Tina Berger

From: Travis Keon <keontc@gmail.com>
Sent: Monday, March 05, 2018 8:46 PM
To: Comments; Mike Schmidtke
Subject: Comment: ASMFC Draft Addendum to the Black Drum Fishery Management Plan

Good evening,

I am a Maryland boat owner and recreational fisherman. Please support keeping the regulations as they are regarding black drum. The drum's age, slow growth, and limited commercial applicability are reasons to not allow for any commercial harvest. Thank you

Travis Keon
3208 Rollin Rd
Falls Church VA, 22042

Tina Berger

From: mjungdahl <mjungdahl@gmail.com>
Sent: Monday, March 05, 2018 6:37 PM
To: Comments
Subject: "Black Drum Draft Addendum I"

Gentleman

In my opinion the commercial fishery for Balck Drum should remain closed, period, rather than risk another decimation and the resulting public outcry. Because is a slow growing fish and mistakingly re-opening the commercial harvet now could have long term unwanted effects. At the very least more small controlled studies should be run until reliable data
can exhibit no harmful results to the Back Drum population in the Chesapeake Bay .

Sincerely
Dr Mark D Jungdahl

Tina Berger

From: Travis Long <travis.long@pgcps.org>
Sent: Monday, March 05, 2018 6:19 PM
To: Mike Schmidtke
Subject: Black drum

I would not like to see the black drum harvest reopened in Maryland. The stock numbers are going down and the pound nets are in place on their habitats. It will be a slaughter. Please vote no!

Sent from my iPhone

Tina Berger

From: Travis Long <travis.long@pgcps.org>
Sent: Monday, March 05, 2018 5:40 PM
To: Comments
Subject: Black drum

Black drum are a slow growth species. The value in the water is far greater than the pennies on the pound for the meat. Please do not open them for harvest!

Sent from my iPhone

Tina Berger

From: Lenny Rudow <Lenny@fishtalkmag.com>
Sent: Monday, March 05, 2018 5:38 PM
To: Mike Schmidtke; Comments
Subject: Black Drum Draft Addendum I

Dear Mr. Schmidtke and ASMFC:

I would like to express my personal support of Option 1 status quo, current FMP remains in place and the commercial fishery for black drum in Maryland remains closed. While stock assessments may not indicate an immediate danger of overfishing the coast-wide stock, any change in regulations could radically affect recreational angling in the Chesapeake Bay. This has happened before - I'm old enough to remember that one of the initial triggers that led to the current regulations being instituted back in the 90's was localized depletion of black drum to the point that the middle-Chesapeake region fishery came to a screeching halt. At the time there was a tremendous public outcry. The short (three to four week) but important drum run was lost entirely for several years, for a commercial take that is financially paltry. Allowing the harvest of 20 to 50 year old spawning stock fish for less per-pound value than white perch, croaker, or virtually any other finfish found in the Chesapeake made no sense then and makes no sense now. Additionally, please consider that black drum commonly begin to run in the Middle-Chesapeake during the latter half of the striped bass trophy season. Because of the timing, their appearance in mid to late May reduces pressure on the recreational striped bass fishery, which we all know has challenges of its own.

Thank you for registering my opinion and taking these factors into consideration.

RUDOW'S FishTalk

Lenny Rudow, Editor - p. 410/798-6503
cell 410/353-1981- Lenny@fishtalkmag.com
www.fishtalkmag.com

Tina Berger

From: Ron <ronbuff@comcast.net>
Sent: Monday, March 05, 2018 5:14 PM
To: Comments
Subject: Black drum

Please do not allow the commercial harvest of black drum. These fish sell for cents on the dollar at market and worth more in the water than out.

Ron Buffington

Tina Berger

From: John Bonanno <jbonanno51@gmail.com>
Sent: Monday, March 05, 2018 5:10 PM
To: Comments
Subject: Black Drum

As a Maryland resident and angler I like to add my two cents to the conversation and state I oppose opening the black drum catch to commercial fishing. There is no real market values to this fish and would better serve the industry as a recreational fish

John
Sent From iPhone

Tina Berger

From: Saigo Takamori <paintboat@hotmail.com>
Sent: Monday, March 05, 2018 2:15 PM
To: Comments
Subject: Black Drum as a commercial fishery

By all means expand the commercial fishery to include the species known as Black Drum!
Limit it to just pound netters.

Thank you.

Marc Castelli
208 David Drive,
Chestertown,
MD 21620.
410 778-5851

Sent from Mail for Windows 10

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October 10, 2017

To: **South Atlantic State/Federal Fisheries Management Board**

From: **Black Drum Technical Committee**

Subject: **Black Drum TC Review of Maryland Proposal**

In September, 2017, the Black Drum Technical Committee (TC) met via conference call to review a proposal from the state of Maryland that would reopen Maryland's commercial fishery for black drum in Chesapeake Bay. After discussion outlined in the attached Call Summary, the TC finds that reopening of this historic fishery would not likely lead to overfishing of the stock. **Therefore, the TC recommends that the Board considers approval Maryland's request to reopen their commercial black drum fishery in Chesapeake Bay.** To improve data used to assess stock status, the TC recommends Maryland conduct biological monitoring of black drum caught by Maryland's commercial fishery in Chesapeake Bay.

Enc: Black Drum TC Sept 29, 2017, Call Summary

M17-103

Atlantic States Marine Fisheries Commission

Black Drum Technical Committee

Call Summary

September 29, 2017
9:30 -11:00 a.m.

Technical Committee: Harry Rickabaugh (Chair) (MD), Jordy Zimmerman (DE), Ryan Jiorle (VA), Chris Stewart (NC), Chris McDonough (SC), Ryan Harrell (GA)

ASMFC Staff: Mike Schmidtke, Jeff Kipp

1) **Welcome & Introductions**

2) **Review of MD Proposal**

- Harry Rickabaugh presented Maryland's proposal to re-open their commercial fishery in Chesapeake Bay. This fishery was historically executed until the late 1990s, when the state of Maryland closed the fishery to conduct a tag and release program that collected life history, migration, and recreational harvest data. After the program was completed, the fishery was not reopened, as it was not considered a high-priority fishery. While the closure was in effect, in 2013, the Atlantic States Marine Fisheries Commission approved the interstate FMP for Black Drum, which required states to maintain current management measures, continuing Maryland's commercial closure in the Chesapeake Bay.

- Maryland is proposing to reopen the Chesapeake Bay commercial black drum fishery with a ten fish per vessel per day harvest limit and a 28 inch minimum total length size limit, equating to an effective daily trip limit of approximately 500 pounds.

- TC Discussion

    - Jordy Zimmerman confirmed some details of the proposal and asked if this proposal would apply to all gears. Harry replied that the proposal would apply to all gears, but realistically this fishery would be mostly pound nets with some hook and line.

    - Chris McDonough asked what monitoring would be conducted. Harry replied that normal commercial monitoring requirements would apply for black drum.

- Chris McDonough asked about comparability to the Virginia commercial fishery. Ryan Jiorle and Chris M discussed the Virginia fishery, in which there is a small directed commercial fishery executed primarily from the Eastern Shore in which black drum are caught via gill nets, pound nets, or hook and line. In Virginia, any commercial license holder can harvest up to one black drum per day, and with an additional permit, black drum larger than a minimum size limit may be harvested without a possession limit.

- Ryan offered to provide data from Virginia's biological monitoring program as supportive material for Maryland's proposal.

- The group discussed the timeframe of the fishery. Although the fishery would legally be open year-round, due to seasonal movements of black drum, this fishery would typically executed about 4-6 weeks per year. Black drum typically spawn before entering Maryland's portion of Chesapeake Bay, so this fishery likely would not catch spawning females.

- Jordy asked about the number of fishermen that would participate. Harry replied that no specific license would be required, but gill nets would be cost-prohibitive for this fishery (they wouldn't catch many black drum due to maximum size restrictions on Atlantic striped bass caught in gill nets) and the pound net fishery in Maryland is capped with limited entry (and is actually shrinking).

- The group discussed potential levels of dead discards. Harry commented that current monitoring efforts show minimal dead discards in the Maryland pound net fishery. The group discussed the potential for death due to overcrowding, but agreed that this was not likely for this fishery.

- Chris M asked about the level of black drum bycatch during the moratorium in the Bay. Harry replied that the pound net fishery starts in May-June, typically catching Atlantic croaker, menhaden, or other migratory fish, but may see 1-5 black drum in a net.

- The group discussed the current market for black drum and potential for this fishery to reach levels seen before the closure. Several group members agreed that black drum are not heavily valued for market such that pound net fishermen would change their behavior, particularly with a ten fish bag limit. Jordy commented that this fishery would occur near the end of the Delaware fishery, in which 45 cents per pound is a typical price for black drum. Jordy commented that as is, the black drum market can quickly become oversaturated, driving the price per pound down. Adding Maryland harvest may increase this oversaturation, resulting in lowered demand

and shortened effective seasons for this fishery. Harry commented that while the Maryland commercial Chesapeake Bay black drum fishery was operating without restriction, average annual landings were about 11,500 pounds, and the fishermen were typically good about monitoring the market. Due to the difficulty of handling large black drum, commercial fishers typically do not want to handle these fish unless they can sell them for a decent price.

- The group discussed the potential for biological monitoring of this fishery. Harry commented that biological sampling of pound nets is already conducted for other species in Maryland, so adding black drum to the species sampled could be looked into. Jordy suggested that fish could be bought directly from the fishery to more easily identify catch location.

****The Black Drum TC recommends that the Maryland proposal to reopen their commercial black drum fishery in the Chesapeake Bay be approved, as reopening of this historic fishery would not likely lead to overfishing of this stock. The TC further recommends that biological monitoring of black drum caught in this fishery be conducted to collect information such as size, age, etc.****

3) **Other Business/Adjourn**

- Jeff Kipp commented that the next benchmark stock assessment for black drum is scheduled for 2020. Jeff and Mike Schmidtke will review data since the last assessment to summarize progress that has been made on research recommendations. This summary will help inform the TC on whether to recommend, on a later call, keeping the assessment as currently scheduled or delaying until more information is collected.

4) **Black Drum FMP Review** (Black Drum PRT)

- The Black Drum PRT reviewed state compliance with the Black Drum FMP for 2016. Their recommendations are found in the 2017 Black Drum FMP Review.

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January 18, 2018

To: **South Atlantic State/Federal Fisheries Management Board**

From: **Atlantic Croaker Technical Committee and Spot Plan Review Team**

Subject: **Recommended Updates to the Annual Traffic Light Analyses for Atlantic Croaker and Spot**

In 2017, benchmark stock assessments were completed for Atlantic croaker and spot. Neither of these assessments were recommended for management use due in part to conflicting signals from abundance and harvest time series. To improve the annual Traffic Light Analyses (TLA) conducted for these species, which monitor these fisheries using abundance and harvest time series, the South Atlantic State/Federal Fisheries Management Board (Board) tasked the Atlantic Croaker Technical Committee (TC) and Spot Plan Review Team (PRT) with exploring potential updates to the TLAs for both species.

The TC and PRT recommend the following changes to the annual Atlantic croaker TLA:

1. Incorporation of indices from the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP) and the South Carolina Department of Natural Resources (SCDNR) Trammel Net Survey into the adult composite characteristic index, in addition to the currently used indices from the Northeast Fishery Science Center (NEFSC) Multispecies Bottom Trawl Survey and Southeast Area Monitoring and Assessment Program (SEAMAP).
2. Use of revised adult abundance indices from the surveys mentioned above, in which age-length keys and length composition information are used to estimate the number of adult (age 2+) individuals caught by each survey.
3. Use of regional metrics to characterize the fisheries north and south of the Virginia-North Carolina state border. The ChesMMAP and NEFSC surveys would be used to characterize abundance north of the border, and the SCDNR Trammel Net and SEAMAP surveys would be used to characterize abundance south of the border.
4. Change/establish the reference time period for all surveys to be 2002-2012.
5. Change the triggering mechanism to the following: Management action will be triggered according to the current 30% red and 60% red thresholds if both the abundance and harvest thresholds are exceeded in any 3 of the 4 terminal years.

The TC and PRT recommend the following changes to the annual spot TLA:

1. Incorporation of indices from ChesMMAP and the North Carolina Division of Marine Fisheries (NCDMF) Pamlico Sound Survey, Program 195, into the adult composite characteristic index, in addition to the currently used NEFSC and SEAMAP indices.
2. Use of revised adult abundance indices from the surveys mentioned above, in which age-length keys and length composition information are used to estimate the number of adult (age 1+) individuals caught by each survey.
3. Use of regional metrics to characterize the fisheries north and south of the Virginia-North Carolina state border. The ChesMMAP and NEFSC surveys would be used to characterize abundance north of the border, and the NCDMF Program 195 and SEAMAP surveys would be used to characterize abundance south of the border.
4. Change/establish the reference time period for all surveys to be 2002-2012.
5. Change the triggering mechanism to the following: Management action will be triggered according to the current 30% red and 60% red thresholds if both the abundance and harvest thresholds are exceeded in any 2 of the 3 terminal years.

In addition to the above changes to the TLA triggering mechanisms, the TC/PRT recommend annual PRT review of juvenile abundance indices and shrimp trawl discards for both species. The TC/PRT recommend these data be used regularly only as supplemental information, but with the potential for PRT recommendation of management action if these or other data indicate action is warranted, even in years when management action is not required by the triggering mechanisms.

A summary of the call on January 16, 2018, on which the TC and PRT discussed and decided upon these changes is attached for your reference.

Enc: Atlantic Croaker TC/Spot PRT Jan 16, 2018, Call Summary

Atlantic States Marine Fisheries Commission

Atlantic Croaker Technical Committee and Spot Plan Review Team

Call Summary

January 16, 2018
10:00 a.m.-12:00 p.m.

Attendees

Technical Committee/Plan Review Team: Tim Daniels (NJ), Michael Grego (DE), Harry Rickabaugh (MD), Ryan Jiorle (VA), Dan Zapf (NC), Chris McDonough (TC Chair, SC), Dawn Franco (GA), Joseph Munyandorero (FL)

ASMFC Staff: Jeff Kipp, Michael Schmidtke

Summary

A conference call was held on January 16, 2018 to review potential changes to the Traffic Light Analysis (TLA) for both spot and Atlantic croaker. Jeff Kipp gave an update of the work done by the sub-group analyzing the available data and exploring alternative configurations of the TLA to improve its utility in informing the board on current stock status. The use of Relative Exploitation along with the TLA was also presented and discussed. The TLA and indices used for both species are very similar. Therefore spot was reviewed and discussed in detail first, including working through a decision tree to provide a recommended TLA configuration to the board. Once this was completed croaker was reviewed with some discussion where there were differences compared to spot, and the same decision tree was used to develop a recommended Atlantic croaker TLA. The discussion points below apply to both species unless otherwise noted.

Jeff presented a background of the current TLAs and how the signals given by the Harvest metric (commercial and recreational landings) and the Adult Abundance metric (independent offshore trawl surveys) do not agree, particularly a continued decline in harvest in recent years, with generally increasing or stable index values. Closer examination of the data indicated the indices were being influenced by age zero fish, particularly in years with strong recruitment. Indices were split into adult and juvenile components. The SEAMAP spring index was determined to be a better indicator of adult abundance, and the fall index better indexes juveniles. Inclusion of additional indices including ChesMMAP for spot and croaker, the South Carolina trammel net survey for croaker and the NC DMF program 195 for spot were also explored, since they have adequate time series and provide information on adult abundance in inshore waters. The SC trammel net survey also provides a wider range of adults. Unlike SEAMAP and NMFS, the NC DMF P195 and ChesMMAP are showing a steady decline in abundance in recent years. There was also evidence of differences in the Mid-Atlantic and South Atlantic trends, suggesting a regional split may be appropriate. The working group also suggesting moving to a two out of three years trip mechanism for spot (as compared to the current 2 consecutive years) and 3 out of 4 years for croaker instead of the current 3 consecutive years.

A question was raised as to why juvenile indices are only used as informative and not as a trigger mechanism. The reason for this is the lack of a significant stock recruit relationship for either species, leading to environmental factors having a stronger influence on recruitment than adult abundance.

The use of relative exploitation in place of the TLA was discussed. The effects of the shrimp trawl fishery would not be incorporated in the annual trigger exercise, potentially affecting results, but would be considered as an informative index in a similar manner to the juvenile indices. The group felt the TLA was more familiar and easier to understand for the board and the general public. The relative exploitation methods presented were also very conservative, and likely would need more work on determining the appropriate reference points. For these reasons the consensus was to continue with the TLA.

In discussing which indices to include, there was some concern raised that the offshore indices, particularly the NMFS trawl survey, may not be accurately tracking adult abundance of these species, even when split out by age. This would be due to timing of the migration of fish offshore compared to the timing of the survey, in some years these two events may occur at the same time, but in others they may not. Changes in habitat use from inshore to offshore may also be occurring, so the consensus was to continue using these surveys and to add in the inshore surveys as well (2 inshore and 2 offshore for each species). The group also agreed to use the age 1+ indices for spot, and the age 2+ indices for croaker.

Whether to split the TLAs regionally into Mid-Atlantic (VA north) and South Atlantic (NC south) was discussed in detail. Clarification was made that the split would be due to fishery differences and not because the biology of the species suggested it was needed. Recruitment indices tend to track across regions, but landings and index values show more continuity within region than across. It was also pointed out that the shrimp trawl fishery occurs primarily in the south Atlantic, and the dynamics of Chesapeake Bay likely differ from southern estuaries. Including ChesMMAP in the Mid-Atlantic region requires changing the reference time period to begin in 2002 as this was the first year for the ChesMMAP survey. By using regional TLAs the south Atlantic could keep a longer time series, although the same TLA reference time period would be used for both regions. Consensus was reached that the TLAs should be split by region due to differences in the fishery trends and characteristics.

Based on the decisions above the reference period for both species needed to be changed to accommodate the shorter time series of the ChesMMAP survey. The group discussed whether to have different reference periods for each region, and whether the 2002-2012 time frame was appropriate for both species. The consensus was to maintain consistency between regions, and that the 2012 cutoff was appropriate to avoid including several very low harvest years in the recent time frame, but still include variability within the data sets.

Clarification was given as to how the current 30%/60% red thresholds were selected, and consensus was to continue using those values.

The tripping mechanism was discussed for each species. The current requirement of two (spot) or three (croaker) consecutive years of red above either of the thresholds to trigger management may be too stringent. Since recruitment is not strongly tied to abundance, a

single strong year-class from a low adult abundance could potentially provide a value of red below 30%, requiring two or three more very poor years before management would be considered. If this occurred more than once, with a continued decline in long term adult abundance, this could lead to recruitment failure, particularly in spot. Group consensus was for a two out of three years above a red threshold occurring for spot and three out of four years for croaker, and both metrics would need to trip in the same three (spot) or four (croaker) year time frame.

There also was a discussion on the inclusion of effort data for either the recreational or commercial fishery. Primarily revolving around the reliability of effort data that could be produced for these species. It was generally agreed upon that including that information would be ideal, but developing a reliable effort data stream would be a very large undertaking, that may not prove successful.

SEDAR

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SEDAR 58 Atlantic Cobia Assessment
Terms of Reference

Terminal Year: 2017

Data Workshop Terms of Reference

1. Definition of assessment unit stock will be developed through Cobia Stock ID process and will be added to ToRs once process is complete.
2. Review, discuss, and tabulate available life history information.
    - Evaluate age, growth, natural mortality, and reproductive characteristics.
    - Provide appropriate models to describe population and fleet specific (if warranted) growth, maturation, and fecundity by age, sex, or length as applicable.
    - Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling.
    - Provide estimates or ranges of uncertainty for all life history information.
3. Recommend discard mortality rates.
    - Review available research and published literature.
    - Consider research directed at these species as well as similar species from the SE and other areas.
    - Provide estimates of discard mortality rate by fishery, gear type, depth, and other feasible or appropriate strata.
    - Include thorough rationale for recommended discard mortality rates.
    - Provide justification for any recommendations that deviate from the range of discard mortality provided in the last benchmark or other prior assessment.
    - Provide estimates of uncertainty around recommended discard mortality rates.
4. Provide measures of population abundance that are appropriate for stock assessment.
    - Consider and discuss all available and relevant fishery dependent and independent data sources.
    - Document all programs evaluated; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics.
    - Provide maps of fishery and survey coverage.
    - Develop fishery and survey CPUE indices by appropriate strata (e.g. age, size, area, and fishery) and include measures of precision and accuracy.
    - Discuss the degree to which available indices adequately represent fishery and

population conditions.
    - Recommend which data sources are considered adequate and reliable for use in assessment modeling.
    - Rank the available indices with regard to their reliability and suitability for use in assessment modeling.
    - Provide appropriate measures of uncertainty for the abundance indices to be used in stock assessment models.
5. Provide commercial catch statistics, including both landings and discards in both pounds and number.
    - Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest.
    - Provide estimates of uncertainty around each set of landings and discard estimates.
6. Provide recreational catch statistics, including both landings and discards in both pounds and number.
    - Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector or gear.
    - Provide length and age distributions for both landings and discards if feasible.
    - Provide maps of fishery effort and harvest.
    - Provide estimates of uncertainty around each set of landings and discard estimates.
7. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.
8. Review, evaluate, and report on the status and progress of all research recommendations listed in the last assessment, peer review reports, and SSC report concerning this stock.
9. Prepare the Data Workshop Report providing complete documentation of workshop actions and decisions in accordance with project schedule deadlines (Section II. of the SEDAR stock assessment report).

Assessment Workshop Terms of Reference

1. Review any changes in data following the Data Workshop and any analyses suggested by the Data Workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.
2. Develop population assessment models that are compatible with available data and document input data, model assumptions and configuration, and equations for each model considered.
    - Fully document and describe the impacts (on population parameters and management benchmarks) of any changes to the model structure, methods, application or fitting procedures made between this assessment and the prior assessment (SEDAR 28).
3. Provide estimates of stock population parameters, if feasible.
    - Include fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship (if applicable), and other parameters as necessary to describe the population.
    - Include appropriate and representative measures of precision for parameter estimates.
    - Compare and contrast population parameters and time series estimated in this assessment with values from the previous assessment (SEDAR 28), and comment on the impacts of changes in data, assumptions, or assessment methods on estimated population conditions.
4. Provide estimates of yield and productivity.
    - Include yield-per-recruit, spawner-per-recruit, and stock-recruitment models.
5. Provide estimates of population benchmarks or management criteria consistent with the available data, applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and National Standards. Include values for fishing mortality (including assumed discard mortality if appropriate), spawning stock biomass, fishery yield, SPR, and recruitment for potential population benchmarks.
    - Evaluate existing or proposed management criteria as specified in the management summary.
    - Recommend proxy values when necessary.
    - Compare and contrast reference values estimated in this assessment with values from the previous assessment (SEDAR 28), and comments on the impacts of changes in data, assumptions or assessment methods on reference point differences.
6. Characterize uncertainty in the assessment and estimated values.
    - Consider uncertainty in input data, modeling approach, and model configuration.
    - Provide a continuity model consistent with the prior assessment configuration, if one exists, updated to include the most recent observations. Alternative approaches to a strict continuity run that distinguish between model, population, and input data influences on findings, may be considered.

- Consider other sources as appropriate for this assessment.
- Provide appropriate measures of model performance, reliability, and 'goodness of fit'.
- Provide measures of uncertainty for estimated parameters and model output.

7. Provide declarations of stock status relative to benchmarks, or alternative data poor approaches if necessary.
8. Perform probabilistic analysis of proposed reference points, stock status, and yield.
    - Provide the probability of overfishing at various harvest or exploitation levels.
    - Provide a probability density function for biological reference point estimates.
    - If the stock is overfished, provide the probability of rebuilding within mandated time periods as described in the management summary or applicable federal regulations.
9. Project future stock conditions (biomass, abundance, and exploitation) and develop rebuilding schedules if warranted; including estimated generation time. Stock projections shall be developed in accordance with the following:
    - If stock is overfished
      F=0, F=Fcurrent, F=Fmsy, F=Ftarget
      F=Frebuild (max that rebuild in allowed time)
    - If stock is not overfished
      F=Fcurrent, F=Fmsy, F=Ftarget
    - If data limitations preclude standard projections (i.e. bullets above), explore alternate models to provide management advice.
10. Provide recommendations for future research and data collection.
    - Be as specific as practicable in describing sampling design and sampling intensity.
    - Emphasize items which will improve future assessment capabilities and reliability.
    - Consider data, monitoring, and assessment needs.
11. Review, evaluate, and report on the status and progress of all research recommendations listed in the last assessment, peer review reports, and SSC report concerning this stock.
12. Complete the Assessment Workshop Report in accordance with project schedule deadlines (Section III of the SEDAR stock assessment report).

Review Workshop Terms of Reference

1. Evaluate the data used in the assessment addressing the following:
    - Are data decisions made by the DW and AW sound and robust?
    - Are data uncertainties acknowledged, reported, and within normal or expected levels?
    - Are data applied appropriately within the assessment model?
    - Are input data series reliable and sufficient to support the assessment approach and findings?
2. Evaluate the methods used to assess the stock, taking into account the available data.
    - Are methods scientifically sound and robust? Do the methods follow accepted scientific practices?
    - Are assessment models configured appropriately and applied consistent with accepted scientific practices?
    - Are the methods appropriate for the available data?
3. Evaluate the assessment findings with respect to the following:
    - Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?
    - Is the stock overfished? What information helps you reach this conclusion?
    - Is the stock undergoing overfishing? What information helps you reach this conclusion?
    - Is there an informative stock recruitment relationship? Is the stock recruitment curve realiable and useful for evaluation of productivity and future stock conditions?
    - Are the quantitative estimates of the status determination criteria for this stock appropriate for management use? If not, are there other indicators that may be used to inform managers about stock trends and conditions?
4. Evaluate the stock projections, addressing the following:
    - Are the methods consistent with accepted practices and available data?
    - Are the methods appropriate for the assessment model and outputs?
    - Are the results informative and robust, and useful to support inferences of probably future conditions?
    - Are key uncertainties acknowledged, discussed, and reflected in projection results?
5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.
    - Comment on the degree to which methods used to evaluate uncertainty reflect and capture all sources of uncertainty in the population, data sources, and assessment methods.
    - Are the implications of uncertainty in technical conclusions clearly stated?

6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.
    - Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.
    - Provide recommendations on possible ways to improve the SEDAR process.
7. Provide suggestions on improvements in data or modeling approaches which should be considered when scheduling the next assessment.
8. Prepare a Peer Review Summary of the Panel's evaluation of the stock assessment, addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with project guidelines.

SEDAR 58
Atlantic Cobia
Assessment Schedule of Events

Terminal Year = 2017
Draft: February 21, 2018

Schedule & ToRs Approved ..... June 2018
Workshop Appointments ..... June 2018

Final Stock ID Resolution..... August 2018

Data Scoping Webinar (DW Panel)..... *week of Aug 27th, 2018*
Unprocessed Data Deadline (*includes raw age and reproduction data*) .....Sept 14, 2016
Data Webinar (DW Panel) ..... *week of Oct 1st, 2018*

- *Status update from WG/data providers*
- *Review summary statistics*
- *Discuss issues where panel feedback needed to prep for DW*

DW Working Paper/Processed Data Submission to SEDAR Staff.....Nov 13, 2018
Pre-DW Conference Call (DW Working Group Chairs) .....*week of Nov 13th or 19th, 2018*
Data Evaluation Workshop (Charleston, SC) .....Nov 27-30, 2018
1st Draft of Data Evaluation Workshop Report..... Nov 30, 2018 (end of workshop)
Post data workshop webinar (DW Panel, if necessary) ..... *week of Dec 3rd or 10th, 2018*
FINAL Data due to data compilers ..... Dec 17, 2018
Draft DW Reports to DW panel for review & final working papers to SEDAR..... Dec 21, 2018
Report Comments due to Editors..... Jan 11, 2019
Final DW report sections due to SEDAR & final age/length comps .....Jan 18, 2019
Data workshop report distribution ..... Jan 25, 2019

****See SEDAR50_DataTimeline document for more detailed data timeline.****

Pre-Assessment webinar (DW and AW Panels)..... *week of Feb 18th, 2019*

- *Discuss any remaining data issues and/or pre-modeling questions*

Assessment Milestone I webinar..... *week of March 11th, 2019*

- *Consider methods and configuration options for models*
- *Recommend assessment methods (i.e. model classifications, packages) to pursue for potential base model configuration*
- *Identify likely issues to be addressed and evaluated in developing the base model*

Assessment Milestone II webinar ..... *week of Apr 1st, 2019*

- *Continue work on model development*

AW working paper submission deadline ..... Apr 8, 2019
Distribution of functioning model and model documentation..... Apr 8, 2019

Assessment Milestone III Webinar..... *week of April 29th, 2019*

- *Review base model alternatives and recommend a base model approach and configuration*

- *Recommend sensitivities and uncertainty evaluations*

Assessment Milestone IV webinar.....*week of May 20th, 2019*

- *Review continuity run results and approve continuity model*
- *Review sensitivities and uncertainty evaluations*
- *Recommend projection approaches and configuration*

Assessment Milestone V webinar.....*week of June 3rd, 2019*

- *Review projection results*
- *Review Assessment report and responses to ToRs*

Assessment Report Draft to panel for review ..... June 17, 2019
AW report comments due to analysts ..... June 28, 2019
Final Assessment Report to SEDAR staff .....July 8, 2019

RW Working Paper Submission ..... .July 12, 2019
Final AW Report distribution .....July 12, 2019
Pre-RW Conference Call (Analytical team, RW Chair)..... week of July 22nd, 2019
RW Panel Introductory Conference Call (RW Panel, Chair)..... week of July 22nd, 2019
Review Workshop: (Atlantic Beach, NC) ..... July 30-Aug 1, 2019
Draft Review Reports due to Chair.....Aug 16, 2019
Review Workshop Addenda/Revision Reports due to Chair and SEDAR .....Aug 23, 2019
Review Workshop Reports due to SEDAR Staff.....Aug 30, 2019
Complete Assessment Report Submitted to Councils/SERO/SEFSC.....Sept 6, 2019

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

4055 Faber Place Drive, Suite 201, North Charleston SC 29405
Call: (843) 571-4366 | Toll-Free: (866) SAFMC-10 | Fax: (843) 769-4520 | Connect: www.safmc.net

Charlie Phillips, Chair | Captain Mark Brown, Vice Chair
Gregg T. Waugh, Executive Director

March 14, 2018
LN# 201817

Mr. Robert Beal
Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, Virginia 22201

RE: Request for information on the management of Atlantic cobia in federal waters upon removal from federal management under Coastal Migratory Pelagics Amendment 31

Dear Mr. Beal:

In May 2017, the Atlantic States Marine Fisheries Commission's (ASMFC) South Atlantic State Federal Fisheries Management Board sent a letter to the Gulf and South Atlantic Fishery Management Councils to request that the South Atlantic Council discuss removing Atlantic cobia from the Coastal Migratory Pelagics Fishery Management Plan (CMP FMP), which would transfer all management authority to the ASMFC. The South Atlantic Council directed staff to begin work on Amendment 31 which evaluates options for a complementary plan with the ASMFC as well as removal of Atlantic cobia from the federal management unit.

In December 2017, the South Atlantic Council reviewed a draft of Amendment 31 and chose to select removal of Atlantic migratory group cobia from the CMP FMP as their preferred alternative.

At their March 2018 meeting, the South Atlantic Council discussed management and enforcement of Atlantic cobia regulations in federal waters under the preferred alternative and determined that before moving forward they would need more information regarding future management actions by the ASMFC. When will the ASMFC request NMFS implement regulations in Federal waters under the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA)? When will you know what specific regulations ASMFC will request? And finally, do you know the approximate length of time for NMFS to implement such regulations once ASMFC makes the request?

The South Atlantic Council intends to take final action on Amendment 31 at their June 2018 meeting. We would appreciate receiving this information on or before May 21, 2018 for inclusion in the briefing book. Thank you for your assistance with this request. If you have any questions, please contact Gregg Waugh or Christina Wiegand.

Still Digging,

Charlie Phillips, Chair
South Atlantic Fishery Management Council

cc: Council Members and Staff, SAFMC
Doug Gregory, Carrie Simmons, and Ryan Rindone, GMFMC
Dr. Louis Daniel and Michael Schmidtke, ASMFC
Jack McGovern and Rick DeVictor, SERO
Monica Smit-Brunello and Shepherd Grimes, NOAA GC
Cisco Werner, Theo Brainerd, Peter Thompson, Larry Massey, and Erik Williams, SEFSC
LeAnn Hogan, NMFS Silver Spring

Atlantic States Marine Fisheries Commission

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James J. Gilmore, Jr. (NY), Chair *Patrick C. Keliher (ME), Vice-Chair* *Robert E. Beal, Executive Director*

Vision: Sustainably Managing Atlantic Coastal Fisheries

April 12, 2018

Mr. Charlie Phillips
Chairman
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
North Charleston, South Carolina 29405

Dear ~~Mr. Phillips~~ Charlie,

Thank you for your March 14, 2018 letter seeking additional information on the pending Atlantic States Marine Fisheries Commission's (Commission) cobia management actions. The questions raised by the South Atlantic Fishery Management Council (Council) regarding the management of Atlantic cobia in federal waters at their March 2018 meeting will be discussed by the Commission's South Atlantic State/Federal Fisheries Management Board (Board) at their meeting during the week of April 30, 2018.

After the Board's meeting, I will respond to the Council's questions and describe the Commission's plan should Draft Amendment 31 be approved. This response will be sent in time to be included in the Council's June Meeting briefing materials. I also intend to come to the Council's June Meeting and can respond to additional questions during the cobia management discussion.

The Commission appreciates the Council's further consideration of removing the Atlantic Migratory Group cobia from the Coastal Migratory Pelagics Fishery Management Plan through Draft Amendment 31. We look forward to continuing to work with the Council as this process moves forward. If you have questions in the meantime, please contact me or Dr. Michael Schmidtke, the Commission's FMP Coordinator for cobia.

Sincerely,

Robert E. Beal

cc: ASMFC South Atlantic State/Federal Management Board

L18-025