

# Atlantic States Marine Fisheries Commission

## ISFMP Policy Board

*February 1, 2021*

*10:45 -11:45 a.m.*

*and*

*February 4, 2021*

*1:45 - 4:15 pm*

*Webinar*

## 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.

### February 1, 2021

1. Welcome/Call to Order (*P. Keliher*) 10:45 a.m.
2. Board Consent (*P. Keliher*) 10:45 a.m.
  - Approval of Agenda
  - Approval of Proceedings from October 2020
3. Public Comment 10:45 a.m.
4. Discuss Recreational Management Reform Initiative (*J. Beaty*) **Possible Action** 10:50 a.m.  
*This agenda item will be discussed jointly with the Mid-Atlantic Fishery Management Council (MAFMC)*
5. Recess until Thursday, February 4 at 1:45 p.m. 11:45 a.m.

### February 4, 2021

6. Public Comment 1:45 p.m.
7. Executive Committee Report (*P. Keliher*) 1:50 p.m.
8. Progress Update on the Risk and Uncertainty Policy (*J. McNamee*) 2:05 p.m.
  - Review Draft of the Risk and Uncertainty Policy
  - Discuss Steps to Consider Final Approval of the Policy
9. Review and Discuss 2020 Commissioner Survey Results (*D. Tompkins*) 2:35 p.m.
10. Review State Membership on Species Management Boards (*T. Kerns*) **Action** 2:55 p.m.
  - Review State Declared Species of Interest
  - Review Pennsylvania's Membership on the Atlantic Menhaden Management Board

This meeting will be held via webinar, click [here](#) for details.  
*Sustainable and Cooperative Management of Atlantic Coastal Fisheries*

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|--|-----------|
| 11. Discuss Commission Process for Working on Recreational Reform Issues with the MAFMC ( <i>T. Kerns</i> )  | 3:25 p.m. |
| 12. Discuss Possible Reporting Programs to Capture Recreational Release Data ( <i>T. Kerns</i> )   | 3:40 p.m. |
| 13. Committee Reports <b>Action</b> <ul style="list-style-type: none"><li>• Habitat Committee (<i>L. Havel</i>)</li><li>• Artificial Reef Committee (<i>L. Havel</i>)</li><li>• Atlantic Coast Fisheries Habitat Partnership (<i>L. Havel</i>)</li></ul> | 3:55 p.m. |
| 14. Review Noncompliance Findings (If Necessary) <b>Action</b>   | 4:10 p.m. |
| 15. Other Business/Adjourn   | 4:15 p.m. |

# MEETING OVERVIEW

ISFMP Policy Board  
Monday February 1, 2021  
10:45 -11:45 a.m.  
and  
Thursday February 4, 2021  
1:45 – 4:15 p.m.  
Webinar

Chair: Pat Keliher (ME) Assumed Chairmanship: 10/19	Vice Chair: Spud Woodward (GA)	Previous Board Meeting: October 22, 2020
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 October 22, 2020

**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. Update on Recreational Reform Initiative (10:50 -11:45 a.m.) Possible Action

### Background

- The Council and the ASMFC’s Policy Board (Board) reviewed progress on the Recreational Management Reform Initiative and discussed next steps. After reviewing nine topics that were either recommended by the Recreational Management Reform Initiative Steering Committee or by stakeholders through scoping for two separate ongoing amendments, the Council and Board agreed to initiate a joint framework/addendum and a joint amendment to address several recreational issues. The framework/addendum will further develop and consider the following topics and management issues:
  - better incorporating MRIP uncertainty into the management process;
  - guidelines for maintaining status quo recreational management measures (i.e., bag, size, and season limits) from one year to the next;
  - a process for setting multi-year recreational management measures;
  - changes to the timing of the recommendation for federal waters recreational management measures; and

- a proposal put forward by six recreational organizations called a harvest control rule. The amendment would consider options for managing for-hire recreational fisheries separately from other recreational fishing modes (referred to as sector separation) and would also consider options related to recreational catch accounting such as private angler reporting and enhanced vessel trip report requirements for for-hire vessels.

**Presentations**

- Update on Recreational Reform Initiative (**Meeting Materials**) by J. Beaty

**Possible Board Actions for Consideration**

- Consider initiating a workgroup to

5. Recess until 1:45 p.m. on February 4

**6. Executive Committee Report (1:50 -2:05 p.m.)**

**Background**

- The Executive Committee will meet on February 3, 2021

**Presentations**

- P. Keliher will provide an update of the Committee’s work

**Board action for consideration at this meeting**

- none

**7. Progress Update on the Risk and Uncertainty Policy (2:05-2:35 p.m.)**

**Background**

- At the 2020 Summer Meeting, Commissioners supported the continued development of the draft Risk and Uncertainty Policy and Decision Tool.
- The Policy Board tasked the Risk and Uncertainty Policy Workgroup with further refining the criteria for the Risk and Uncertainty Decision Tool and updating the striped bass example.

**Presentations**

- J. McNamee will review changes to the draft Risk and Uncertainty Policy and potential next steps.

**Board action for consideration at this meeting**

- None

**8. Review and Discuss 2020 Commissioner Survey Results (2:35-2:55 p.m.)**

**Background**

- Commissioners completed a survey of Commission performance in 2020 (**Supplemental Materials**). The survey measures Commissioner’s opinions regarding the progress and actions of the Commission in 2020.

**Presentations**

- D. Tompkins will present the results of the 2020 Commissioner survey highlighting significant changes from the previous year.



**Board discussion for consideration at this meeting**

- Determine if any action is required based on the survey results

**9. Review State Membership on Species Management Boards (2:55-3:25 p.m.) Action****Background**

- Each year states review their declared interest for Commission managed species. States and agencies have requested changes.
- Articles II, VIII, and XII of the ASMFC Compact address participation by certain states eligible for ASMFC fishery management activities, including Pennsylvania, generally requiring that such participation be limited to anadromous species found in those states' waters. Pennsylvania has been part of the Atlantic Menhaden Management Board since 2016. Because Atlantic Menhaden are not anadromous, the question arose whether it is proper for Pennsylvania to participate in the Menhaden Board.

**Presentations**

- T. Kerns will present requests for changes to the State Declared Species of Interest.
- R. Beal will present a review of Pennsylvania's membership on the Atlantic Menhaden Management Board

**Board action for consideration at this meeting**

- Consider changes to the State Declared Species of Interest

**10. Discuss Commission Process for Working on Recreational Reform Issues with the MAFMC (3:25-3:40 p.m.)****Background**

- The MAFMC and the Commission have been working on a Recreational Management Reform Initiative for summer flounder, scup, black seas bass and bluefish.
- The Policy Board has been meeting with the MAFMC to discuss these issues

**Presentations**

- T. Kerns will present information on the Commission process for this issue

**Board action for consideration at this meeting**

- none

**11. Discuss Possible Reporting Programs to Capture Recreational Release Data (3:40-3:55 p.m.)****Background**

- In a recent review of biological reporting requirements, the Bluefish Technical Committee noted the stock assessment recommendation to accurately characterizing the recreational release lengths is integral to the assessment and any improvement to the methodology used to collect these data is recommended.
- The TC discussed options for electronic reporting that could be used for collecting recreational angler release data to remove the need for a state to create a new data collection system with an ACCSP staff member. The TC recommended the Bluefish Board advance the importance of broadly collecting reliable recreational release length frequency data from all recreational species by asking the Policy Board to task

the ASC to work with the ACCSP to develop a comprehensive program for reporting released fish of all recreationally import species the Commission manages.

- The Bluefish Board had some concerns about the lack of specificity in the recommended task.

**Presentations**

- T. Kerns will present information current and developing applications that could address the collection of recreational release data.

**Board action for consideration at this meeting**

- None

**12. Committee Reports (3:55-4:10 p.m.) Action**

**Background**

- The Habitat Committee met in the Fall of 2020
- Concerns were raised by Habitat Committee members that the Army Core was considering changes to dredging windows. The Committee drafted a comment letter for dredging windows for the Commission to consider.
- The Artificial Reef Committee has updated the 1988 state artificial reef profiles
- In the Fall of 2020 the ACFHP Steering Committee met

**Presentations**

- L. Havel will present a summary of the HC fall meeting and the draft comment letter
- L. Havel will present the update of the state artificial reef profiles
- L. Havel will present an overview of ACFHP activities

**Board action for consideration at this meeting**

- Approval of the comment letter on dredging windows
- Approval of the state artificial reef profile update

**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**

**Webinar  
October 22, 2020**

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

**TABLE OF CONTENTS**

Call to Order, Chair Patrick Keliher ..... 1

Approval of Agenda ..... 1

Approval of Proceedings from August 5, 2020 ..... 1

Public Comment..... 1

Chair’s Report ..... 1

Executive Committee Report ..... 4

Consider Dividing the South Atlantic and Federal Fisheries Management Boards ..... 5

Set the 2021 Coastal Sharks Fishery Specifications ..... 7

Review Noncompliance Findings ..... 7

Other Business ..... 7

Vice-Chair Comments ..... 11

Adjournment..... 12

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## INDEX OF MOTIONS

1. **Approval of agenda** by Consent (Page 1).
2. **Approval of Proceedings of August 5, 2020 Webinar** by Consent (Page 1).
3. **Move to split the South Atlantic State/Federal Management Board into a Pelagic Board and a Sciaenid Board** (Page 6). Motion by Joe Cimino; second by Spud Woodward. Motion carried (Page 6).
4. **Move to approve the 2021 coastal shark specifications via an e-mail vote after NOAA Fisheries publishes the final rule for the 2021 Atlantic Shark Commercial fishing season** (Page 7). Motion by Chris Batsavage; second by Jim Estes. Motion carried (Page 7).
5. **Move to adjourn** by Consent (Page 12).

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## ATTENDANCE

### Board Members

Pat Keliher, ME (AA)	Loren Lustig, PA (GA)
Cheri Patterson, NH (AA)	John Clark, DE, proxy for D. Saveikis (AA)
Ritchie White, NH (GA)	Roy Miller, DE (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)	Lynn Fegley, MD, proxy for B. Anderson (AA)
Dan McKiernan, MA (AA)	Russell Dize, MD (GA)
Raymond Kane, MA (GA)	Phil Langley, MD, proxy for Del. Stein (LA)
Jason McNamee, RI (AA)	Steve Bowman, VA (AA)
David Borden, RI (GA)	Steve Murphey, NC (AA)
Justin Davis, CT (AA)	Bill Gorham, NC, proxy for Rep. Steinberg (LA)
Bill Hyatt, CT (GA)	Mel Bell, SC, proxy for P. Maier (AA)
Maureen Davidson, NY, proxy for J. Gilmore (AA)	Doug Haymans, GA (AA)
Emerson Hasbrouck, NY (GA)	Spud Woodward, GA (GA)
Joe Cimino, NJ (AA)	Jim Estes, FL, proxy for J. McCawley (AA)
Tom Fote, NJ (GA)	Marty Gary, PRFC
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)	Karen Abrams, NOAA
Kris Kuhn, PA, proxy for T. Schaeffer (AA)	Mike Millard, USFWS, proxy for S. White

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

### Staff

Robert Beal	Laura Leach
Toni Kerns	Savannah Lewis
Kristen Anstead	Sarah Murray
Max Appelman	Joe Myers
Pat Campfield	Marisa Powell
Dustin Colson Leaning	Caitlin Starks
Chris Jacobs	Deke Tompkins
Jeff Kipp	Geoff White
Heather Konell	

### Guests

Pat Augustine, Coram, NY	Chip Lynch, NOAA
Joey Ballenger, SC DNR	Shanna Madsen, VMRC
Alan Bianchi, NC DENR	John Maniscalco, NYS DEC
Karyl Brewster-Geisz, NOAA	Brandon Muffley, MAFMC
Jeff Brust, NC DENR	Allison Murphy, CBF
Mike Celestino, NJ DEP	Ken Neill
Heather Corbett, NJ DEP	Gerry O'Neill, Cape SeaFoods
Jessica Daher, NJ DEP	Derek Orner, NOAA
Jamie Darrow, NJ DEP	Michael Pierdinock
Peter Fallon, Maine Strippers	Nicholas Popoff, FL FWS
Lynn Fegley, MD DNR	Andrew Sinchuk, NYS DEC
Cynthia Ferrio, NOAA	Helen Takade-Heumacher, FL FWS
Dawn Franco, GA DNR	Beth Versak, MD DNR
Lewis Gillingham, VMRC	Gregory Wojcik, CT DEP
Carol Hoffman, NYS DEC	Chris Wright, NOAA
Pete Himchak	Erik, Zlokovitz, MD DNR
Mike Luisi, MD DNR	Renee Zobel, NH FGD

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Draft Proceedings of the ISFMP Policy Board Webinar  
October 2020

The ISFMP Policy Board of the Atlantic States Marine Fisheries Commission convened via webinar; Thursday, October 22, 2020, and was called to order at 11:18 a.m. by Chair Patrick C. Keliher.

**CALL TO ORDER**

CHAIR PATRICK C. KELIHER: It is 11:18, I think I'll call the ISFMP Policy Board to order.

**APPROVAL OF AGENDA**

We'll jump right into the agenda. First on the agenda is the Board Consent of the agenda. Does anybody have any additions or deletions to the agenda, or anything they might like to add now under new business? Dan McKiernan.

MR. DANIEL MCKIERNAN: Thanks, Pat. At a previous meeting there was some conversations about ASMFC possibly hosting a welk symposium. I've had some communications with some of the folks down in the Mid-Atlantic, and if we could just talk about that briefly, about what role ASMFC could play in that or not, so maybe under Other Business.

CHAIR KELIHER: Yes, let's bring that up under Other Business, Dan. That would be good. Anybody else, in regards to any additions to the agenda?

MS. TONI KERNS: Pat, I know we've just brought this up, but there are three letters that the Board will need to address, two from the American Lobster Board and one from the Atlantic Striped Bass Board.

CHAIR KELIHER: Yes, just remind me when we get to the new business, Toni, and we'll make sure we go over those as well. I don't see any other hands going up. I will approve of the agenda by consensus, with the additions under new business.

**APPROVAL OF PROCEEDINGS**

CHAIR KELIHER: Approval of the proceedings from the August 2020 meeting. Any additions,

deletions, or questions about those proceeding notes?

Seeing no hands, those are approved by consensus.

**PUBLIC COMMENT**

CHAIR KELIHER: Item Number 3 is Public Comment. Are there any comments from the public to the Policy Board? Hearing none, seeing no hands, we'll move right along to the Chair's Report.

**CHAIR'S REPORT**

CHAIR KELIHER: I ask you all just to put your feet up, get a bowl of popcorn, this will take a couple minutes.

I would like to give kind of an overview of where we've been over the last year. As you look back over the past year, and try to characterize it in a word or a phrase. It's really been truly just an extraordinary year, and a year of first for both states, federal partners, and our stakeholders. The first time in over a hundred years that we as a nation and a global community have had to face a life-threatening pandemic that is yet to run its course. We've all had to change the way we live and work. The state and federal agencies have had to adapt their telecommuting policies, to allow for full time telecommuting. Large gatherings and celebrations have been postponed, and in-person meetings have shifted to meetings via webinar. Notably, it will be the first time in the Commission's 79-year history we will not be gathering in one of our members states to conduct the important fisheries business that we're dealing with today.

It is certainly my hope that we will be able to come together next October, and regain some sense of normalcy. Closer to home I witnessed the devastating effects on the pandemic to our marine fisheries across all sectors, and our state budgets and our revenue streams and/or our fishery dependent and independent monitoring activities.

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Draft Proceedings of the ISFMP Policy Board Webinar  
October 2020

The commercial fishing industry and dealers and processors, as well as for the for-hire businesses, have suffered greatly during the pandemic. The passage of the CARES Act has offered some relief in the form of \$300,000,000.00 divided amongst all the states around the Atlantic, Gulf, and Pacific coast.

Since April the Commission has worked closely with its member states and NOAA, to coordinate the development of state spend plans based on the state's preference, and the Commission is obviously assisting with distributing the funds to the affected stakeholders. To date spend plans have been approved for 11 of the 15 states that make up the Commission.

The much-needed money is beginning to get to the hands of the fishing industry. While aid to fishermen through the CARES Act is a step in the right direction, available funds are not sufficient to meet all of the needs of our coastal fishing communities, as they struggle to maintain their livelihoods and businesses.

As Congress deliberates on additional assistance to help reduce the financial impacts of COVID-19, I'll continue to work with my fellow Commissioners in urging our Congressional representatives to consider the impacts in fisheries and fishing communities, as part of any pending legislation.

While many state fisheries agencies have navigated budget cuts for several years, the pandemic and lack of revenue stream will take an even deeper cut to our budgets. This in turn will further constrain our abilities to perform the necessary fisheries management and monitoring activities. Luckily, my fellow state marine fisheries agency directors are highly resourceful.

We find ways to get to the greatest bang for the buck, and by seeking efficiencies, ways that we can all do business, and prioritizing management and monitoring activities for species with the greatest need. Some relief has

been provided in the forms of some additional funds from the Commission, since much of the Commission's meeting and travel budgets have gone unspent through this year.

The Commission's Executive Committee, composed primarily of state directors, has never been more engaged, with nearly weekly meetings that give us an opportunity to share our challenges and seek solutions. I have great faith in our ability to tackle the obstacles before us, and come out the other side even stronger and more resilient. The pandemic also impacted critical marine fisheries data collection programs. Recreational harvest data was not collected for several months, the full impact of which are still being calculated. Certainly, with the lack of recreational harvest estimates for 2020, it will hinder our ability to make informed decisions about fisheries performance and setting management measures for the year 2021 and beyond. Several fisheries independent surveys were also canceled this year, which will create data gaps in some long-standing surveys, and may have repercussions to stock assessments for years to come.

Assessing the issues posed by the data gaps will take concerted efforts of our science and technical staff. Given the challenge and level of accumulative years of experience of our technical staff, I have no doubt that they will find workable solutions to these issues. Let's talk about some of the positives though that have resulted from the responses to the pandemic.

First and foremost, we have found that we are stronger and more resilient than we believed ourselves to be. Staff at the Commission and within our states and federal agencies have quickly shifted to full time telecommuting, barely missing a beat and continuing the important work that we all do.

Small and large meetings were moved to webinars, and while there was a learning curve for those of us who are, say a bit technically

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challenged, we have managed to succeed. I've been impressed with the ease with which we now meet by webinar. Don't get me wrong, it's no substitute for meeting in person, but we are productively using technology to discuss the issues and make management decisions.

We can't use this pandemic as an excuse not to make these important decisions or delay any actions. Over this past year we've accomplished some major tasks, and initiated some significant management actions. We completed benchmark stock assessments for Atlantic cobia, American shad and American lobster to guide our decision making on these three species. In August, the Menhaden Board approved the use of ecological reference points in the management of this as very important forage species.

Over ten years in the making, this is an important first step towards ecosystem-based fisheries management, and I am very proud of the work of all of the state and federal scientists and states that sustain the commitment to make this a reality. Recognizing the distribution and availability of fisheries resources are shifting, due to the change in water temperature, and historic allocations may no longer reflect the current conditions.

The states and our partners with the Mid-Atlantic Fishery Management Council are considering changes to state-by-state commercial allocations for black sea bass. Also, with the Council, we're exploring novel, new approaches to managing recreational fisheries for bluefish, summer flounder and scup, as well as black sea bass, and seek to address the access to the resource, and create more sustainability in management measures from year to year.

Lastly, we initiated a new plan amendment for striped bass. It's been 17 years since we've considered major revisions to the striped bass management program, and amending the plan will certainly be a major undertaking. While it's been an incredibly challenging year, there is much we can be grateful for, the dedication of

our hardworking staff succeed from a distance, our sustained commitment to one another to seek outcomes that are the best interest of the resource, while striving for equity in our decisions, and the force of character and determination exhibited by our fishing industry and our coastal communities, to make the best of the challenging times that we're in. I want to thank you all for your support you've given Spud and I over the last year, and I look forward to working with you in the years ahead.

With that I will conclude my remarks. If I was given these remarks before the election, I certainly would have promised a lobster in every pot. I hope you are all able to understand that Maine dialect. I should have told you there was a close caption button somewhere, but hopefully you understood what I was saying. With that, thank you very much. That concludes the Chair's report. I do have a hand. Oh, I saw a hand up but now the hand is down. I don't know who it is, it's just the initials J.G.

MR. JAMES J. GILMORE: Well Pat, I'm incognito again, it's Jim Gilmore. Thank you, and again I just wanted to, I think echo all the Commissioners that I think you're correct, and that the Commission staff has done an outstanding job above and beyond the call of duty, but you and Spud I think should get extra acknowledgement for the leadership during this time period.

I don't know how you pulled this off, but you've done an excellent job. I think when they put the optimism in the dictionary, they have to put ASMFC and leadership next to it, because I think everyone has done a great job. Just wanting to make one note on history on a negative thing, whatever, was that all of you who, you saw when Doug Grout was Chair a few years ago there was an annual report that was done, and part of our history ended in the last few weeks.

The Roosevelt Hotel, where the Commission had its first meeting, and actually we had the annual meeting in 2018, sadly has closed down because of the business impact from COVID.

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Again, our history is changing, in addition to the challenges we have. I just wanted to let everybody know that, and hopefully we'll find a new venue in years to come, and that we'll all be coming out of this, and keep up the good work, Pat.

CHAIR KELIHER: Thank you, Jim, and I certainly couldn't do it without my Vice-Chair. Spud has been a rock through all of these. I mean, I think together we work incredibly well together, and obviously we couldn't do it without the support of all of the Commission staff. Thanks again to everybody involved.

### **EXECUTIVE COMMITTEE REPORT**

CHAIR KELIHER: If I see no other hands, I'm going to move on to the next agenda item, which is the Executive Committee report. Yesterday, the Executive Committee had a very quick meeting. For those of you who are not aware, we have been meeting nearly weekly, if not biweekly, for oh several months now, as we've dealt with the pandemic.

Certainly, the CARES Act caused us to all come together and meet much more frequently. But these meetings have certainly been very beneficial. I know they have been beneficial to me, because hearing the other issues and concerns and knowing that a state is not in this alone during these challenging times, has been beneficial for me.

We yesterday reviewed the Administrative Oversight Committee Report, and considered the 2020 audit for the Commission. I'm very happy to report that there were no issues that were raised by the firm that did the audit of the Commission, and that was accepted by the Executive Committee. We then went on to discuss future annual meetings, and we hope we will be back on track. Just so everybody is aware, New Jersey will continue to hold a spot for the annual meeting in 2021. We'll move to North Carolina in 2022, Maryland in 2023, and Delaware in 2024.

We also discussed Pennsylvania's participation on the Atlantic Menhaden Board. As you recall there has been some discussion on this in the past, and we have brought it back to the attention of the Executive Committee to discuss the future of their participation. When it was first raised, the question of their participation was kind of in conflict with the charter, as it clearly said that both Pennsylvania and Vermont could sit on boards for anadromous species.

Since that time, we have moved in the direction of the use of ecological reference points, and that really kind of changes some of the dynamics with the Atlantic Menhaden Board. As such, we've had some very good conversations with the Commonwealth of Pennsylvania, as well as our legal team.

We are currently in the process of developing a memo. This memo will continue to be reviewed by the Executive Committee. The memo will then make it a recommendation to the full Commission, if there is a request for a change or if there is anything in regards to any precedent setting nature here.

Certainly, the issues around liability and the legal complexities of this are being taken into consideration, but there will be much more on that in future meetings. We also discussed the improvement to the public comment process. Tina Berger and others have been working on this. This is a work in progress.

Certainly, because of the pandemic and because of the challenges with the use of webinars, and I think the fact that this group is working right now, and finding ways and thinking about ways to improve communications with both the public, and with our advisory panel process is really important. I think we'll be able to report something back out from that committee at the winter meeting.

Lastly, under Other Business. Rhode Island addressed the issue of staffing of the current Law Enforcement Committee meeting. Just so

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everybody is aware, our Executive Director will be working on finding new staff support for the Law Enforcement Committee. There was a very brief update on the CARES Act. I things are moving well there as well, and then there has been some redistribution of the ACFCMA funds.

Every state will receive 48K to help offset some of the budget impacts, and then there will be some additional money for a cobia plan down for the South Atlantic states, as well as the Striped Bass Tagging Study. That concludes my report of the Executive Committee. I'll ask Bob Beal if I missed anything. Did I miss anything in my quick note taking there, Bob?

EXECUTIVE DIRECTOR ROBERT E. BEAL: No, I think you got it all, Pat.

CHAIR KELIHER: Great, and I appreciate that. Any questions regarding the Executive Committees work? Seeing no hands. Item Number 6 is a Lunch Break. Since it is 11:30, if there are no objections, what I would like to do is kind of power through the agenda, make sure we have time to deal with the new business.

But I think we can probably get through these next several agenda items, and deal with lunch after we conclude the annual meeting. Any objections to that approach? Hearing none, we will go then to Item Number 7, which is Consider Dividing the South Atlantic and the Federal Fisheries Management Boards. Toni Kerns, you're up.

**CONSIDER DIVIDING THE SOUTH ATLANTIC  
AND FEDERAL FISHERIES  
MANAGEMENT BOARDS**

MS. KERNS: In your briefing materials there is a memo from me regarding splitting the South Atlantic Board. I did not prepare a PowerPoint, since a lot of the information in there that I think folks would want to look at is the landings, and those graphs look much too small to see. But the South Atlantic Board is responsible for management of seven of the Commission's species.

Two of those species in the time that I have set at the Commission have come under complete FMP management by the Commission. They were previously under the South Atlantic Council, those are red drum and Atlantic cobia, and then we still have the five other species that we've been managing over time, including spot, Spanish mackerel, black drum, Atlantic croaker, and spotted sea trout.

The Board is made up of the states from Florida to New York, but different states have declared interest in the different species of the Board. An example, New York to Florida has a declared interest in Spanish mackerel, and New Jersey to Florida has an interest in croaker. Depending on the species that are being discussed, several states on the Board would have downtime until the species that they are interested in are up on the agenda.

We are suggesting to split this management board for several reasons into two pieces. The first grouping would be for Atlantic cobia and Spanish mackerel. We would call this a coastal pelagics board, and then all the other species would fall into a sciaenid board. This recommendation is coming in order to make the best use of the Commissioner's time at these meetings.

The South Atlantic Board have gotten longer and longer, as we add more and more species. Those states that are on the outer edges of the management board may not be wanting to participate in some of the species, and so therefore we could save some of those Commissioners time, by splitting this Board into the pelagics and the sciaenid board. In addition, as I said before, these meetings are getting longer and longer, and it just helps to break up the timeframe in which the Board has to sit at the table and discuss the species.

Then lastly is on the administrative side for staff time. It might make it easier for us as we divide staff workload up into different parts, or into the different species, that we have the ability to split these species by these boards, in order to

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October 2020

better allocate staff time to different management boards. That is my presentation to the Board. Sorry, Pat, one thing that I didn't mention is that in particular for Atlantic cobia, as we see this species expand its range northward, we're seeing additional northern states that want to participate in the Cobia Board, and so this goes along with the argument that the states on the outer range of these species may not want to have to participate in some of the more southern focus species. That is all.

CHAIR KELIHER: Great, thank you, Toni. Any questions for Toni? I would remind the Policy Board that we do need to take action on this if we want to make a change. Bob Beal.

EXECUTIVE DIRECTOR BEAL: Not a question for Toni, but I'm not sure if she hit this point or not. I think one of the important things with our South Atlantic Board has always been the state/federal nature of that Board, and we've had obviously the Services are allowed to be a part of that. But we've also had a voting seat for the South Atlantic Council. I think, you know there obviously is a link between ASMFC and the South Atlantic Council Spanish mackerel.

We both maintain FMPs, but there is still a cobia link as well. Some of the other southern species that will be part of the sciaenid board may be of importance to the South Atlantic Council. I would suggest, if we do split the South Atlantic Board into two pieces, it's probably worth extending an invitation to the South Atlantic Council, to see if they want to serve on both of those, or one or neither.

CHAIR KELIHER: Okay great, thanks for that, Bob. Pat Geer.

MR. PAT GEER: Yes, I just have a real quick question about, are we going to address the Omnibus FMP for spot, Spanish mackerel and spotted sea trout? Are we going to continue to have that, or eventually do we plan on splitting those up into separate management plans?

MS. KERNS: Pat, I can, well both Pats, I can respond to the other one.

CHAIR KELIHER: Yes, please, Toni.

MS. KERNS: Pat, we would be able to carry on, even though they were all in the omnibus for now, and when Spanish mackerel, which we anticipate will have management action after its stock assessment, that I believe will be completed at the beginning of 2022. It will be presented to the Board in the beginning of 2022.

But by the time all of the SEDAR work is done. Then we'll be able to split Spanish mackerel out of that omnibus. Before that we created the omnibus. Each of those three species have their own individual FMP, so just like we brought them all together, we can break them apart.

CHAIR KELIHER: Any other questions for Toni on this issue? Is there interest in having somebody make a motion to divide these two bodies? Joe Cimino.

MR. JOE CIMINO: I'm actually kind of surprised it was so quiet, but yes. I do have an interest; **I would make the motion to split cobia and Spanish mackerel into its own board.** I thought either Pat Geer or Lynn would have suggested it. After, you know a couple years of meetings, I think they were ready to throw five-hour energy drinks around to people, to get us through the South Atlantic Board as it is. We've got some tough decisions with cobia coming, and northern states with interest. As Toni mentioned, we're going to have to deal with you know the commercial Spanish mackerel fishery north of North Carolina very soon. For those reasons I think this is an important motion.

CHAIR KELIHER: Great, Joe does that capture your motion on the board?

MR. CIMINO: Yes.

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CHAIR KELIHER: Spud, is that a second?

MR. A.G. "SPUD" WOODWARD: That's a second, Pat, yes.

**CHAIR KELIHER: We have a motion to split the South Atlantic State/Federal Management Board into a Pelagic Board and a Sciaenid Board. Motion by Joe Cimino, seconded by Spud Woodward.** Is there any, Joe, do you want to give any more justification, or are you all set?

MR. CIMINO: No, that was it, thank you.

CHAIR KELIHER: Is there any additional comments or questions on the motion? Seeing no hands, is there any objection to the motion? **Seeing no hands, the motion passes by consensus.** Great, thank you.

#### **SET THE 2021 COASTAL SHARKS FISHERY SPECIFICATIONS**

CHAIR KELIHER: We will move right along to Item Number 8, which is Set the 2021 Coastal Sharks Fishery Specifications, and Toni, you're back up.

MS. KERNS: Normally we would have a Coastal Sharks Management Board to take care of such actions, but this was the only issue that needed to be addressed, and so in the interest of time we decided to bring this up at the Policy Board meeting. Each year NOAA Fisheries puts out annual specifications for Atlantic coastal shark regulations. Those regulations do not come out in a final rule until later on in the year. The management board typically agrees via motion to set the specification via e-mail vote.

We currently do have a proposed rule that is out for these regulations, and NOAA Fisheries is proposing a January 1 start date for all shark management groups, and is proposing an initial 36 shark possession limit for large coastal and hammerhead management group, with the possibility of in-season adjustment. What we're looking for today is an agreement by the Board

to set the 2021 coastal shark specification via an e-mail vote. That's all I have, Mr. Chair.

CHAIR KELIHER: Any questions of Toni? We do need to make a final action on this. Is there a motion? Chris Batsavage.

**MR. CHRIS BATSAVAGE: Yes, I would like to make a motion. I move to approve the 2021 coastal shark specifications via an e-mail vote after NOAA Fisheries publishes the final rule for the 2021 Atlantic Shark Commercial fishing season.**

CHAIR KELIHER: Thank you, Chris. We've got several hands up, Jim Estes, are you seconding that motion?

MR. JIM ESTES: Yes sir, I am.

CHAIR KELIHER: We have a motion on the board, are there any questions on the motion? No questions, no comments. I'm going to read the motion into the record. Move to approve the 2021 Coastal Sharks specifications by an e-mail vote after NOAA Fisheries publishes the final rule for the 2021 Atlantic Shark Commercial Fishing season.

**Motion by Mr. Batsavage, seconded by Mr. Estes. Are there any objections to the motion? Hearing and seeing no objections, the motion passes by consensus.**

#### **REVIEW NONCOMPLIANCE FINDINGS**

CHAIR KELIHER: Thank you very much, and Item Number 9 is Review of Noncompliance Findings, and as I said earlier, luckily, we have none.

#### **OTHER BUSINESS**

CHAIR KELIHER: That moves us into Other Business. Dan McKiernan, do you want to bring up the welk issue?

MR. MCKIERNAN: Yes, thank you. Actually, the two issues that have come before the Lobster Board regarding letters that I think the Board has asked the Commission to send. I assume

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October 2020

this is the time to discuss that, under Other Business?

CHAIR KELIHER: Yes, we need to discuss, there is both the Lobster Board and the Striped Bass Board have recommended letters to the Policy Board, so why don't we deal with welk first, and then go right into the letters.

MR. McKIERNAN: Yes, we can fly through welk. I just want to bring it to the Commission's attention that back in the winter meeting folks were coming up with some grand ideas about cooperative sharing of information on welk fisheries, because managing welk fisheries in state waters was becoming more and more challenging. At the time there was some discussion about a possible interstate plan, but I think most folks are balking at that.

But one of the thoughts was to hold a symposium with states with welks fisheries to contribute to some science and management sharing, and I've been told this morning through some e-mails that the Virginia Sea Grant folks are interested in hosting that. I don't think it needs to be necessarily a Commission initiative, but the Commission does give us a chance as a group of cooperating states to come together.

In fact, at the previous discussion, of course as we talk about coming together, we all think of the dollar signs, what does it cost? Since then Zoom has happened, and so I would really urge the folks in Virginia, if that's where it's going to take place, to put that together, and certainly in Massachusetts we would be anxious to contribute to that as well. I don't know if we want to have a little conversation about that, but it doesn't need to be a Commission's commitment at this point.

CHAIR KELIHER: I'm assuming thought, Dan, you're looking for some kind of coordination support from the Commission as well?

MR. McKIERNAN: Yes.

CHAIR KELIHER: Okay, great. I've got three hands up, Pat Geer, Lynn Fegley, and then Tom Fote, so go ahead, Pat.

MR. GEER: I talked to Bob Fisher today, who works at VIMS and Sea Grant, and he is very excited about doing this. He said that they will be able to come up with funding if we do have a face to face workshop, and that he will take the lead on the issue. You know given the circumstances; I think things just kind of dropped through the cracks a little bit. We were aggressively pursuing this after the February Commission meeting.

All the states provide names of contact folks that would sit on this workgroup, and you know Bob is excited to get going on this again. We'll forward it on to him, and keep him in the loop, and we'll get moving on this. It seems like Virginia Sea Grant is very interested in taking the complete lead on this, and I would assume that ASMFCs interest in this is just whether or not they want to have somebody attend the workshops.

CHAIR KELIHER: Yes, thanks Pat, that is good news that they are willing to help coordinate that. Lynn Fegley.

MS. LYNN FEGLEY: I really think that Pat just said pretty much exactly what I was going to say. This is going to be a really worthwhile conversation. There is lots of new science and lots of really interested stakeholder if you have concerns. But I think it would actually benefit Commission staff at some point to attend, you know maybe if somebody like a Pat Campfield, just to keep sort of an eye on the radar. But I would just support what Pat said, and we should work together to come up with a good agenda for the gathering, thanks.

CHAIR KELIHER: Great, thanks, Lynn. Tom Fote.

MR. THOMAS P. FOTE: I'm just basically looking at the history of what we do and how we basically handle certain species. If I remember right, the reason we don't do things like welks

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and blue crabs, is because they are in state, they are not interstate. I'm wondering if that still applies on shellfish. I mean one of the old reasons we didn't do it, because we were getting most of the money to manage fisheries way back when from the Wild Grow Funds, and they wouldn't allow for shellfish management. But I don't know how we've changed over the years.

CHAIR KELIHER: Thanks for that, Tom, and I'll let Bob chime in if he would like. But I think from my standpoint, since we're not looking at the development of an FMP, and only trying to help coordinate amongst our state partners, which seems to be a small, non-burdensome role that the Commission could take. But Bob, do you have any comments you want to make on that?

EXECUTIVE DIRECTOR BEAL: No, I agree, Pat. As of now anyway, there is no push for interstate fishery management plan, this is just information sharing session on the current state of science, as well as management programs. I think we can help out, and send someone to the workshop, or have them link to the workshop, whatever the case is, you know with our current resources, without a problem at all.

CHAIR KELIHER: Great. Anything else on the welk issue? I don't think there is any action that needs to be taken here. Sounds like with Virginia Sea Grant taking the lead, they could just coordinate with the Commission to help communicate amongst all the states, to see who wants to attend. I think we're pretty clear what the next steps are. Let's move right on to the letters. Dan, since you were teed up, why don't we start with the Lobster Board and the letters that were recommended from the Lobster Board to the ISFMP Policy Board.

MR. McKIERNAN: Okay thank you, Pat. The first has to do with the most recent approved lobster addendum, Addendum XXVI, which was approved a few years ago, and the spirit of that was to improve data collection in the lobster fishery. At the same time NOAA Fisheries is also

taking on more data collection for their federal lobster permit holders.

There has been a series of weekly calls posted by ACCSP, and they have been very productive about how to make sure that these data are all compatible. It's the consensus coming out of the last meeting that it would be appropriate to ask NOAA Fisheries to collect certain parameters that will be consistent with the way the parameters are being collected at the state level.

One of the biggest challenges for our state lobster data gatherers is not just to manage their own data, but to then grab what's available through the federal system, and force it into a new format, to make it as compatible as possible. It is the consensus of the group to request that NOAA Fisheries make changes for certain data elements going forward, to ensure compatibility and data usefulness.

That is for each effort trap hauls, traps in the water, buoy lines, and traps per trawl. Then the overall numbers of buoy lines in the water as well. These are parameters that are going to be very valuable for not only the Technical Committee conducting stock assessments, but also the Large Whale Take Reduction Plan analysts at NOAA, and their contractors, and of course going forward, as we've tried to resolve ocean planning challenges with offshore wind development.

These are also going to be really, really useful parameters, and we need to collect them in a way that is compatible between the federal and the state system. I don't know, Toni, you have been very helpful in helping us put this ask together. Does that cover it as you see it?

MS. KERNS: Yes, Dan, thank you.

CHAIR KELIHER: Does anybody have any questions of Dan or Toni regarding that issue, or the letter? Toni, do you need a motion on this, or can we just do this by consensus? It's pretty clear on the record.

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The Board will review the minutes during its next meeting.

Draft Proceedings of the ISFMP Policy Board Webinar  
October 2020

MS. KERNS: Consensus is just fine, Pat.

CHAIR KELIHER: As long as there is no objection, then the Commission will send a letter. Seeing no objection, perfect. **The** Commission will send a letter on the data needs. Dan, do you want to bring up the second one?

MR. MCKIERNAN: Yes, the second one concerns the Jonah crab management plan, and in the Plan Review Team's report, which was brought before the Board. There was a concern about unimplemented Jonah crab regulations in the state of New York, particularly regulations that limit the directed trap fishery to lobster permit holders only, and a thousand crab limit.

These issues were raised in '18 and '19, but haven't been addressed yet. Our recommendation is to just send the state of New York a friendly reminder, requesting them to adopt those as codified rules. We understand from the reports that it appears that the spirit of those rules is being upheld, but the plan does require rules to be enacted to come into compliance.

CHAIR KELIHER: Okay thanks for that, Dan. I just want to make sure that it's clear that this is not a noncompliance finding, we're just hoping to give actually some leverage to New York, to help with their legislature. Maureen Davidson.

MS. MAUREEN DAVIDSON: That's exactly what it is, that we have not been able to get our legislature to rule on that particular aspect of the Jonah crab management. However, also, so we're trying to see if we can't get them to move on it. Then we're also seeing if there is any way that we might be able to do this through regulation.

Sort of a convoluted but alternative path that we are currently seeing if we're going to be allowed to do. We appreciate the patience on the part of the Lobster Board and the Commission, as we are really trying to work with our state legislators on moving forward,

and come in compliance with the FMP. Thank you.

CHAIR KELIHER: Great, thank you, Maureen. Any other questions as it pertains to this particular letter? Seeing no other hands, is there any objections to sending this letter to New York? Hearing no objections, that letter will be sent. Thank you very much for that. The last letter is around striped bass and striped bass regulations. David Borden, are you on?

MR. DAVID V. BORDEN: Yes sir.

CHAIR KELIHER: Would you like to describe the letters that the Striped Bass Management Board was considering?

MR. BORDEN: Certainly. The Striped Bass Board took up Addendum VI yesterday, and basically approved it, with the exception, which is the circle hook requirement. They basically approved all of the state implementation plans, with the exception of Mass and Maine. There are a number of comments that it will be reflected in the record on what some of the concerns were, and the Board ultimately took the position of approving the Addendum, with the exception of those two.

I suggest it is a formality that we send a letter to those two states, and ask them to revise their regulations. Both of the states have offered to do that, to revise regulations, but I wanted to be clear this is not a traditional noncompliance finding, it's simply a letter that each of those states can use internally, when they go back to their regulatory process (fade). I don't think it requires a normal motion at this level, unless we have objections, Mr. Chairman.

CHAIR KELIHER: Thank you, David, for that description. As far as the state of Maine is concerned, I mean it's pretty clear that the exemption for tube worms did not pass. We will be able to implement rulemaking, in order to have that in place prior to the next fishing season. You know we are a forest product state. We do make a lot of paper up here, so

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we always love it when people use paper and send us letters. But I don't think it's really required, unless the Policy Board believes so. I don't know how Mass feels about the need of a letter either. Dan, do you have a comment?

MR. McKIERNAN: Yes, I don't think we need a letter.

CHAIR KELIHER: With Maine and Mass not worrying about receiving the letter, and being able to move forward, I see no need for Commission staff to spend time on the letter. Unless there are no objections, we'll move forward with the paperless approach. Dennis Abbott.

MR. DENNIS ABBOTT: Will the Commonwealth of Massachusetts and the state of Maine report back to the Commission that they've taken appropriate action?

CHAIR KELIHER: We certainly would do that in our compliance reports.

MR. McKIERNAN: Yes, Dennis, I'll be taking it to our Marine Fisheries Advisory Commission at their next meeting, and I'll report back after that.

CHAIR KELIHER: Are there any other questions of comments on the striped bass letter or no letters? Seeing no hands, is there any other business to be brought before the Policy Board?

MS. KERNS: Pat, I have one other thing.

CHAIR KELIHER: Toni.

MS. KERNS: I just wanted to update the Policy Board on an issue that came to our attention this morning. The Horseshoe Crab Board reviewed the FMP review for this year, and in that FMP review it provided estimates for the biomedical harvest and the associated mortality with that harvest. A state has sent us a new compliance report that has updated information on their biomedical harvest, which would lower the total coastwide harvest.

I just wanted to let the Board know to look out in their e-mail for a revised FMP review, with the corrections that we received from the state. Due to data confidentiality reasons, we're not going to be able to tell you what state gave us that correction, but just to let you know that that is coming, and we will share that revised report with the associated committees as well, in addition to the Board.

CHAIR KELIHER: Any questions for Toni on that issue? Seeing no hands. Toni, are you going to just report back to us on that issue, or do you need any action here, or this just an FYI?

MS. KERNS: It was just an FYI. I know that the increase in the biomedical harvest raised some eyebrows from folks, and so I just wanted to point it out that that number will be lower, and to be on the lookout for a new FMP reveal.

CHAIR KELIHER: Great, okay, thank you, Toni. If no questions, is there any other business to be brought before the ISFMP Policy Board?

#### **VICE-CHAIR COMMENTS**

CHAIR KELIHER: Hearing no other business, let's give my Vice-Chair an opportunity to make any comments if he would like.

MR. WOODWARD: Thank you, Pat, I just wanted to express my appreciation to all the Commissioners and all the other folks from the states and the delegations, and also all the staff for making the annual meeting the best it can be, given the constraints we've been operating under.

I think all of us hope that this was a one and done, and that next year we will be together, hopefully sooner than later in 2021. I appreciate your support, Pat, and your leadership, and that of Bob. I think sometimes hard times bring out the best in us, and I certainly appreciate the support, being reelected for Vice-Chair, and I'll do my best to keep us moving in a positive direction. Thank you.

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Draft Proceedings of the ISFMP Policy Board Webinar  
October 2020

CHAIR KELIHER: Great, thanks, Spud. Bob Beal, any comments before we adjourn the annual meeting?

EXECUTIVE DIRECTOR BEAL: No, other than I wish I could have seen you all in public. For whatever reason I'm more well-rested after this annual meeting than most of them. I guess I sleep better at home. But no, travel safe home everybody.

CHAIR KELIHER: Thank you! I would want to echo those comments of both the Vice-Chair and our Director. I appreciate everybody's time and attention. We've had a lot of conversations at different Executive Committee meetings about the concerns about how we move forward through this web-based approach. I think we are making the best of it, and I appreciate everybody that is making the webinar successful. With that, I thank you very much. A motion to adjourn our annual meeting would be in order. Tom Fote.

**ADJOURNMENT**

MR. FOTE: I'll make a motion to adjourn, with one stipulation that New Jersey is looking forward to next year, all of us being in person, having a great fishing contest, and getting a lot of business done in New Jersey next year.

CHAIR KELIHER: Motion to adjourn, and looking forward to seeing each other next year in person by Tom Fote. Second by Mel Bell. Any objections to the motion to adjourn? Hearing no objection, seeing no objections, this concludes the Atlantic States Marine Fisheries Commission's Annual Meeting. Thank you very much everybody!

(Whereupon the meeting adjourned at 12:08  
p.m. on October 22, 2020.)



## Mid-Atlantic Fishery Management Council

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Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman

Christopher M. Moore, Ph.D., Executive Director

# MEMORANDUM

**Date:** January 15, 2021  
**To:** Chris Moore, Executive Director  
**From:** Julia Beaty, staff  
**Subject:** Next steps for Recreational Reform Initiative Framework/Addendum and Amendment

## Introduction

The Mid-Atlantic Fisheries Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission) have discussed improvements to management of jointly managed recreational fisheries since 2018. In 2019 they formed a joint steering committee to develop strategies to increase management flexibility and stability in recreational management measures for summer flounder, scup, black sea bass, and bluefish.

In October 2020, the Council and the Commission's Policy Board passed the following motion initiating two management actions to address several prioritized topics associated with the Recreational Reform Initiative:

*Move to initiate a joint framework/addendum to address the following topics for summer flounder, scup, black sea bass, and bluefish, as discussed today:*

- *Better incorporate MRIP uncertainty into management*
- *Develop guidelines for maintaining status quo measures*
- *Develop a process for setting multi-year measures*
- *Consider changes to the timing of federal waters measures recommendations*
- *Harvest control rule*

*and to also initiate an amendment to address recreational sector separation and recreational catch accounting such that scoping for the amendment would be conducted during the development of the framework/addendum.*

Each topic is described in more detail on pages 6-18. Note that "better incorporate MRIP uncertainty into management" includes three specific topics, as described in more detail later in this document.

During the February 2021 joint meeting, the Council and Policy Board will discuss next steps for these actions, including their priority level compared to other ongoing actions for these four species. As an immediate next step, staff recommend formation of a working group to further develop the topics listed above under the framework/addendum (including those that may be

moved to a technical guidance document) prior to the next joint meeting of the Council and Policy Board. The working group could be tasked with further evaluating the following:

- Compliance of prioritized topics with Magnuson-Stevens Fishery Conservation and Management Act requirements. For example, can multi-year management measures and the Harvest Control Rule comply with the requirement for annual evaluation of catch limit overages?
- Which topics currently in the framework/addendum would not require changes to the Fishery Management Plans (FMPs) and therefore could instead be accomplished through a technical guidance document? A staff recommendation for technical guidance document topics is summarized below; however, additional consideration is needed regarding which topics may warrant consideration of changes to the accountability measures (AMs) or other parts of the FMPs and therefore would require a framework/addendum.
- If a wholesale change in management such as the Harvest Control Rule is identified as the highest priority for the Council and Policy Board, would this eliminate the need for some of the other prioritized topics? If so, should some topics not be further developed?
- Plans for further technical analysis and development of alternatives.

Working group membership could include Council, Commission, and Greater Atlantic Regional Fisheries Office (GARFO) staff and leadership, as well as additional individuals with expertise in Magnuson Act requirements, methodologies used by the Marine Recreational Information Program (MRIP), and federal and state management of these recreational fisheries.

During the next joint meeting of the Council and Policy Board, potentially in May 2021, the two groups could review progress made by the working group and further refine priorities and the planned timelines for completion of these actions.

To assist in the discussion in February, this document provides rationale for developing some topics through a technical guidance document rather than a framework/addendum, as well as example timelines and background information on all topics prioritized in October 2020.

### **Types of Management Actions**

Staff recommend that some of the prioritized topics be developed through a technical guidance document, rather than a framework/addendum. Some topics are highly technical in nature and may not require changes to the FMPs, depending on the specific changes desired by the Council and Board. For example, guidelines for appropriate use of data could be adopted through a technical guidance document. However, a framework/addendum may be required if specific management responses to the data are considered, or if changes in how the data are used require changes to the AMs. Table 1 shows an example of which topics could potentially be addressed through a technical guidance document; however, this grouping may need to be revised after further evaluation of these topics to determine which topics may require or warrant a change to the FMPs. This grouping could be revisited during the next joint meeting of the Council and Policy Board.

Table 1: Example grouping of the prioritized Recreational Reform Initiative topics into three types of management actions. The grouping of the technical guidance document and framework/addendum topics may be revisited after further consideration of which topics may require or warrant a change to the FMPs.

Technical Guidance Document	Framework/Addendum	Amendment
<ul style="list-style-type: none"> <li>• Develop a process for identifying and smoothing outlier MRIP estimates.*</li> <li>• Evaluate the pros and cons of using preliminary current year MRIP data.*</li> <li>• Develop guidelines for maintaining status quo measures.</li> </ul>	<ul style="list-style-type: none"> <li>• Envelope of uncertainty approach for determining if changes to recreational management measures are needed.*</li> <li>• Develop process for setting multi-year recreational management measures.</li> <li>• Consider changes to the timing of recommending federal waters measures.</li> <li>• Harvest Control Rule proposal put forward by 6 recreational organizations.</li> </ul>	<ul style="list-style-type: none"> <li>• Recreational sector separation.</li> <li>• Recreational catch accounting.</li> </ul>

\*When the Council and Board passed the motion on page 1, it was understood that “better incorporate MRIP uncertainty into management” addressed these topics.

### Draft Timeline for Next Steps

Table 2 lists draft timelines for development of a technical guidance document, a joint framework/addendum, and a joint amendment to address the prioritized Recreational Reform Initiative topics. These timelines assume the Council and Board will develop some topics through a technical guidance document, rather than a joint framework/addendum. If this recommendation is not approved, then those topics would be developed through the framework/addendum and the timeline for the framework/addendum is likely to extend beyond that listed below.

The timelines in Table 2 also assume that the technical guidance document and framework/addendum are high priorities for the Council and Board over the next few years and the Recreational Reform amendment is a lower priority. The timeline for the amendment will depend on the refined scope of the action, which will be determined after the scoping period.

The timelines take into consideration other ongoing priority actions for these species and are feasible for Council staff. However, Commission and GARFO staff have raised concerns about their ability to meet these timelines given staff capacity and other priority actions for these four species.

Table 2: Draft timeline for next steps for development of a technical guidance document, joint framework/addendum, and joint amendment to address all prioritized Recreational Reform Initiative topics. These timelines assume the Council and Board develop some topics in a technical guidance document, rather than a framework/addendum, otherwise the timeline for the framework/addendum will likely be longer than that listed below. Bold text indicates a potential joint meeting. All dates are subject to change.

<b>Date</b>	<b>Technical Guidance Document</b>	<b>Framework/Addendum</b>	<b>Amendment<sup>1</sup></b>
<b>Feb 2021</b>	Council/Board discuss next steps. Working group formed to assist with analysis and development of topics.	Council/Board discuss next steps. Working group formed to assist with analysis and development of alternatives.	Council/Board discuss next steps and priority level.
Mar-Apr 2021	Working group further develops and analyzes topics.	Working group further develops and analyzes topics, considers plan for scoping. <sup>2</sup>	--
<b>May 2021</b>	Council/Board review working group progress, refine list of topics in technical guidance document if necessary.	Council/Board review working group progress and refine list of topics in framework/addendum if necessary.	Council/Board review priority level for this action. FMAT/PDT formed (assuming action remains a priority.)
Jun-July 2021	Further technical development.	FMAT/PDT develops draft scoping document. <sup>2</sup>	FMAT/PDT develops draft scoping document.
<b>Aug 2021</b>	Council/Board review progress.	Council/Board approve scoping document. <sup>2</sup>	Council/Board approve scoping document and scoping plan.
Sep-Oct 2021	Working group completes development of draft document.	Scoping. <sup>2</sup>	Scoping.

<sup>1</sup> This timeline assumes this amendment remains a high priority after further Council and Policy Board discussion in February and May 2021. If this amendment is not a high priority, the timeline would be extended.

<sup>2</sup> The Council and Board do not typically hold scoping periods for frameworks and addenda; however, the Harvest Control Rule, as proposed, requires extensive stakeholder input. See pages 10-11 for details. Specific management alternatives would not be developed prior to scoping. The intent of scoping would be to gather public input to help refine the scope of the action and to inform development of the alternatives, with an emphasis on the Harvest Control Rule. Additional public input on all alternatives in the framework/addendum will be sought after the complete range of alternatives is finalized.

<b>Date</b>	<b>Technical Guidance Document</b>	<b>Framework/Addendum</b>	<b>Amendment<sup>1</sup></b>
Nov 2021	MC considers for use in development of 2022 recreational measures, pending Council/Board approval in December.	FMAT/PDT reviews scoping comments and provides initial recommendations for types of alternatives to be further developed.	FMAT/PDT reviews scoping comments and provides initial recommendations for types of alternatives to be further developed.
<b>Dec 2021</b>	Council/Board consider approval of draft document.	Council/Board review scoping comments and FMAT/PDT recommendations; refine scope of action.	Council/Board review scoping comments and refine scope of action.
Early 2022	TC considers in development of state waters 2022 rec. measures.	FMAT/PDT further develops range of alternatives. AP meeting to review FMAT/PDT progress and recommend final range of alternatives.	FMAT/PDT develops alternatives.
<b>Spring 2022</b>	--	Council/Board approve final range of alternatives and draft addendum for public comment. Public hearings, if desired by states.	Council/Board review FMAT/PDT progress and provide guidance on further development of alternatives. FMAT/PDT further develops alternatives.
<b>Summer 2022</b>	--	FMAT/PDT and AP meetings to develop recommendations for final action. Council/Board take final action.	AP meeting to review FMAT/PDT progress and recommend final range of alternatives. Council/Board approve final range of alternatives.
Fall 2022	MC/TC and Council/Board consider for use in development of 2023 recreational management measures.	Framework/addendum documents completed by staff. Framework document submitted to NMFS for approval and implementation.	FMAT/PDT develops draft public hearing document and draft Commission amendment for public hearings.
<b>Late 2022</b>	recreational management measures.	Federal rulemaking process.	Council/Board approve documents for public hearings.
Early 2023			Public hearings.
Spring 2023	--	Potential federal implementation.	FMAT/PDT and AP meetings to develop recommendations for final action.
<b>Summer 2023</b>	--	--	Council/Board take final action.

Date	Technical Guidance Document	Framework/Addendum	Amendment <sup>1</sup>
Fall 2023	MC/TC and Council/Board consider for use in development of 2024 recreational management measures.	MC/TC and Council/Board consider for use in development of 2024 recreational management measures.	Staff complete amendment documents. Council document submitted to NMFS for approval and implementation
Early 2024			Federal rulemaking process.
Mid 2024	--	--	
Late 2024 or Jan 2025	--	--	Potential federal implementation.

### Technical Guidance Document Topics

As described above, the following three topics could be further developed through a technical guidance document, pending further consideration of the specific changes desired. Each of these topics are described in more detail below.

- Develop a process for identifying and smoothing outlier MRIP estimates (part of the prioritized topic of “better incorporate MRIP uncertainty into management”).
- Evaluate the pros and cons of using preliminary current year MRIP data (part of the prioritized topic of “better incorporate MRIP uncertainty into management”).
- Develop guidelines for maintaining *status quo* recreational management measures.

#### Adopt a Process for Identifying and Smoothing Outlier MRIP Estimates

In recent years, the Commission’s Summer Flounder, Scup, and Black Sea Bass Technical Committee identified two MRIP black sea bass harvest estimates as outliers (i.e., New York 2016 wave 6 for all modes and New Jersey 2017 wave 3 private/rental mode only) and replaced them with smoothed estimates when developing state waters recreational management measures. These smoothed estimates have not been used in other parts of the management process, including the stock assessment, recreational harvest limit (RHL) and annual catch limit (ACL) overage evaluations, and the setting of federal waters recreational management measures.

The Monitoring and Technical Committees have not used statistical methods to identify potential outlier estimates for the other three species; however, they have addressed variability in the data for all four species in other ways such as using averages of multiple previous years when predicting future harvest under different management measures

The Council and Board agreed that it would be beneficial to adopt a standardized process for identifying and adjusting (if needed) outlier MRIP estimates. This process would be applied to both high and low outlier estimates as appropriate and could be used for all four species.

The Technical Committee used the Modified Thompson’s Tau approach to identify the two outlier black sea bass estimates. They used two different methods to smooth those estimates. They agreed that the appropriate method may vary on a case by case basis. If guidelines are adopted for standardizing the process of identifying and smoothing outlier MRIP estimates, it will be important for the Monitoring and Technical Committees to maintain the discretion to deviate from this process if they provide justification for doing so.



The process currently used by the Monitoring and Technical Committees to recommend recreational management measures is not codified in the FMPs; therefore, a change to this method would not require an FMP framework/addendum or amendment.

#### *Evaluate the Pros and Cons of Using Preliminary Current Year Data*

Each fall, Council staff develop projections of recreational harvest of summer flounder, scup, and black sea bass in the current year to compare against the upcoming year's RHL. These projections combine preliminary current year harvest estimates through wave 4 (i.e., through August) with the proportion of harvest by wave in one or more past years.<sup>3</sup> The Monitoring Committee recommends the appropriate methodology in any given year. The data used (e.g., one or multiple previous years) varies on a case by case basis.

A different process is used for bluefish. Historically, expected bluefish recreational harvest has been evaluated when considering a recreational to commercial transfer. Expected bluefish harvest was typically based on the previous year or a multiple year average and did not account for preliminary current year data.

These different methodologies were developed based on Monitoring Committee guidance. The FMPs do not prescribe which data should be used to develop recreational management measures, beyond requiring use of the best scientific information available. The Council and Board wish to evaluate the appropriateness of using preliminary current year data and data from one or multiple previous years to project harvest for comparison against the upcoming year's RHL. If the Council and Board wish to provide guidance to the Monitoring and Technical Committees on which data to use, then this could be considered through a technical guidance document. However, if they wish to place restrictions on the use of certain types of data (e.g., preliminary current year data), then an FMP framework/addendum may be necessary.

#### *Develop Guidelines for Maintaining Status Quo Recreational Management Measures*

The Council and Board wish to consider standardized guidelines for comparing both recreational harvest data (all considerations described above related to outliers and preliminary data could apply) and multiple stock status metrics (biomass, fishing mortality, recruitment) when deciding if measures should remain unchanged. For example, poor or declining stock status indicators could require changes when status quo would otherwise be preferred. These guidelines would take into account existing FMP requirements, such as the accountability measures.<sup>4</sup>

The idea behind this concept is to establish a pre-determined, standardized checklist of metrics to evaluate when determining if recreational management measures can remain unchanged, should be more restrictive, or can be liberalized. For example, if projected recreational harvest falls within a pre-defined range above or below the next year's RHL (see next page), if recruitment and biomass trends are stable or increasing, if fishing mortality trends are stable or decreasing, and if fishing effort trends are stable or decreasing, then status quo management measures could be justified. Alternatively, if projected recreational harvest exceeds a pre-determined range above and below the RHL, if recruitment or biomass trends are declining, if fishing mortality is

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<sup>3</sup> In December 2020, MRIP announced new standards related to the dissemination of recreational catch and harvest estimates. Instead of publishing wave-level estimates, the estimates will now be published as cumulative estimates every two months. Wave-level estimates will continue to be available by request; therefore, this will not require a change to how the Monitoring Committee has typically projected current year harvest for summer flounder, scup, and black sea bass. More information is available at: <https://www.fisheries.noaa.gov/feature-story/noaa-fisheries-establishes-recreational-fishing-survey-and-data-standards>.

<sup>4</sup> The summer flounder, scup, and black sea bass accountability measures are summarized in this document: [https://www.mafmc.org/s/AMs-description\\_SF\\_scup-BSB\\_Dec2020.pdf](https://www.mafmc.org/s/AMs-description_SF_scup-BSB_Dec2020.pdf).

above the target level, or if fishing effort shows increasing trends, then more restrictive management measures may be needed. Decisions related to future management measures will be more complicated when these indicators show a mix of positive and negative signals. Therefore, the Monitoring and Technical Committees should have the discretion to deviate from the pre-determined guidelines based on annual considerations and should provide justification for their recommendations.

The Recreational Reform Steering Committee referred to this as the “sign posts” method and drafted a preliminary example which was discussed at the October 2019 joint Council/Board meeting.<sup>5</sup> However, other examples could be considered.

As previously noted, the FMPs do not prescribe which data should be used to develop recreational management measures, beyond requiring use of the best scientific information available. If the Council and Board wish to adopt guidelines on how to evaluate the available data, then this could be considered through a technical guidance document.

### **Framework/Addendum Topics**

The following four topics could be further developed through a joint framework/addendum. Each of these topics are described in more detail below.

- Envelope of uncertainty approach for determining if changes to recreational management measures are needed (part of the prioritized topic of “better incorporate MRIP uncertainty into management”).
- Develop process for setting multi-year recreational management measures.
- Consider changes to the timing of federal waters measures recommendations.
- Harvest Control Rule proposal put forward by 6 recreational organizations.

Depending on the specific changes desired, it is possible that the envelope of uncertainty approach could be developed through a technical guidance document, rather than a framework/addendum. The working group may also determine that some of the items currently listed under the technical guidance document may require a framework/addendum. The Council and Board can further evaluate the scope of the framework/addendum based on the working group’s evaluation at a future joint meeting.

#### *Envelope of Uncertainty Approach for determining if Changes to Recreational Management Measures are Needed*

Under this approach, a pre-defined range above and below the projected harvest estimate (e.g., based on percent standard error) would be compared against the upcoming year’s RHL. If the RHL falls within the pre-defined range above and below the projected harvest estimate, then no changes would be made to management measures.

In some recent years, the Monitoring and Technical Committees have recommended maintaining status quo measures for black sea bass and summer flounder based on percent standard error (PSE) values associated with MRIP estimates. The intent behind the envelope of uncertainty approach is to develop a standard, repeatable, and transparent process to be used each year, rather than an ad hoc process. The Monitoring and Technical Committees would maintain the discretion to deviate from this process if they saw sufficient justification to do so.

This approach could be used in combination with other topics listed in this document, such as the process for identifying and smoothing outlier MRIP estimates, considerations related to the use

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<sup>5</sup> See the briefing materials, presentation, and webinar recording available at: <https://www.mafmc.org/briefing/october-2019>.

of preliminary current year data, and considerations related to the timing of the recommendation for federal waters management measures.

The 2013 Omnibus Recreational Accountability Measures Amendment considered a similar approach using confidence intervals around catch estimates to determine if the recreational ACL had been exceeded; however, that amendment proposed using only the lower bound of the confidence interval, rather than the upper and lower bounds. For this reason, that portion of the amendment was disapproved by NOAA Fisheries.

#### *Develop Process for Setting Multi-Year Recreational Management Measures*

The FMPs allow recreational catch and harvest limits to be set for up to three years at a time. However, each year the Council and Board consider recent data on recreational catch and harvest as well as updated stock status information, if available, before determining if the recreational possession limits, fish size limits, and open/closed seasons should be modified to ensure that the following year's RHL can be met but not exceeded. These annual considerations can result in frequent adjustments to the recreational management measures. Some Council and Board members have called this "chasing the RHL." This can be especially frustrating to stakeholders when availability is high and there is not a perceived conservation need to adjust the measures.

To address these issues, the Council and Board wish to further develop and evaluate a process for setting recreational management measures that would be in place for two years at a time, with a strong commitment among all state and federal managers to making no changes in the interim year. This would include restricting the use of conservation equivalency to make adjustments to management measures through the Commission process in the interim year. This would also include not reacting to new data that would otherwise allow for liberalizations or require restrictions. The Council and Board would react to these data when developing new recreational management measures for the following two years. The considerations described in the previous section regarding guidelines for maintaining status quo measures would not apply in the interim year. The Recreational Reform Steering Committee drafted a preliminary example process which was discussed at the October 2019 joint Council/Board meeting.<sup>6</sup>

An FMP framework/addendum would be required to allow for the use of multi-year recreational management measures in this way. For example, changes to the current accountability measure regulations would be needed. Additional considerations are needed regarding the Magnuson Act requirements for annual ACL overage evaluation.

#### *Consider Changes to the Timing of Recommendations for Federal Waters Recreational Management Measures*

Table 3 lists the timeline for development and implementation of recreational management measures for summer flounder, scup, and black sea bass in recent years. The timeline for bluefish has differed as preliminary current year data have not typically been used for bluefish.

The Council and Board wish to further evaluate the pros and cons of adopting federal waters recreational management measures in December (as is current practice for summer flounder, scup, and black sea bass), as opposed to earlier in the year, such as October or August. If the approach described above for multi-year management measures is used, these decisions would be made every other August, October, or December, rather than every year.

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<sup>6</sup> See the briefing materials, presentation, and webinar recording available at: <https://www.mafmc.org/briefing/october-2019>.

The current process of recommending federal waters measures for the upcoming year in December can pose challenges for implementing needed changes in both federal and state waters in a timely and coordinated manner. It also limits how far in advance for-hire businesses can plan their trips for the upcoming year.

In recent years, changes to the federal recreational measures for summer flounder, scup, and/or black sea bass have not been implemented until May-July of the year in which the changes are needed. Adopting recommendations for federal waters measures in August or October could allow for changes to be implemented earlier in the year; however, less information on current year fishery performance would be available for consideration.

The current regulations associated with the recreational management measures for these species do not specify the time of year at which these decisions must be made. However, a change to this timeline would impact certain parts of the FMPs which are not defined in regulations. For example, Frameworks 2, 6, and 14 to the Summer Flounder, Scup, and Black Sea Bass FMP include annual timelines for using conservation equivalency to consider if the federal waters recreational management measures for summer flounder (Frameworks 2 and 6) and/or black sea bass (Framework 14) should be waived in favor of state waters measures. For this reason, any changes to the timing of the federal waters measures recommendation should be done through a framework/addendum and cannot be addressed through a technical guidance document.

Table 3: Timeline for development and implementation of state and federal waters recreational management measures for summer flounder, scup, and black sea bass in recent years.

<b>Month</b>	<b>Action</b>
August	Council/Board set or review next year’s recreational catch and harvest limits.
November	Monitoring Committee uses preliminary current year MRIP data through wave 4 to project the full current year’s harvest for comparison against the next year’s RHL. The Monitoring Committee recommends changes to recreational management measures, if needed.
December	Council/Board adopt federal waters recreational management measures for the following year and agree on the overall level of reduction or liberalization (if any) to be achieved by the combination of all state and federal waters measures in the following year.
January - April	States develop and Board reviews and approves state waters recreational management measures for the current year.
May - July	Changes to federal waters measures implemented.

### *Harvest Control Rule*

Six recreational fishing organizations submitted a proposal called a Harvest Control Rule through the scoping period for the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment.<sup>7</sup> This was originally put forward as an allocation proposal; however, after considering the advice of the FMAT and the Recreational Reform Steering Committee, the Council and Board agreed that the allocation aspects of this proposal are not feasible under the Magnuson Act. They expressed an interest in further considering the aspects of the proposal which address the setting of recreational management

<sup>7</sup> The full proposal can be found on pages 147-152 of this document: [https://www.mafmc.org/s/Tab02\\_SFSBSB-ComRec-Allocation-Amd\\_2020-05.pdf](https://www.mafmc.org/s/Tab02_SFSBSB-ComRec-Allocation-Amd_2020-05.pdf).

measures, considered independently from the commercial/recreational allocation aspects of the proposal. Specifically, they wished to further evaluate the proposal's recommendation for pre-determined recreational management measure "steps" associated with different biomass levels.

The conceptual idea behind this part of the proposal is to determine a range of pre-defined management measures which would be used at different biomass levels. The upper and lower bounds of these management measure "steps" would be informed by input from recreational stakeholders. The proposal states that the most liberal step would include the most liberal set of measures preferred by anglers when biomass is high. The proposal suggests that beyond a certain level, anglers do not "need" a smaller minimum fish size, higher bag limit, or longer open season. The most conservative step would include the most restrictive measures which could be tolerated without major loss of businesses such as bait and tackle shops and party/charter businesses. The proposal also suggests that there is a point at which making measures more restrictive no longer has a conservation benefit. These ideas are conceptual at this stage and have not been fully developed or analyzed. Fully developing these concepts would require extensive stakeholder input to meet the intent of the proposal.

The Magnuson Act requires that ACLs be set each year in pounds or numbers of fish, and that each ACL have associated AMs to prevent exceeding the ACL and to trigger a management response if an ACL is exceeded. The FMP must define a way to measure total removals (total dead catch) and to evaluate performance relative to an ACL set in numbers of fish or pounds. This does not mean it is impossible to start with preferred measures and translate those into catch, but managers are still required to demonstrate that catch associated with the measures is not expected to exceed the ACL. Ultimately, managers must demonstrate that measures are expected to prevent overfishing.

To comply with these Magnuson Act requirements, each set of recreational measures should be clearly associated with projected catch levels. One concern with this approach is the feasibility of accurately predicting catch levels at each of the management measure steps. Even when recreational measures have remained similar across years, the resulting MRIP estimates have sometimes varied significantly. Total dead catch can vary substantially with external factors such as changing total and regional availability, recruitment events, or changing effort based on factors other than management measures. For these reasons, the pre-determined management measure steps, especially the upper and lower bounds, would be a starting point for consideration and would need to be regularly re-evaluated. The Council and Board could not commit to maintaining recreational management measures within a pre-determined range; however, the range could be put forward as a target.

The proposal suggests that higher levels of biomass correspond to higher levels of access, which could allow for liberalization of recreational measures. However, under current recreational fishery capacity, effort and catch can scale with biomass and availability, in some cases even under highly restrictive recreational measures. This complicates the assumption that recreational measures can liberalize when biomass increases. In addition, changes in the recreational fishery over time (e.g., general effort increases, species-specific effort changes, legal/policy constraints, and improved technology for targeting fish) further complicate the assumption that past recreational measures can be used to estimate expected future catch.

However, there are benefits to the transparency provided by a tiered management approach with clearly defined measures at each level. Additional exploration of the relationship between the effectiveness of recreational management measures and estimated biomass would also be worthwhile.

## Amendment Topics

### *Recreational Sector Separation*

Recreational sector separation would entail managing the for-hire components of the recreational fisheries separately from anglers fishing on private or rental boats and from shore.

Recreational sector separation could be considered through either separate allocations to the for-hire sector and private anglers (including anglers fishing from private or rental boats and from shore), or as separate management measures for the two recreational sectors without a fully separate allocation, as summarized below.

### *Sub-Allocation of the Recreational Annual Catch Limit or RHL*

This option would specify within the FMP a percentage allocation to the for-hire recreational sector of either the ABC, the recreational ACL, or the RHL. There are several potential ways in which a separate allocation could be created as described below and illustrated in Figure 1. The differences between some options are nuanced, and the pros and cons of each approach should be further explored.

- A. Current FMPs:** The ABC is divided into the recreational ACL and the commercial ACL for summer flounder, scup, and black sea bass and the recreational ACT and commercial ACT for bluefish. Projected recreational discards are removed from the recreational ACL/ACT to derive the RHL. Both the private and for-hire recreational sectors are held to a single combined ACL/ACT and RHL. Evaluation of potential overages, and consequences for those overages, are considered for all recreational modes combined.
- B. Separate ACLs:** Under this approach, the ABC would be allocated three ways: into a private recreational ACL, a for-hire recreational ACL, and a commercial ACL. This method would require development of these three allocations, as well as separate AMs for the private recreational and for-hire sectors. The FMAT for the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment does not recommend this approach as it would impact the commercial allocation.
- C. Recreational Sub-ACLs:** Under this approach, the ABC would remain divided into the recreational ACL and commercial ACL based on the allocation approach defined in the FMPs. The recreational ACL would be further allocated into private and for-hire sub-ACLs. This would require development of separate AMs for the private recreational and for-hire sectors. The FMAT for the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment recommended further development of this approach as it would maintain separation of the recreational sectors from the commercial sector, it allows for consideration of different discard trends by each recreational sector, and it allows for the full separation of accountability for overages (as opposed to separate RHLs, described below).
- D. Separate RHLs:** Under this approach, the private and for-hire sectors would remain managed under a single recreational ACL. Separate RHLs could be developed for each sector for the purposes of determining management measures. Accountability under this option would likely be partially at the RHL level as performance to the RHL could be evaluated for each recreational sector for the purposes of adjusting future management measures to constrain harvest to the RHL, and partially at the ACL level (in the sense that AMs must be established at the ACL level). This approach includes separate management of harvest only; dead discards are not included in RHLs and would be accounted for at

the ACL level. Separation at the RHL level does not represent full separation and would need to include joint accountability to a combined recreational ACL, which could be problematic if one sector contributes more to an overage than the other.

Note that any approach creating separate ACLs or sub-ACLs would require the development of corresponding separate AMs.

In addition to determining where sector separation occurs, consideration should be given to which data sources and methods to use for sector allocation, including:

- How to use MRIP and/or VTR data in the allocations;
- Whether to allocate using catch (landings and dead discards) or harvest (related to the question of whether to allocate at the ACL or RHL level);
- Whether to allocate in numbers of fish or pounds;
- The base years or other method of evaluating this recreational sector data.

Many scoping comments expressed an interest in sector separation to make better use of for-hire VTR data, which some stakeholders perceive as being more accurate than the MRIP for-hire estimates since vessels with federal for-hire permits are required to submit VTRs for every trip. However, there are also concerns about the accuracy of self-reported VTR data. In addition, VTR data include estimates of numbers of fish, but not weight of fish, so incorporating VTR data into allocations would require either establishing allocations in numbers of fish, developing a method to estimate weights of harvested and discarded fish from the numbers reported on VTRs, or adding a required data field for weight to VTRs. On average, for-hire VTR harvest is lower than the MRIP for-hire estimates since 1995 (Figure 2).

Most states do not require state-only permitted vessels to submit VTRs and data from these groups would be missing if VTRs were used to determine for-hire allocations. Data from some state-specific VTR programs (e.g., New York) are incorporated into the MRIP estimates of for-hire effort; however, they are not incorporated into the MRIP estimates of catch as they have not been validated.

The FMAT for the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment noted that there is currently some "borrowing" of data between the private angler and for-hire fisheries in the MRIP estimation process. For-hire estimation by MRIP incorporates some information from VTRs. While separate estimates for each recreational sector could serve as a basis for managing them separately, if the sectors were split completely, improvements would likely be needed in the sampling efforts for both sectors. Currently, much of the for-hire sampling for summer flounder, scup, and black sea bass is focused on discards, which provides information on the length of discarded fish that contributes to the discard estimates for the entire recreational fishery. Many of the length measurements for landings come from private anglers, which influences the mean weight of landed fish used to generate recreational harvest estimates.

Separate dead discard estimates in weight are not currently available by recreational sector. Technically it would be possible to generate these estimates, but it may not be entirely defensible. Calculation of sub-allocation options could use total dead catch in numbers of fish (for catch-based allocations for separate ACLs or sub-ACLs), or total harvest in numbers of fish or pounds (for harvest-based allocations for separate RHLs). Example allocations based on harvest in numbers of fish are shown in Table 4.

The uncertainty in the recreational data by mode is an important consideration when determining if sector separation is appropriate. Because the uncertainty in the MRIP data increases as it is

broken down by wave, state, and mode, the Council and Board would need to consider whether the benefits of sector separation outweigh the drawback of increased uncertainty when using mode-specific data to set and evaluate catch limits and recreational measures. Considerations related to identifying and smoothing outlier MRIP estimates, as described earlier in this document, could also apply to this topic.

As an example, MRIP percent standard errors (PSEs) were queried for the North and Mid-Atlantic regions (Maine through Virginia) for all for-hire modes combined and private/rental/shore modes combined for summer flounder, scup, and black sea bass. Table 5 shows that the PSEs increase for the for-hire mode when separated from the combined mode data. PSEs for the private/shore modes combined are slightly higher than those for all modes combined, but there is less of a difference from the combined modes PSEs given that private and shore estimates account for most harvest of these species. PSEs also vary by species.

There are no comparable estimates of uncertainty for VTR data because these data are not an expanded estimate associated with sampling uncertainty.

#### *Separate Management Measures for For-Hire vs. Private/Rental and Shore Modes Without Separate Allocations*

Rather than creating a separate allocation for the for-hire sector, a degree of sector separation could be achieved by setting different management measures to account for the differing priorities and data for for-hire vs. private anglers (including the private/rental and shore modes).

Separate management measures by recreational sector are currently used in the bluefish fishery in federal and state waters and in a limited manner in state waters for scup and black sea bass. Massachusetts, Rhode Island, Connecticut, and New York use different scup possession limits for the for-hire sector at certain times of year. Connecticut has a different black sea bass possession limit for for-hire vessels during a certain time of the year.

It could be beneficial to develop a policy for how sector-specific measures should be developed, how accountability should be evaluated, and how adjustments would be applied to both recreational sectors. Such a policy could clarify the process for stakeholders and managers, reducing process uncertainty and increasing transparency when setting recreational measures.

Creating a policy for separate measures for for-hire vs private anglers does not require an amendment. This could possibly be done through specifications, or if not, through a framework/addendum. If separate allocations were created (see previous section), describing the process for setting separate recreational measures would be an inherent part of that option.



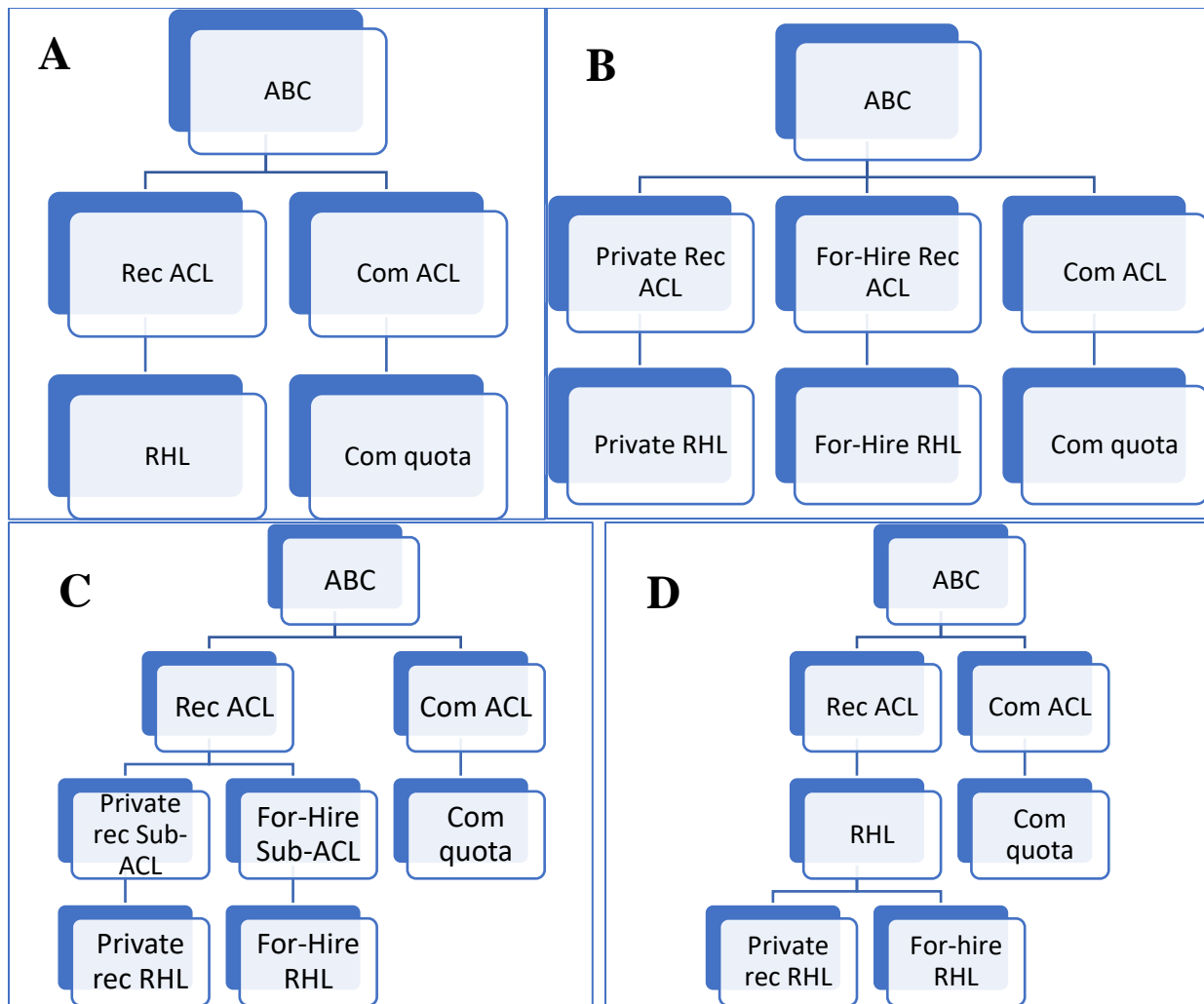


Figure 1: Conceptual flowcharts of potential recreational sector separation configurations including A) status quo, B) separate ACL allocations, C) sub-ACL allocations, and D) separate RHLs. This figure is based on the current management program for summer flounder, scup, and black sea bass. The commercial/recreational allocation for bluefish currently occurs at the ACT level.

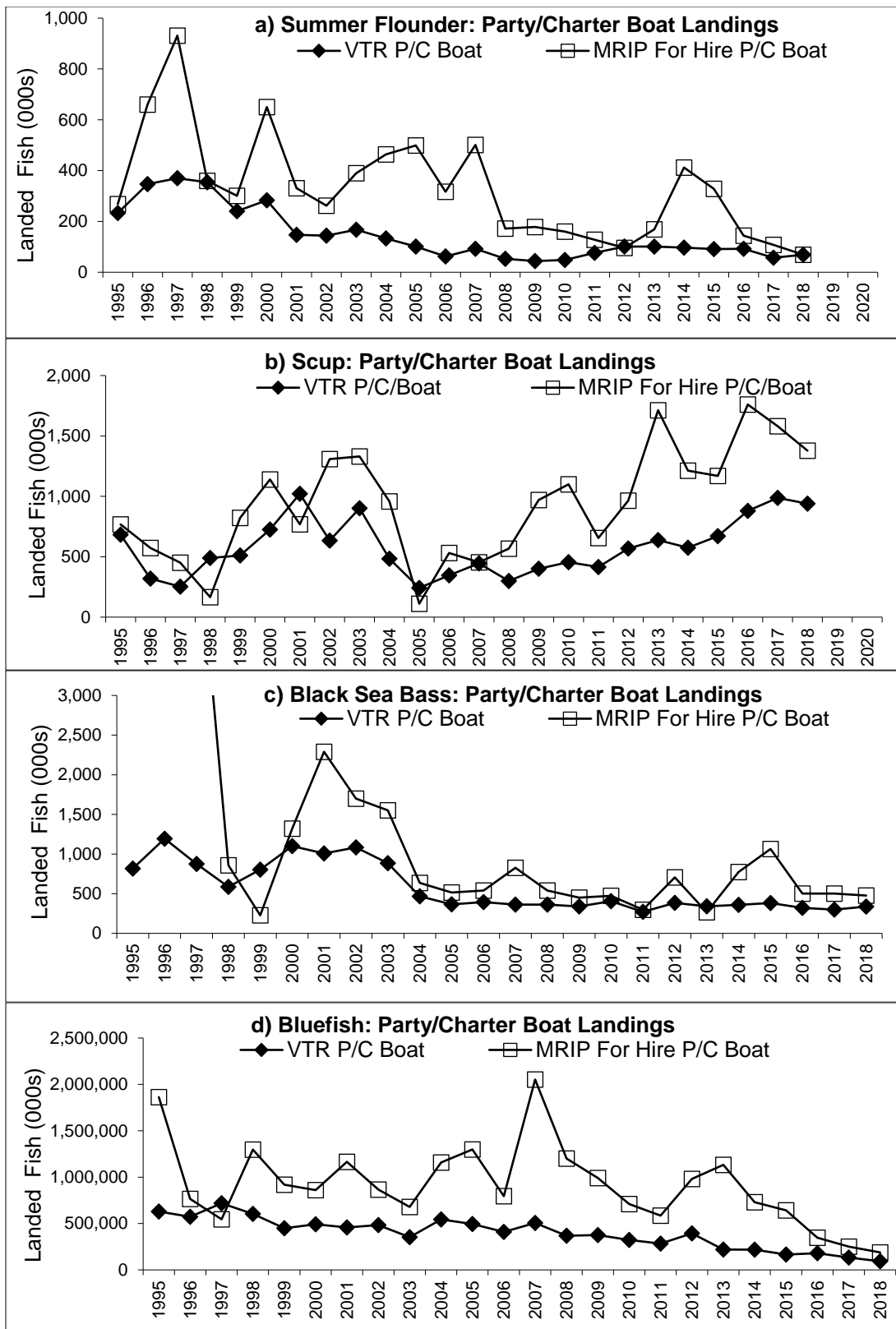


Figure 2: Comparison of federal party/charter vessel VTR estimates of landed fish vs. MRIP estimated for-hire landed fish, 1995-2018, for a) summer flounder, b) scup, c) black sea bass, and d) bluefish.

Table 4: Example approaches for calculating separate sub-allocations to private (i.e., private/rental and shore mode) and for-hire sectors, based on harvest in numbers of fish.

Species	Approach	Years	Private	For-Hire
<b>Summer Flounder</b>	5 most recent years through 2018	2014-2018	94%	6%
	10 most recent years through 2018	2009-2018	95%	5%
	15 most recent years through 2018	2004-2018	95%	5%
<b>Scup</b>	5 most recent years through 2018	2014-2018	89%	11%
	10 most recent years through 2018	2009-2018	88%	12%
	15 most recent years through 2018	2004-2018	88%	12%
<b>Black Sea Bass</b>	5 most recent years through 2018	2014-2018	86%	14%
	10 most recent years through 2018	2009-2018	87%	13%
	15 most recent years through 2018	2004-2018	82%	18%
<b>Bluefish</b>	5 most recent years through 2018	2014-2018	97%	3%
	10 most recent years through 2018	2009-2018	96%	4%
	15 most recent years through 2018	2004-2018	95%	5%

Table 5: MRIP PSEs for total catch in numbers of fish, North and Mid-Atlantic (Maine through Virginia) for summer flounder, scup, and black sea bass by mode, 2004-2019.

Year	Summer Flounder			Scup			Black Sea Bass		
	All For-Hire	Private/Shore	All modes	All For-Hire	Private/Shore	All modes	All For-Hire	Private/Shore	All modes
2004	13.8	5.9	5.7	28.4	15.4	14.4	19.7	16.3	14.2
2005	11.3	7.4	7.1	27.1	19.6	19.1	16.9	12.4	11
2006	16.8	8	7.7	18.1	16.1	15.4	15.3	11.1	9.8
2007	10.9	6.7	6.4	16.5	15.3	14.3	10.4	10.9	9.2
2008	10.1	6.5	6.3	16.8	11.6	10.5	9.5	15.7	14.4
2009	10.1	5.8	5.7	15.1	11.5	10.6	10.3	10.2	9.3
2010	12.6	6.8	6.7	24.8	10.4	9.8	12.0	23.2	21.8
2011	9.3	6.6	6.5	18.8	15.2	14.5	12.4	10.5	9.7
2012	9.9	11.3	11.1	16.4	12.3	11.3	10.1	9.7	9.1
2013	12.9	8.2	8.0	7.9	11.7	10.6	6.8	9	8.5
2014	18.2	8.6	8.2	17.8	10.5	9.7	13.5	8.4	7.6
2015	12.2	8	7.7	14.0	15.6	14.8	12.0	10.2	9.1
2016	8.5	8	7.8	10.6	10.5	10.0	7.1	8.5	7.9
2017	13.5	10.7	10.4	8.0	13.5	12.7	6.6	11.8	11.1
2018	8.7	6.6	6.4	9.2	8.6	8.1	9.6	6.3	5.7
2019	12.6	8.8	8.6	10.7	6.7	6.1	8.7	6.5	5.9
<b>AVG</b>	<b>11.9</b>	<b>7.7</b>	<b>7.4</b>	<b>16.6</b>	<b>13.2</b>	<b>12.4</b>	<b>11.5</b>	<b>11.6</b>	<b>10.6</b>

### Recreational Catch Accounting

The theme of improved recreational catch accounting was prominent in many scoping comments for the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment. Examples of changes recommended through scoping are listed below. The intent behind these recommendations is to reduce uncertainty in the recreational data. It is worth noting that MRIP is currently considered the best scientific information available for the recreational fisheries and will continue to be used for stock assessments and catch limit evaluations for the foreseeable future. MRIP is a national-level program and the Council and Commission have a very limited ability to influence changes to the MRIP estimates.

- **Private angler reporting:** Private angler reporting has been explored in specific fisheries in other regions, and as of August 2020 is required in this region for bluegill and golden tilefish. Consideration could be given to the feasibility of private angler reporting for summer flounder, scup, black sea bass, and bluefish given that these fisheries take place in state and federal waters, from shore and from private and for-hire vessels, and that there are millions of directed trips per year for each species (e.g., an estimated 8.7 million angler trips for which summer flounder was the primary target, 2.7 million for which scup was the primary target, 1.4 million for which black sea bass was the primary target, and 5.3 million for which bluefish was the primary target in 2019). Given the scale of these recreational fisheries, mandatory private angler reporting may be a challenge to implement. Thorough consideration should be given to the potential levels of non-compliance and how this may impact the resulting data. Lessons learned from other private angler reporting programs should be evaluated and considered.
- **Tagging programs:** A few scoping comments suggested that anglers be issued tags for a specific number of fish each year. Tagging programs are used in some recreational fisheries, but they may be more appropriate for species with much lower harvest levels than summer flounder, scup, black sea bass, and bluefish. Consideration should be given to the pros and cons of moving forward with this approach compared to a traditional possession limit, especially considering the millions of targeted recreational trips for these species. Ensuring that the program is fair and equitable is a challenge. For example, consideration would need to be given to who receives tags, how they are distributed, and how the program is administered.
- **Mandatory tournament reporting:** A few scoping comments recommended mandatory catch reporting for recreational fishing tournaments. During the May 2020 joint meeting, one Council/Board member questioned the value of mandatory reporting for tournaments given that tournament catch likely constitutes a very small percentage of total catch. An evaluation of summer flounder, scup, black sea bass, and bluefish catch in tournaments has not been performed and may be complicated by the lack of a centralized list of tournaments which would catch these species. Tournament catch of these species is included in the MRIP estimates, but is not specifically designated as tournament catch.
- **Enhanced VTR requirements:** A few scoping comments recommended additional VTR requirements, such as requiring VTRs for for-hire vessels that do not have federal permits and reinstating “did not fish” reports for federal permit holders to better understand fishing effort.



# Atlantic States Marine Fisheries Commission

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## MEMORANDUM

**TO: ISFMP Policy Board**

**FROM: Risk and Uncertainty Policy Workgroup**

**DATE: January 15, 2021**

**SUBJECT: Risk and Uncertainty Policy**

At the 2020 Summer Meeting, Commissioners reviewed the draft Risk and Uncertainty Policy. The Policy Board tasked the Risk and Uncertainty Policy Workgroup (R&U WG) with further developing the tool, including refining the criteria for the Risk and Uncertainty Decision Tool (decision tool) and updating the striped bass example.

Through collaboration with the Committee on Economics and Social Sciences (CESS) and members of Assessment Science Committee, the R&U WG developed criteria for the decision tool. The socioeconomic criteria seek to capture the short-term and long-term effects of the proposed management change. To accommodate the socioeconomic criteria, the R&U WG divided the risk and uncertainty process into two stages: First, the species Technical Committee (TC) provides inputs for the technical components of the decision tool (stock status, model uncertainty, management uncertainty, environmental uncertainty, environmental importance) and produces a preliminary harvest level; second, the CESS evaluates the effects of the proposed management using the preliminary harvest level and the socioeconomic criteria.

Through collaboration with members of the Striped Bass TC, the striped bass example was updated based on the revised criteria. This example is intended to be illustrative and did not follow the full risk and uncertainty process (e.g., it did not incorporate Commissioner input on the weightings). As a result, the striped bass example does not necessarily reflect what would have resulted from a full implementation of the process.

The following documents describe and demonstrate the proposed risk and uncertainty process:

- A Risk and Uncertainty Policy document, which describes the general proposed approach to managing risk and uncertainty in decision-making
- A Risk and Uncertainty TC Guidance document, which outlines the specifics of the proposed risk and uncertainty process
- The Risk and Uncertainty Decision Tool, which includes a description of the decision tool, the decision tool criteria, and the striped bass example; the Risk and Uncertainty Decision Tool spreadsheet can be downloaded and used to explore different scenarios:  
[http://www.asmfc.org/files/Meetings/2021WinterMeetingWebinar/PolicyBoard\\_Risk\\_UncertaintyDecisionTool.XLSX](http://www.asmfc.org/files/Meetings/2021WinterMeetingWebinar/PolicyBoard_Risk_UncertaintyDecisionTool.XLSX)
- A Risk and Uncertainty Weightings Survey, which provides an example survey for determining Commissioner weighting preferences for the decision tool

As a next step, the R&U WG recommends using tautog as a pilot case for the Risk and Uncertainty Policy. Unlike the striped bass example, the tautog pilot would be a full implementation of the process, though it would still allow flexibility to make any necessary changes to the process.

M21-15

## DRAFT ASMFC Risk and Uncertainty Policy

### Risk and Uncertainty Policy Statement

The Commission recognizes that fishery information is inherently variable, and that successful management requires full consideration of this uncertainty and the associated risks on management decisions. The purpose of the Commission's Risk and Uncertainty Policy is to provide a consistent yet flexible mechanism to account for both scientific and management uncertainty in the Commission's decision-making process in order to protect all Commission-managed stocks from the risk of overfishing, while minimizing any adverse social, economic, or ecosystem effects. This Policy seeks to maximize the long-term benefits across all of our marine fishery resources by providing objective criteria to characterize both scientific and management uncertainty, and to evaluate management risk. Additionally, the Policy improves transparency in the management process, allowing for better communication among managers, industry, and other stakeholders.

### Risk and Uncertainty Approach

The Commission's approach consists of a framework, the Risk and Uncertainty Decision Tool (decision tool), that can be adapted to fit the needs of a particular species, while also providing transparency and consistency across species. The decision tool incorporates diverse information about risk and uncertainty, as well as the relative importance of this information, into a single value. The current version of the tool arrives at a probability of achieving management objectives to be used with projections for that species; however, it could be adapted for other management questions in the future.

The Risk and Uncertainty Decision Tool consists of a series of questions related to the risk and uncertainty of a species' management. Responses to the questions may be quantitative or qualitative, and may be indices or scores composed of multiple pieces of information. These responses are weighted based on the relative importance of the information to management of risk and uncertainty for the species. The decision tool combines all of this information into a single value, in this case the probability of achieving the management objective, through a logistic function.

The resulting probability will be provided to the Technical Committee (TC) or Plan Development Team (PDT) for developing management options that meet the Board's risk tolerance, i.e., the probability of achieving management objectives.

### Template Risk and Uncertainty Decision Tool

The following is a template decision tool with technical inputs and default weightings.

Decision Tool Inputs	Scoring	Default Weight
<i>1. Stock Status</i>		
Stock status: is stock overfished/depleted?	0 to 1	0.10
Stock status: is stock above or below biomass target?	0 to 1	0.10
Stock status: is overfishing occurring?	0 to 1	0.10
Stock status: is fishing mortality above or below the target?	0 to 1	0.10
<i>2. Additional Sources of Uncertainty</i>		
Model uncertainty: how much model uncertainty is there?	0 to 5	0.10
Management uncertainty: how much management uncertainty is there?	0 to 5	0.10

Environmental uncertainty: how much environmental uncertainty is there?	0 to 5	0.10
<b>3. Additional Risk Considerations</b>		
Environmental/trophic importance: how important is the species to the ecosystem/other key species?	0 to 5	0.10
<b>4. Socioeconomic Considerations</b>		
Commercial short-term: what is the short-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Commercial long-term: what is the long-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Recreational short-term: what is the short-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10
Recreational long-term: what is the long-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10

### **Developing Species-Specific Decision Tools**

A species Board may either approve the template decision tool for use for the species or adapt the decision tool to meet the specific needs of a species (e.g., by adjusting the weightings for different categories or adding additional information). However, information on stock status, modeling uncertainty, environmental uncertainty, management uncertainty, environmental importance, and socioeconomic considerations should always be incorporated. The Policy Board may develop further guidance for species-specific decision tools.

The species Board will work in collaboration with the TC and the Committee on Economics and Social Sciences (CESS) to develop the decision tool and its supporting documentation. will also develop a species matrix, a document recording the information relevant to the decision tree questions, for the species.

The species Board will provide guidance on the information to be included in the species decision tool (e.g., new decision tool questions) and the weightings (i.e., relative importance of the information). The species Board may develop the weightings by discussion at a meeting or by another method for determining collective input, such as a survey. This information will then be passed on to the species TC.

The species TC, including a representative from the CESS, will create the species matrix with information relevant to the decision tool. The TC will use this information to assign responses to the decision tool input questions on stock status, modeling uncertainty, environmental uncertainty, management uncertainty, and environmental importance. The TC will produce a preliminary probability of achieving management objectives and provide a draft report on the decision tool responses to the CESS. The CESS will add the socioeconomic components to the species matrix, decision tool, and report. A recommended probability of achieving the management objectives that includes the socioeconomic components will be produced.

The TC will present a report outlining the initial risk and uncertainty input determinations to the species Board. The report will efficiently detail the responses to the decision tool input questions, a concise

explanation of the reasoning behind each response, and the preliminary probability of achieving management objectives.

The species Board will review the report, including the TC's responses to the decision tool input questions, in a public setting, allowing for maximum transparency in the process. The species Board may make changes to the question weightings (i.e., the relative importance of the information). In addition, the Board may make changes to the responses to the input questions if warranted, though the stock status, modeling uncertainty, environmental uncertainty, management uncertainty sections should be accepted unless there is a significant reason to change them. The species Board will approve the finalized responses to the decision tool and the final probability of achieving management objectives.

#### **Using the Risk and Uncertainty Decision Tool**

When a management action is anticipated for a species, the TC and CESS will review and update the decision tool inputs as needed. The TC will provide a revised report including the revised inputs, a preliminary probability (without the socioeconomic component), and the harvest level associated with that probability to the CESS. The CESS will update the socioeconomic component and score the proposed management change questions based on the preliminary probability and harvest level. A recommended probability of achieving the management objectives that includes the socioeconomic components will be produced. The revised report, highlighting any changes and including the probabilities with and without the socioeconomic component, will be provided to the species Board for review and approval. This revised probability may be approved without revisiting the decision tool weightings.

Once the report is finalized, it will be transferred as guidance to the TC or PDT responsible for developing management action documents. The probability of achieving the management objectives will be used for developing management options that reflect the species Board's risk preferences.

As new information arises, the decision tool may be updated and a new probability of management success produced, following the processes above. The species TC should periodically review the species matrix to ensure that all information is up-to-date. The species Board should revisit weightings every 5 years to ensure that they still reflect the Boards' preferences, unless the Board has already reviewed the weightings during regular updates and use of the decision tool.



## Risk & Uncertainty TC Guidance Document

### The Risk & Uncertainty Decision Tool

The Risk and Uncertainty Decision Tool consists of a series of questions related to the risk and uncertainty of a species' management. Criteria for responding to the questions may be quantitative or qualitative, and may be indices or scores composed of multiple pieces of information. The responses, or technical inputs, are converted to the same numerical scale (0 to 1) and then weighted. The weightings allow for the up-weighting or down-weighting of each input based on the relative importance of the issue to management of the species. Generally, the species Technical Committee (TC) and the Committee on Economics and Social Sciences (CESS) will provide the technical inputs, while the species Board will determine the weightings.

The Risk & Uncertainty Decision Tool combines all of the weighted inputs into a single value, a recommended probability of achieving management objectives (e.g., the probability of  $F$  being below the  $F$  target), which can then be used for developing management options. The logistic function for calculating the recommended probability is:

$$p(Z) = \frac{1}{1 + e^{-Z}}$$

Where  $Z = a + b_1x_1 + b_2x_2 + \dots$ , denoting a list of inputs ( $x$ ) times their weighting coefficients ( $b$ ). The intercept,  $a$ , sets the initial scale of the  $Z$  score. An  $a$  of 0, as used here, corresponds to a default value of 50% when the stock is at or above its biomass target and at or below its  $F$  target, and no additional risk or uncertainty factors are considered. The intercept can also be adjusted.

The management objective depends on the goals of the analysis required. The initial implementation of the decision tool would be to set a total allowable catch (TAC) or harvest strategy to that has the recommended probability of meeting a specific objective. That objective could be being at or below the  $F$  target (for setting annual specifications), being at or below the  $F$  threshold (for ending overfishing), or being at or above the SSB target or threshold at a specified point in time (for stock rebuilding).

### Template Decision Tool Inputs & Default Weightings

The following is a template decision tool with technical inputs and default weightings. The inputs are separated into four components: stock status, additional sources of uncertainty, additional risk considerations, and socioeconomic considerations. Specific criteria for scoring the decision tool inputs can be found in the Risk and Uncertainty Decision Tool spreadsheet. The decision tool may be adapted to meet species-specific needs (see Species-Specific Decision Tool below).

Decision Tool Inputs	Scoring	Default Weight
<i>1. Stock Status</i>		
Stock status: is stock overfished/depleted?	0 to 1	0.10
Stock status: is stock above or below biomass target?	0 to 1	0.10
Stock status: is overfishing occurring?	0 to 1	0.10
Stock status: is fishing mortality above or below the target?	0 to 1	0.10
<i>2. Additional Sources of Uncertainty</i>		
Model uncertainty: how much model uncertainty is there?	0 to 5	0.10

Management uncertainty: how much management uncertainty is there?	0 to 5	0.10
Environmental uncertainty: how much environmental uncertainty is there?	0 to 5	0.10
<b>3. Additional Risk Considerations</b>		
Environmental/trophic importance: how important is the species to the ecosystem/other key species?	0 to 5	0.10
<b>4. Socioeconomic Considerations</b>		
Commercial short-term: what is the short-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Commercial long-term: what is the long-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Recreational short-term: what is the short-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10
Recreational long-term: what is the long-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10

The stock status, additional sources of uncertainty, and additional risk considerations inputs can only increase the final recommended probability of achieving management objectives, making it more precautionary. For example, an overfishing status could have a score of 1, which would add to the Z score, increasing the recommended probability.

The socioeconomic considerations inputs can either increase or decrease the recommended probability, depending on the anticipated effect of management change. Negative socioeconomic effects will decrease the recommended probability, making it less precautionary, while positive socioeconomic effects will increase the probability. Short-term and long-term socioeconomic effects are separated, allowing Commissioners to weight them differently based on their tradeoff preferences. For example, if short-term negative economic effects were of greater concern, those inputs could be weighted higher, while if long-term benefits of fishery sustainability were considered more important, the long-term inputs could be weighted higher. Commercial and recreational effects are also separated as effects may be different across sectors and there may be tradeoffs between them.

While the template decision tool includes default weightings, they may be changed to reflect Commissioner preferences. For example, stock status could be given a higher weight than other components if it was deemed the most important factor.

### **Species-Specific Decision Tools**

Species-specific Risk and Uncertainty Decision Tools may be developed as relevant management needs for ASMFC species occur. A species Board, in consultation with the TC, can adapt the template decision tool questions and weightings to meet the specific needs of a species (e.g., by adjusting the weightings for different categories or adding additional information). However, all decision tools should incorporate information on stock status, modeling uncertainty, management uncertainty, environmental uncertainty, environmental importance, and socioeconomic considerations.

## **Species Matrix**

The species matrix is a document for recording all information relevant to the decision tool. This document can be periodically updated by the TC and CESS representative, and should be updated each time the risk and uncertainty process is initiated. The matrix should be adapted to fit the needs of the species and its decision tool.

## **Risk and Uncertainty Report**

The TC and CESS will draft and the Board will revise a Risk and Uncertainty Report for each risk and uncertainty process. The report will efficiently detail the responses to the decision tool input questions and provide concise explanations of the reasoning behind each response. It will also provide a preliminary probability of achieving the management objectives (without the socioeconomic component) and the final recommended probability (with the socioeconomic component). The report will be standardized across species, with some variation allowed to account for the differences between species-specific management objectives.

## **Developing a Species-Specific Decision Tool**

A species Board may elect to use the template decision tool or develop a species-specific decision tool. The species-specific decision tool and supporting documents will be created following the process outlined below:

1. The species Board initiates the development of species-specific decision tool and provides:
  - a. guidance on changes to or additional categories for the decision tool
  - b. preliminary weightings for the decision tool inputs (weightings can be determined via survey or real-time voting technology)
2. TC gathers information relevant to the input questions for components 1-3 of the Decision Tool (stock assessment, additional uncertainty, additional risk) and compiles it in a species matrix.
3. TC provides responses to the input questions for components 1-3. The decision tool's logistic formula is used to arrive at a preliminary probability of achieving the management objectives.
4. The TC drafts a report including the following & provides it to the CESS:
  - a. responses to the input questions
  - b. a brief summary of the reasoning behind the responses to the questions, including supporting information/data from the species matrix
  - c. the preliminary probability of achieving management objectives
5. CESS gathers information relevant to the input questions for component 4 (socioeconomic considerations) of the decision tool and compiles it in a species matrix.
6. CESS provides responses to the input questions for component 4, which are added to the decision tool. Note: the management change portion of the socioeconomic component will not be scored until a management action is anticipated, as this score is intended to capture the effect of the proposed management change (see Risk & Uncertainty Decision Tool spreadsheet for further details on scoring and criteria.) A revised probability of achieving the management objectives is produced.
7. The socioeconomic responses (component 4), justifications for scoring, and recommended probability of achieving the management objectives are added to the report.
8. The TC presents the report to the species Board.
9. During a meeting, the Board may make revisions to the decision tool and report, including:

- a. Adjusting the weightings of the responses or components
  - b. Revising the responses to the input questions
    - i. Note: responses to status questions should be accepted unless there is a significant reason to change them. Responses to the additional uncertainty questions (component 2) should also typically be based on expert opinion. The environmental importance and socioeconomic considerations questions (components 3 & 4) incorporate value judgements about management goals and may be more likely to warrant Commissioner input.
    - ii. Any changes made should be documented in the report, including justifications for changes or additional information.
10. The Board approves the final report and the probability of achieving management objectives
11. The final probability of achieving management objectives is provided to the TC or PDT as guidance for developing management options.

### **Using the Decision Tool**

An anticipated management action for a species (e.g., when a stock assessment is completed) will trigger a review, and possible update, of the species matrix and decision tool.

1. Decision tool review is triggered by anticipated management action
  - a. If the TC determines that no updates are needed at that time, the existing preliminary probability (excluding the socioeconomic component) will be used to produce a preliminary TAC/harvest level, which will be provided to the CESS in the draft report.
    - i. Note: If the Board had previously changed one of the inputs (scores) in the decision tool and none of the underlying information has changed, the input should continue to match the Board's change rather than the original TC/CESS input. The report should continue to include the text describing both the original scoring by the TC/CESS, as well as the change made by the Board and a justification for why the change was made.
  - b. If the TC determines that updates are needed, they will update the species matrix and decision tool with new information and revised input determinations, as needed. A new preliminary probability and associated TAC/harvest level will be produced.
2. The TC drafts a report including the following & provides it to the CESS:
  - a. The responses to the input questions, highlighting changes to the responses
  - b. A brief summary of the reasoning behind the responses to the questions, including supporting information/data from the species matrix.
  - c. The preliminary recommended probability of achieving management objectives.
  - d. The preliminary TAC/harvest level associated with that probability.
3. The CESS scores the management change portion of the socioeconomic questions based on the preliminary TAC/harvest level and the TC's draft report. The CESS also makes any necessary changes to the other portions of the socioeconomic component. A final recommended probability of achieving the management objectives is produced.
4. The socioeconomic component and final recommended probability are added to the report.
5. The TC presents the report to the species Board for review.

6. During the meeting, the species Board may make adjustments to the decision tool and report, if warranted. The species Board will then approve the revised decision tool, report, and final probability of achieving management objectives.
7. The final probability of achieving management objectives is provided to the TC or PDT as guidance for developing management options.

### **Updating the Decision Tool**

As noted above, a determination that management action is needed for a species will trigger a review, and possible update, of the species matrix and decision tool.

The TC and CESS should periodically update the species matrix with relevant information. If new information arises that may significantly alter the decision tool inputs, the Board should be consulted to see if they would like to update the decision tool. The decision tool can be updated separately from a management action.

The species Board may make changes to the decision tool weightings when the decision tool is being used. However, it is preferable to make decisions about the weightings separately from management actions. The species Board should revisit weightings every 5 years to ensure that they still reflect the Boards' preferences, unless they have already reviewed the weightings during recent updates or uses of the decision tool. The revised weightings will be passed on to the species TC to update the species decision tool.

## RISK & UNCERTAINTY DECISION TOOL SPREADSHEET

K. Drew, S. Murray, and J. McNamee

January 2021

### Decision Tool Overview

The Risk and Uncertainty Decision Tool consists of a series of questions related to the risk and uncertainty of a species' management. The responses (technical inputs) are converted to the same numerical scale (0 to 1) and then weighted. The weightings allow for the up-weighting or down-weighting of each input based on the relative importance of the issue to management of the species. Generally, the species Technical Committee (TC) and the Committee on Economics and Social Sciences (CESS) will provide the technical inputs, while the species Board will determine the weightings (see TC Guidance Doc for further details on process).

The Risk & Uncertainty Decision Tool combines all of the weighted inputs into a single value, a recommended probability of achieving management objectives (e.g.,  $F$  below the  $F$  target), which can then be used for developing management options. The logistic function for calculating the recommended probability is:

$$p(Z) = \frac{1}{1 + e^{-Z}}$$

Where  $Z = a + b_1x_1 + b_2x_2 + \dots$ , denoting a list of technical inputs ( $x$ ) multiplied by their weighting coefficients ( $b$ ). The intercept,  $a$ , sets the initial scale of the  $Z$  score. An  $a$  of 0, as used here, corresponds to a default value of 50% when the stock is at or above its biomass target and at or below its  $F$  target, and no additional risk or uncertainty factors are considered. The intercept can also be adjusted.

The decision tool is comprised of four components, which consist of multiple questions:

1. Stock Status
2. Additional Sources of Uncertainty
3. Additional Risk Considerations
4. Socioeconomic Considerations

The stock status, additional sources of uncertainty, and additional risk considerations components can only increase the recommended probability, making it more precautionary. The socioeconomic components can either increase or decrease the recommended probability, depending on the anticipated effect of management change. Negative socioeconomic effects will decrease the recommended probability, making it less precautionary, while positive socioeconomic effects will increase the probability. Short-term and long-term socioeconomic effects are separated, allowing Commissioners to weight them differently based on their tradeoff preferences.

### Contents

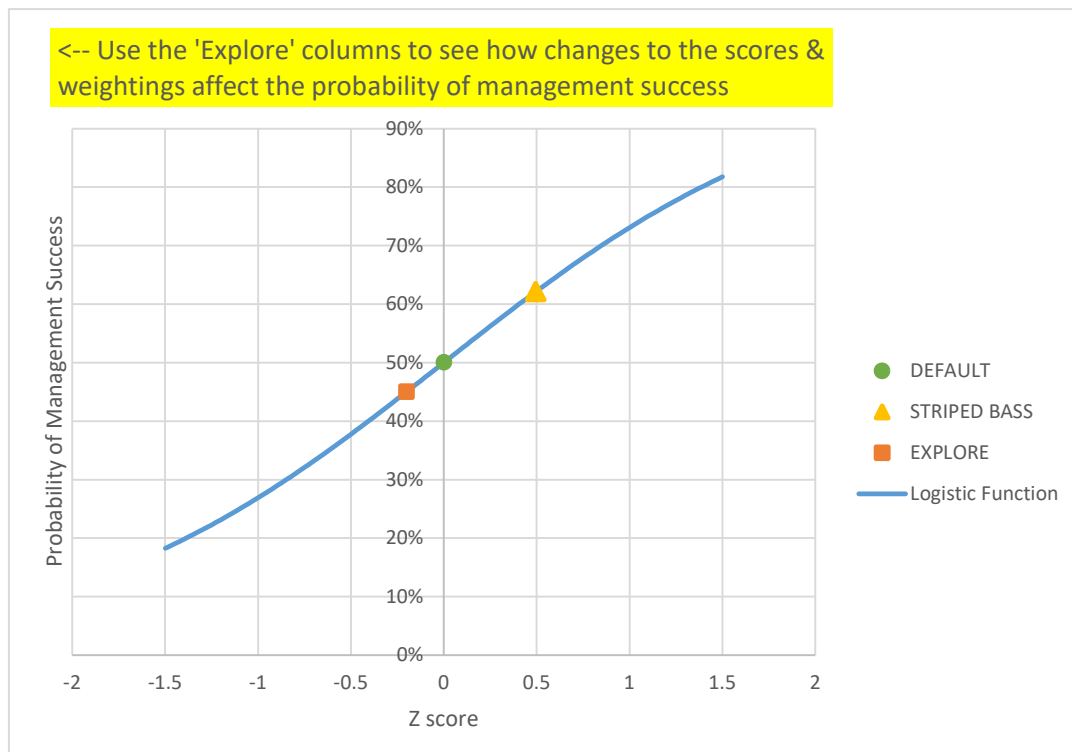
The "**Decision Tool**" tab illustrates how the decision tool combines the technical inputs with the weightings to arrive at the recommended probability of achieving the management objectives. The "**Explore**" columns on this tab can be used to see how changes to the inputs or weightings for a species will change the final probability.

The decision tool questions and the criteria for determining the technical inputs are listed in the "**R&U Criteria**" and the "**Socioeconomic Criteria**" tabs. The criteria for components 1-3 are listed in "R&U Criteria," while the criteria for component 4 are detailed in the "Socioeconomic Criteria" tab.

The "**Striped Bass Matrix**" tab provides an example species matrix, which includes more detailed explanations for the striped bass example scoring.

RISK & UNCERTAINTY DECISION TOOL						
Scoring Default and Examples						
Decision Tool Question (Scoring scale)	DEFAULT		Striped Bass		EXPLORE	
	Weight	Score	Weight	Score	Weight	Score
P(SSB < SSB threshold) (0 to 1 scale)	0.1	0%	0.1	100%	0.1	0%
P(SSB < SSB target) (0 to 1 scale)	0.1	0%	0.1	100%	0.1	0%
P(F > F threshold) (0 to 1 scale)	0.1	0%	0.1	95%	0.1	0%
P(F > F target) (0 to 1 scale)	0.1	0%	0.1	100%	0.1	0%
How much model uncertainty is there? (0 - 5 scale)	0.1	0	0.1	0.5	0.1	0
How much management uncertainty is there? (0 - 5 scale)	0.1	0	0.1	1.5	0.1	0
How much environmental uncertainty is there? (0 - 5 scale)	0.1	0	0.1	2	0.1	0
How important is the species to the ecosystem? (0 - 5 scale)	0.1	0	0.1	1	0.1	0
What is the short-term socioeconomic effect of changes to the comm fishery? (-5 to 5 scale*)	0.1	0	0.1	-2	0.1	-5
What is the long-term socioeconomic effect of changes to the comm fishery? (-5 to 5 scale*)	0.1	0	0.1	2	0.1	0
What is the short-term socioeconomic effect of changes to the rec fishery? (-5 to 5 scale*)	0.1	0	0.1	-4	0.1	-5
What is the long-term socioeconomic effect of changes to the rec fishery? (-5 to 5 scale*)	0.1	0	0.1	4	0.1	0
<b>Z Score</b>	<b>0</b>		<b>0.495</b>		<b>-0.2</b>	
<b>Recommended Probability</b>	<b>50%</b>		<b>62%</b>		<b>45%</b>	

\*In these examples, the long-term socioeconomic components **add** to the probability (making it more precautionary), while short-term socioeconomic components **subtract** from the probability (less precautionary); however, the signs for either or both components could be reversed (e.g. short-term could add to the probability) if the situation warrants it.



**RISK & UNCERTAINTY DECISION TOOL CRITERIA**

<b>1. Stock Status</b>			
Component	Question	Criteria	Score
<b>Overfished</b>	Is the stock overfished?	Probability that SSB is below the SSB threshold from stock assessment, if available (0.0 - 1.0) or a binary (0 for not overfished, 1 for overfished);	0.0 to 1.0
<b>SSB Target</b>	Is the stock below the biomass target?	Probability that SSB is below the SSB target from stock assessment, if available (0.0 - 1.0) or a binary (0 for above the target, 1 for below the target)	0.0 to 1.0
<b>Overfishing</b>	Is overfishing occurring?	Probability that F is above the F target/threshold from stock assessment, if available (0.0 - 1.0) or a binary (0 for no overfishing, 1 for overfishing)	0.0 to 1.0
<b>F Target</b>	Is fishing mortality above the target?	Probability that F is above the F target from stock assessment, if available (0.0 - 1.0) or a binary (0 for below the target, 1 for above the target)	0.0 to 1.0

**NOTE:** The criteria for **Additional Sources of Uncertainty & Additional Risk Considerations** are broad, providing suggested factors to consider rather than a more detailed scoring rubric to be applied across all species. TCs may use their discretion to determine which factors are most relevant for their species and if there are other factors that should be added. The TC may also develop a more detailed species-specific scoring rubric. This approach allows for an assessment that is tailored to individual species.

<b>2. Additional Sources of Uncertainty</b>								
Component	Question	Criteria	None (0)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)
<b>Model Uncertainty</b>	How much model uncertainty is there?	Factors to consider include: retrospective patterning, sensitivity runs, model fits, model parameter precision, sensitivity to starting values.	Minimal uncertainty, excellent diagnostics			Moderate uncertainty, fair diagnostics		High uncertainty, poor diagnostics
<b>Management Uncertainty</b>	How much management uncertainty is there?	Factors to consider include: performance of management towards goals, stock status (if there are additional concerns not captured by stock status components), initiation of relevant management actions, uncertainty due to factors outside control of managers (e.g., historical incorrect assumptions about uncalibrated MRIP estimates), prescriptive FMP to guide future management decision, noncompliance, IUU fishing activities	Minimal uncertainty and/or already included			Moderate uncertainty		High uncertainty
<b>Environmental Uncertainty</b>	How much environmental uncertainty is there (that is not accounted for in the model)?	Factors to consider include: is link between recruitment and environment adequately accounted for in model, vulnerability to climate change, is natural mortality adequately accounted for in model (constant across time and ages vs varying across ages and time), degree of prey dependence (for predators) or predator dependence (for prey) if not accounted for in model	Minimal uncertainty and/or already included			Moderate uncertainty		High uncertainty

<b>3. Additional Risk Considerations</b>								
Component	Question	Criteria	None (0)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)
<b>Ecosystem Importance</b>	How important is the species to the ecosystem or other key species?	Factors to consider include: role in maintaining other key species, such as other important fished species or threatened or endangered species; role in providing important ecosystem services; importance to ecosystem functions	No ecosystem/trophic concerns	Low ecosystem/trophic importance		Moderate ecosystem/trophic importance		High ecosystem/trophic importance



<b>4. Socioeconomic Considerations</b>			
<b>Component</b>	<b>Question</b>	<b>Criteria</b>	<b>Score</b>
<b>Commercial Short-term</b>	What is the short-term socioeconomic effect of the proposed management change on the commercial fishery?	See Socioeconomic Criteria tab	-5 to 5
<b>Commercial Long-term</b>	What is the long-term socioeconomic effect of the proposed management change on the commercial fishery?	See Socioeconomic Criteria tab	-5 to 5
<b>Recreational Short-term</b>	What is the short-term socioeconomic effect of the proposed management change on the recreational fishery?	See Socioeconomic Criteria tab	-5 to 5
<b>Recreational Long-term</b>	What is the short-term socioeconomic effect of the proposed management change on the recreational fishery?	See Socioeconomic Criteria tab	-5 to 5

**NOTE:** The results from components 1-3 will be used to develop a preliminary probability of management success and the associated TAC/change to harvest. These preliminary results, along with the scoring for components 1-3, will be provided to the CESS in order to score the socioeconomic components.

See the Socioeconomic Criteria tab for further details.

**SOCIOECONOMIC CRITERIA**

**NOTE:** The results of the other components of the Risk & Uncertainty Decision tool (stock status, model uncertainty, mgmt. uncertainty, environmental uncertainty, trophic importance), the preliminary probability of management success, and preliminary TAC/harvest level associated with those scores will be provided to the CESS for consideration when scoring the socioeconomic components.

**R&U Decision Tool Question:** What is the short-term or long-term socioeconomic effect of the proposed management change on the fishery?

The socioeconomic component seeks to account for the potential negative socioeconomic effects of a more precautionary approach (often short-term), while also accounting for the potential positive socioeconomic effects of a more precautionary approach (often long-term). Short-term and long-term effects are separated so that the tradeoffs between them can be assessed and weighted according to Commissioner preferences. Scores are also broken down into commercial and recreational.

The final socioeconomic effects scores are a combination of the importance of the fishery and the magnitude of the proposed management change. The importance scores include an indicator of value (commercial economic value or recreational desirability) and a fishery dependence indicator. The importance score is then scaled based on the management change score.

**Commercial Importance Score** = (Commercial Economic Value + Fishery Dependence)/2

**Recreational Importance Score** = (Recreational Desirability + Fishery Dependence)/2

**Short-term Commercial Score** = **Commercial Importance** \* **Short-term Management Change**

**Long-term Commercial Score** = **Commercial Importance** \* **Long-term Management Change**

**Short-term Recreational Score** = **Recreational Importance** \* **Short-term Management Change**

**Long-term Recreational Score** = **Recreational Importance** \* **Long-term Management Change**

Note: the CESS may change the sign of the management change scores (e.g. + to -) if the expected effects of the management change are the opposite (e.g. if the short-term effects of a TAC reduction are positive, or the long-term effects of a TAC reduction are negative) in a particular case, noting the justification for the change.

The socioeconomic criteria use indicators as a way to consistently and efficiently score fisheries across the Commission's species. However, the CESS may manually change the score(s) for a species if there is additional outside information or if the CESS determines that the score does not match the reality of the fishery. Scores changes should be documented in the species matrix and risk and uncertainty report.

SOCIOECONOMIC IMPORTANCE CRITERIA								
Commercial Fishery Importance								
Indicator	Notes	None (0)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)	SCORE
Economic Value	Total coastwide annual ex-vessel value (3 yr. avg.; 2019 dollars)	no commercial fishing	< \$1 million	\$1 - 10 million	\$10 - 30 million	\$30 - 100 million	>\$100 million	
Community Dependence	Average community dependence (ex-vessel value as % of total ex-vessel value for all species) for top 10 communities. Top 10 communities = highest landings. (3 yr. avg.)	no commercial fishing	0 - 5%	5 - 15%	15 - 25%	25 - 50 %	> 50%	
<b>Commercial Importance Subscore</b>								<b>0</b>
Recreational Fishery Importance								
Indicator	Notes	None (0)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)	SCORE
Importance (Desirability)	Total coastwide annual targeted trips (primary or secondary target) as % of total coastwide trips (3 yr. avg.)	no recreational fishing	0 - 0.5%	0.5% - 1.5%	1.5% - 5%	5% - 10%	>10%	
Community Dependence	Average community dependence (targeted trips as % of total rec trips) for top 10 communities. Top 10 communities = most targeted trips. (3 yr. avg.)	no recreational fishing/limited to small #s of trips in fewer than 10 communities	0 - 3 %	3 - 10 %	10 - 15%	15 - 20 %	>20%	
<b>Recreational Importance Subscore</b>								<b>0</b>

PROPOSED MANAGEMENT CHANGE CRITERIA									
<b>Commercial Short-term Management Change</b>									
Indicator	Notes	None (0)	Very Low (0.2)	Low (0.4)	Moderate (0.6)	High (0.8)	Very High (-1)	Direction (-1 or 1)	SCORE
Short-term Commercial Management Change	Score: What is the scale of the proposed management change (based on the preliminary probability)? Direction: What is the short-term socioeconomic effect of increased precaution?	no change	0-2% change	2-5%	5-10%	10-20%	>20% change	1 = positive effect, 1 = negative effect	
<b>Commercial Long-term Management Change</b>									
Indicator	Notes	None (0)	Very Low (0.2)	Low (0.4)	Moderate (0.6)	High (0.8)	Very High (-1)	Direction (-1 or 1)	SCORE
Long-term Commercial Management Change	What is the scale & direction of the effect of increased precaution (increasing the probability of achieving ref. pts., decreasing the TAC) on the longer term sustainability of the recreational fishery?	No effect on sustainability	minimal effects on the fishery's sustainability		moderate effects on the fishery's sustainability		very significant effects on the fishery's sustainability	1 = positive effect, 1 = negative effect	
<b>Recreational Short-term Management Change</b>									
Indicator	Notes	None (0)	Very Low (0.2)	Low (0.4)	Moderate (0.6)	High (0.8)	Very High (-1)	Direction (-1 or 1)	SCORE
Short-term Recreational Management Change	Score: What is the scale of the proposed management change (based on the preliminary probability)? Direction: What is the short-term socioeconomic effect of increased precaution?	no change	0-2% change	2-5%	5-10%	10-20%	>20% change	1 = positive effect, 1 = negative effect	
<b>Recreational Long-term Management Change</b>									
Indicator	Notes	None (0)	Very Low (0.2)	Low (0.4)	Moderate (0.6)	High (0.8)	Very High (-1)	Direction (-1 or 1)	SCORE
Long-term Recreational Management Change	What is the scale & direction of the effect of increased precaution (increasing the probability of achieving ref. pts., decreasing the TAC) on the longer term sustainability of the recreational fishery?	No effect on sustainability	minimal effects on the fishery's sustainability		moderate effects on the fishery's sustainability		very significant effects on the fishery's sustainability	1 = positive effect, 1 = negative effect	

TOTAL SOCIOECONOMIC SCORES													
Score	Direction	Scoring Scale											FINAL SCORE
		Negative					Neutral	Positive					
		Very High	High	Moderate	Low	Very Low	None	Very Low	Low	Moderate	High	Very High	
<b>Commercial</b>													
Commercial Short-term Total Score	Commercial Importance * Long-term Management Change	-5	-4	-3	-2	-1	0	1	2	3	4	5	#VALUE!
Commercial Long-term Total Score	Commercial Importance * Short-term Management Change	-5	-4	-3	-2	-1	0	1	2	3	4	5	#VALUE!
<b>Recreational</b>													
Recreational Short-term Total Score	Recreational Importance * Long-term Management Change	-5	-4	-3	-2	-1	0	1	2	3	4	5	#VALUE!
Recreational Long-term Total Score	Recreational Importance * Short-term Management Change	-5	-4	-3	-2	-1	0	1	2	3	4	5	#VALUE!

STRIPED BASS - SPECIES MATRIX EXAMPLE			
Component	Criteria	Score	Justification
<b>1. Stock Status (Scored 0 to 1)</b>			
<b>Overfished</b>	Probability that SSB is below the SSB threshold from stock assessment, if available (0.0 - 1.0) or a binary (0 for not overfished, 1 for overfished);	1	Probability SSB 2017 < SSB threshold from 2019 assessment
	Probability that SSB is below the SSB target from stock assessment, if available (0.0 - 1.0) or a binary (0 for above the target, 1 for below the target)	1	
<b>SSB Target</b>	Probability that F is above the F target/threshold from stock assessment, if available (0.0 - 1.0) or a binary (0 for no overfishing, 1 for overfishing)	0.95	Probability F2017 > Fthreshold from 2019 assessment
<b>Overfishing</b>	Probability that F is above the F target from stock assessment, if available (0.0 - 1.0) or a binary (0 for below the target, 1 for above the target)	1	
<b>F Target</b>			
<b>2. Additional Sources of Uncertainty (Scored 0 to 5)</b>			
<b>Model Uncertainty</b>	Factors to consider include: retrospective patterning, sensitivity runs, model fits, model parameter precision, sensitivity to starting values.	0.5	Scored based on retrospective patterns, sensitivity runs, model fits, and model parameter precision. The model fits are very good for total catch; reasonable to good fits to catch age composition information (both fleets); age-aggregate index fits are reasonable except for age 1 indices (all standardized residuals < 2, most <1, little to no patterning in residuals); index fits to age composition indices are fair, but generally good for indices that receive higher weight in the model (save MDSSN, for which fits to age composition information is very good); precision of model estimated parameters are generally good (nearly all CVs < 0.20) ; there is some suggestion of sensitivity to starting values, but fishing mortality and Likelihood values among 100 runs do not differ substantially; there is very little retrospective patterning until ~5 years of data are removed, and then the patterning is still modest.
<b>Management Uncertainty</b>	Factors to consider include: performance of management towards goals, stock status (if there are additional concerns not captured by stock status components), initiation of relevant management actions, uncertainty due to factors outside control of managers (e.g., historical incorrect assumptions about uncalibrated MRIP estimates), prescriptive FMP to guide future management decision, noncompliance, IUU fishing activities	1.5	Since the stock is overfished and is experiencing overfishing, arguably goals are not being met and our measures are not working as expected; however, the Management Board has initiated management action, the stock status is at least partially due to past management assuming uncalibrated MRIP estimates, and stock status is explicitly accounted for in component 1. Furthermore, prescriptive, and arguably conservative management triggers are in place in the FMP to guide future management.
<b>Environmental Uncertainty</b>	Factors to consider include: is link between recruitment and environment adequately accounted for in model, vulnerability to climate change, is natural mortality adequately accounted for in model (constant across time and ages vs varying across ages and time), degree of prey dependence (for predators) or predator dependence (for prey) if not accounted for in model	2	Environmental uncertainty wasn't especially explicitly well accounted for in the assessment. There is a likely link between recruitment dynamics and the environment (e.g., spawning and nursery habitat area as a function of precipitation); Striped Bass exhibit a number of characteristics identified by NOAA as increasing their vulnerability to climate change effects, including complexity of reproductive strategy, short duration aggregate spawning, sensitivity to temperature, and specific larval requirements (Morrison et al. 2015). Groner et al. (2018) suggested that Striped Bass in some regions are living at their maximum thermal tolerance and that this is driving increased disease and mortality. The Striped Bass tagging model suggests potential high natural mortality in Chesapeake Bay (starting in the late 1990s), while the assessment model assumes time-constant (though age-varying) natural mortality. On the other hand, fish that migrate to the ocean region are assumed to experience baseline natural mortality due to observations that the Myco disease does not progress further and, in many cases, fish may actually heal (Vogelbein et al. 2006). Striped Bass appear to be opportunistic predators without being dependent on any given prey item under many, but not all, spatial and temporal scales.
<b>3. Additional Risk Considerations (Scored 0 to 5)</b>			
<b>Ecosystem Importance</b>	Factors to consider include: role in maintaining other key species, such as other important fished species or threatened or endangered species; role in providing important ecosystem services; importance to ecosystem functions	1	We considered that Striped Bass is an important predator (but see environmental) and probably an important competitor (e.g., weakfish). Multispecies models suggest that trends in prey natural mortality correlate with Striped Bass abundance or biomass. Menhaden consumption by Striped Bass could be large and has historically been estimated with high uncertainty. We are aware of an April 29th 2019 report of a Striped Bass regurgitating an Atlantic Sturgeon carcass (C Godwin, pers comm) – nevertheless, Striped Bass are likely minor threats to endangered species.

<b>4. Socioeconomic Considerations (Scored 0 to 5, - for negative effects, + for positive effects)</b>			
<b>Commercial Short-term</b>	See Socioeconomic Criteria tab	-2	low
<b>Commercial Long-term</b>	See Socioeconomic Criteria tab	3	moderate
<b>Recreational Short-term</b>	See Socioeconomic Criteria tab	-4	high
<b>Recreational Long-term</b>	See Socioeconomic Criteria tab	5	very high
<b>Socioeconomic Subscores (Scored 0 to 5)</b>			
<b>Commercial Economic Value</b>	Total coastwide annual ex-vessel value (3 yr. avg.; 2019 dollars)	3	3 yr. avg. ex-vessel value was approximately \$19 million (2019 dollars) based on non-confidential data; confidential data also reviewed (moderate)
<b>Commercial Fishery Dependence</b>	Average community dependence (ex-vessel value as % of total ex-vessel value for all species) for top 10 communities. Top 10 communities = highest landings. (3 yr. avg.)	2	9% avg. community dependence (low)
<b>Recreational Desirability</b>	Total coastwide annual targeted trips (primary or secondary target) as % of total coastwide trips (3 yr. avg.)	5	14% of coastwide trips (high)
<b>Recreational Dependence</b>	Average community dependence (targeted trips as % of total rec trips) for top 10 communities. Top 10 communities = most targeted trips. (3 yr. avg.)	5	27% avg. community dependence (very high)
<b>(Scored 0 to 1)</b>			
<b>Commercial Management Change Short-term</b>	Score: What is the scale of the proposed management change (based on the preliminary probability)? Direction: What is the short-term socioeconomic effect of increased precaution?	-0.8	Change was -18% (high), assumed to have negative short-term socioeconomic effect; note: this was the actual management change, which may have already included socioeconomic considerations. In the real R&U process, this would be based on the % change that resulted from the preliminary probability (components 1-3).
<b>Commercial Management Change Long-term</b>	What is the scale & direction of the effect of increased precaution (increasing the probability of achieving ref. pts., decreasing the TAC) on the longer term sustainability of the recreational fishery?	0.8	In this example, the long-term effects were assumed to be proportional to the short-term but positive.
<b>Recreational Management Change Short-term</b>	Score: What is the scale of the proposed management change (based on the preliminary probability)? Direction: What is the short-term socioeconomic effect of increased precaution?	-0.8	Change was -18% (high), assumed to have negative short-term socioeconomic effect; note: this was the actual management change, which may have already included socioeconomic considerations. In the real R&U process, this would be based on the % change that resulted from the preliminary probability (components 1-3).
<b>Recreational Management Change Long-term</b>	What is the scale & direction of the effect of increased precaution (increasing the probability of achieving ref. pts., decreasing the TAC) on the longer term sustainability of the recreational fishery?	0.8	In this example, the long-term effects were assumed to be proportional to the short-term but positive.

## Risk & Uncertainty Decision Tool - Weightings Survey

### Preferences for Decision Tool Weightings

Responses to these questions will be used to determine the weightings (i.e., relative importance) of different inputs to the Risk & Uncertainty Decision Tool. When averaged across respondents, higher ranked inputs will have more weight in the decision tool, while lower ranked inputs will have less weight.

**\*\*If you think all inputs should be weighted equally, please rank all questions as "moderately important."\*\***

1. When considering risk & uncertainty for this species, how important is: whether or not the biomass is below the threshold?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. When considering risk & uncertainty for this species, how important is: whether or not the biomass is below the target?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. When considering risk & uncertainty for this species, how important is: whether or not fishing mortality is above the threshold?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. When considering risk & uncertainty for this species, how important is: whether or not fishing mortality is above the target?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. When considering risk & uncertainty for this species, how important is: the amount of modeling uncertainty?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. When considering risk & uncertainty for this species, how important is: the amount of management uncertainty?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. When considering risk & uncertainty for this species, how important is: the amount of environmental uncertainty?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. When considering risk & uncertainty for this species, how important is: the importance of the species to the ecosystem or other key species (fished species, endangered or threatened species, etc.)?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. When considering risk & uncertainty for this species, how important is: the short-term socioeconomic effect of the proposed management change on the commercial fishery?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. When considering risk & uncertainty for this species, how important is: the long-term socioeconomic effect of the proposed management change on the commercial fishery?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. When considering risk & uncertainty for this species, how important is: the short-term socioeconomic effect of the proposed management change on the recreational fishery?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. When considering risk & uncertainty for this species, how important is: the long-term socioeconomic effect of the proposed management change on the recreational fishery?

Not important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**DRAFT**

**[Date]**

**To: [Commissioners]**

**From: Robert Beal, Executive Director**

**Re: Memorandum Regarding Participation of Pennsylvania in Atlantic Menhaden Management Board**

This memorandum summarizes the review of questions concerning the participation of Pennsylvania on the Atlantic Menhaden Management Board in light of provisions of the ASMFC Compact limiting certain states' participation to management of anadromous fish.

1. Articles II, VIII, and XII of the ASMFC Compact address participation by certain states eligible for ASMFC fishery management activities, including Pennsylvania, generally requiring that such participation be limited to anadromous species found in those states' waters.
2. Pennsylvania has been part of the Atlantic Menhaden Management Board since 2016. Because Atlantic Menhaden are not anadromous, the question arose whether it is proper for Pennsylvania to participate in the Menhaden Board.
3. Based upon review of the relevant Compact provisions, reviewing the historical practice, and after conferring with legal counsel, the Interstate Fisheries Management Program Policy Board concluded that Pennsylvania's continued participation on the Menhaden Board is not inconsistent with the referenced Compact limitations. While Pennsylvania's role is limited to anadromous species, that limitation does not foreclose Pennsylvania's participation in the Menhaden Board given the close biological nexus between menhaden and Atlantic Striped Bass, an anadromous species in which Pennsylvania has an interest and has long participated on the ASMFC management board. Allowing Pennsylvania to participate in Menhaden Management Board in light of the biological linkage between menhaden and Striped Bass is consistent with the Commission's increased interest in ecosystem-based management, as reflected in our Commission's Ecological Reference Points (ERP) Work Group, which has been examining reference points that account for Atlantic menhaden's role as a forage fish for Atlantic Striped Bass and other species.
4. Going forward, particular questions regarding states participation in management of specific species will continue be resolved on a case by case basis, mindful of relevant provisions of the Compact, Rules and Regulations, and Charter, and the particular circumstances.



# **Update to the Atlantic States Marine Fisheries Commission *Profiles of State Artificial Reef Programs and Projects***

date

[add ASMFC logo]

[photo for front]

## Atlantic Artificial Reef Summary Information

### Permitted Sites

In federal waters	In offshore state waters	In inshore state waters	Total
168	80	89	<b>337</b>

### Number of Mitigation Reefs

6

### Average Annual Operating Budget

\$348,956

*Add Map of Atlantic States with link to each AR program website*

## Table of Contents

- Summary Information.....#
- Introduction....#
- Massachusetts.....#
- Rhode Island.....#
- Connecticut.....#
- New York.....#
- New Jersey.....#
- Delaware.....#
- Virginia.....#
- North Carolina.....#
- South Carolina.....#
- Georgia.....#
- Florida.....#
- Conclusion....#
- Appendix.....#

## Introduction

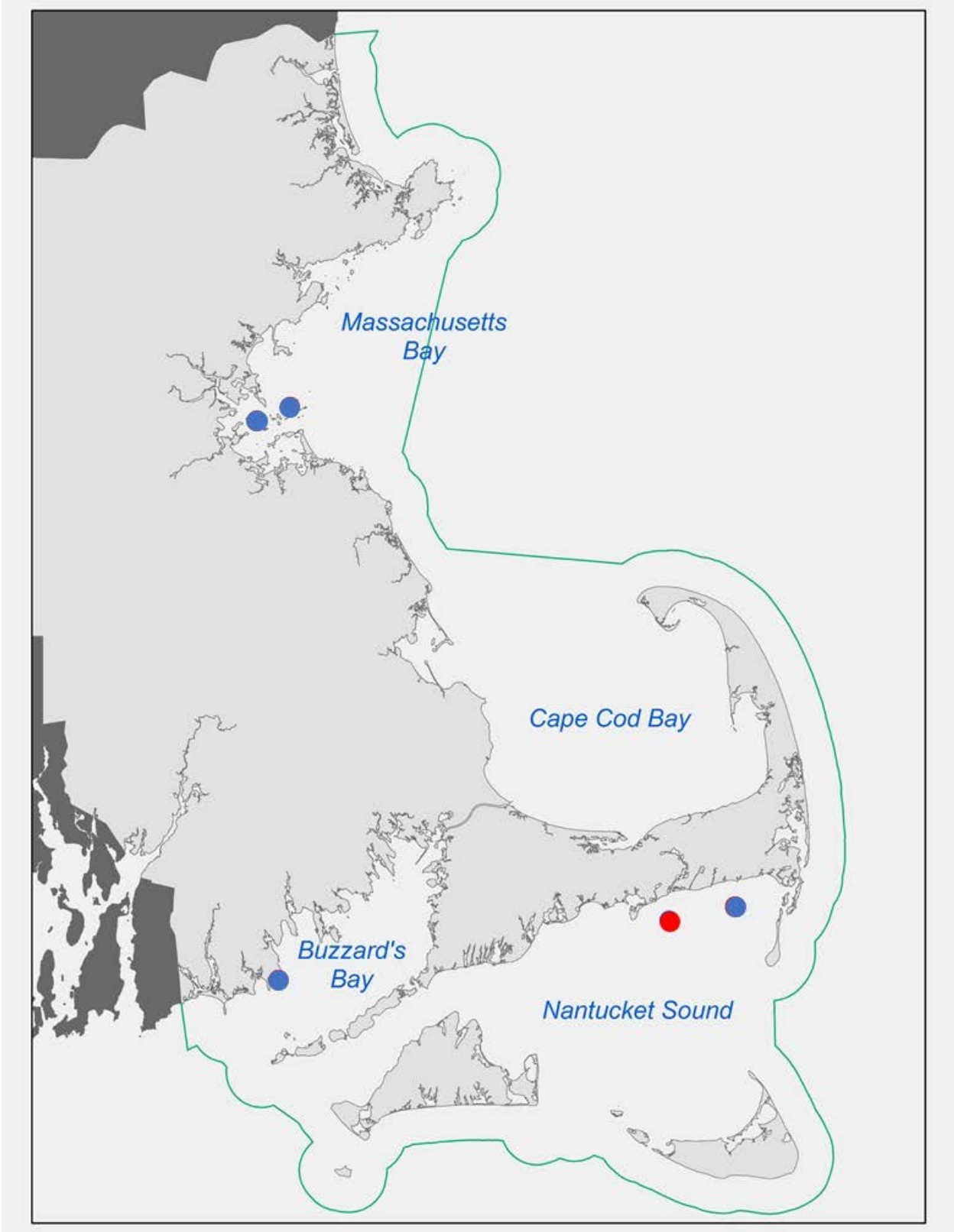
In 1988, the Atlantic States Marine Fisheries Commission published [A Profile of Atlantic Artificial Reef Development](#), which featured profiles for each state’s artificial reef program (ARP, see appendix for list

of abbreviations and acronyms). In the 30+ years since its release, many states have expanded their programs; deployed a variety of artificial reefs (ARs) using best management practices for construction, materials, and siting; and have monitored sites for use – both by fishers and divers, as well as by marine life. This publication is an update to the 1988 profiles, providing summary information on each state’s program, as well as featuring some reefing highlights over the last three decades.

# MASSACHUSETTS

## Artificial Reef Program Overview

Artificial Reef Details	
Number of Permitted Sites	5 (all in offshore waters)
Number of Mitigation Reefs	2
Program Details	
Artificial Reef Management Authority	Massachusetts Division of Marine Fisheries (MA DMF)
Average Annual Operating Budget	\$10,000
State Artificial Reef Plan	<a href="https://www.mass.gov/media/9591/download">https://www.mass.gov/media/9591/download</a>
Reef Coordinator	Mark Rousseau; <a href="mailto:Mark.Rousseau@mass.gov">Mark.Rousseau@mass.gov</a>
Shellfish Reef Program Contact (separate from the ARP)	Jeff Kennedy; <a href="mailto:Jeff.Kennedy@mass.gov">Jeff.Kennedy@mass.gov</a>
Artificial Reef Website, with list of deployments	<a href="https://www.mass.gov/service-details/artificial-reefs">https://www.mass.gov/service-details/artificial-reefs</a>
State Reef Publications	<a href="https://www.mass.gov/media/9596/download">https://www.mass.gov/media/9596/download</a>
Research Collaborations	<a href="https://www.tandfonline.com/doi/pdf/10.1080/00288330909510001">https://www.tandfonline.com/doi/pdf/10.1080/00288330909510001</a>



ARs in Massachusetts. Red circles indicate reefs placed before 1988, and blue circles indicate reefs placed after 1988.

The Massachusetts ARP was formalized in 2008 with the completion of the Massachusetts Marine Artificial Reef Plan. The MA DMF Fisheries Habitat Program oversees all ARP developments. Prior to 2008, artificial reefing activity in Massachusetts consisted of a series of ad-hoc deployments for research pilot projects or mitigation. Four of the five Massachusetts permitted reef sites are less than 25 years old. The Dartmouth reef in Buzzard's Bay was created in 1997 using Reef Balls by the University of Massachusetts as a pilot research project. The Sculpin Ledge reef in Boston Harbor is a 1999 mitigation project designed using concrete terrace structures to address subtidal habitat loss at Spectacle Island resulting from the capping of a landfill using "Big Dig" project fill. The Boston Harbor HubLine reef was constructed in 2006 as mitigation for hard bottom habitat impacts resulting from the installation of the HubLine natural gas pipeline between Boston and Salem. The Harwich Reef in Nantucket Sound was created in 2016 using concrete recycled from the demolition of the local high school. The Harwich reef was a collaborative effort with the local charter boat captains and was the first reef project funded using revenue from Massachusetts Recreational Saltwater Fishing License sales. This is a recreation-only reef, with all commercial fishing activity prohibited through regulation enacted in 2016. The permit remains open to accept additional materials in the future.

Permits for the Yarmouth reef, Massachusetts' oldest AR originally created in 1978, were reissued in 2016 to allow additional material to be deployed in vacant areas of the 125-acre site. In 2019, derelict concrete navigation buoy moorings were donated and deployed by the United States Coast Guard (USCG) additional USCG deployments expected in the future. Additionally, 2,000 cubic yards of granite and concrete were added to the site, using funding by Massachusetts Department of Fish and Game's In-lieu Fee Mitigation Program to pay for deployment.

The Massachusetts ARP is currently focused on addressing three programmatic bottlenecks to help position the program for sustained success: permitting new sites, acquiring free materials, and securing funding for future deployments. Progress on ARP development is limited by the availability of funding and dedicated staff. A part-time coordinator oversees the ARP and utilizes staff from other programs to conduct reef-associated activities. Collaborations with local communities and other state agencies are utilized to secure free materials and to obtain new permits. All Massachusetts reef sites have established stations for collecting long term monitoring data, including acoustic monitoring of fish and bottom temperature data collection, to take advantage of ongoing efforts from other MA DMF projects to assist with reef monitoring.

Figure 1. USCG *Vessel Oak* deploying derelict concrete navigational aid "sinkers" on the Yarmouth Reef in Nantucket Sound. Photo credit: Mark Rousseau, MA DMF.

## **Program Highlights**

Completion of the Massachusetts Artificial Reef Plan in 2008 formally established guidance to direct future artificial reefing activities in Massachusetts. Dedicated funding for the program is limited for site selection and monitoring, requiring program staff to build on collaborative efforts with local and state agencies to secure materials of opportunity and funding for deployments. Despite these limitations, the ARP continues to make strides building reefs, siting new reef sites to permit, securing new materials of opportunity, and researching and monitoring existing reef sites.

## Harwich Artificial Reef

Massachusetts's newest AR is the Harwich Reef in Nantucket Sound, deployed in 2016. The project was a collaborative effort between the Town of Harwich and MA DMF. The first deployment of materials consisted of 1,600 cubic yards of concrete rubble obtained from the demolition of the Old Harwich High School, deployed to create patch habitat arrays across a 10-acre site. MA DMF enacted a regulation prohibiting all commercial fishing activity on the reef site and within a 100-meter perimeter buffer zone. The regulation makes this the first and only reef site in Massachusetts dedicated exclusively to recreational saltwater fishing. The reef is very popular within the local community. The permit remains open to allow for the deployment of additional materials to the site.

Figure 2. Deployment of materials to the Harwich Artificial Reef site. Photo credit: Mark Rousseau, MA DMF.

## Monitoring

MA DMF utilizes ARs as long-term monitoring stations to track movement of radio tagged finfish and horseshoe crabs using acoustic receivers, and for the collection of time series bottom temperature data in jurisdictional waters. Temperature data collection dates back to 2006 on some AR locations. MA DMF also conducts periodic sidescan sonar surveys of reef sites to verify material placement and stability. An Underwater Visual Census (UVC) survey using divers collects data on the HubLine mitigation reef in Boston Harbor annually to document long-term successional changes to both native and invasive species on AR habitat and compared to nearby natural, hard structured habitats. The UVC survey has been completed every July since 2006. In Nantucket Sound, a 2019 study using Baited Remote Underwater Video Stations (BRUVS) compared reef productivity of the Yarmouth and Harwich ARs, Massachusetts' oldest and newest ARs. Species richness, diversity, abundance, and age structure of economically important demersal fish species were compared to fish aggregations on nearby natural reefs and sand bottom habitats. The study identified an increase in abundance of reef-associated species with increases in reef age. Future research on reefs in Nantucket Sound will utilize BRUVS to assess structured habitat connectivity to determine appropriate spacing of new reefs to existing reefs and natural structured habitats. To complete AR monitoring studies, MA DMF has relied on volunteer services of recreational sport fishing clubs and graduate student interns to assist MA DMF's monitoring efforts, particularly in Nantucket Sound. In 2019, collaborations to complete BRUV research on Nantucket Sound reef sites included a Northeastern University's (NEU) Three Seas Program graduate intern and several members of the Cape Cod Salties who donated vessel time to MA DMF.

Figure 3. BRUV Research in Nantucket Sound. Photo credit: Simonetta Harrison, MA DMF intern/NEU.

Figure 4. Collaborative monitoring in Nantucket Sound with the Cape Cod Salties and NEU graduate intern. Photo credit: Mark Rousseau, MA DMF.

## Site Selection

The success of the Harwich reef deployment in 2016 generated significant demand for the permitting of additional reef sites in Massachusetts. In 2017, MA DMF began assessing potential AR locations in structure-limited areas of lower Cape Cod Bay. To identify potential sites, information about existing benthic conditions was collected in three distinct phases: sidescan imaging acoustic surveys, underwater camera groundtruth imaging, and SCUBA diver transect monitoring. Over 12,000 acres of bottom were surveyed in four distinct locations using sidescan sonar. Survey locations were ranked based on absence

of structure, proximity to structure, and ideal bathymetric conditions. With the assistance of an NEU graduate intern, over 300 sediment photos and more than 5,000 linear feet of diver transect data were collected and analyzed to identify five potential new reef locations in lower Cape Cod Bay. If permitted, the five sites identified in Cape Cod Bay will double the number of ARs in Massachusetts jurisdictional waters.

Figure 5. Lower Cape Cod Bay sites selected for permitting. Image credit: Kristen Schmicker, MA DMF intern/NEU.

### Material Acquisition

Reef sites with open permits are a desirable option for government agencies looking to donate suitable materials of opportunity for reefing as a means to recognize cost savings for large-scale infrastructure improvement projects when disposal debris can meet MA DMF reefing materials requirements. MA DMF is working with the Massachusetts Department of Fish and Game and the Massachusetts Department of Transportation to secure free materials of opportunity from large transportation upgrades such as the Massachusetts South Coast Railway Improvement project. Over 1,000 cubic yards of granite from more than 60 culvert and bridge infrastructure upgrades along the rail line have been donated to the MA DMF reef program for reefing. With no funding immediately available for material deployments, MA DMF has secured a temporary lease from the New Bedford Marine Commerce Terminal for staging the donated granite until deployment funding is secured. Additionally, MA DMF is collaborating with the USCG Stations Newport and Woods Hole to receive derelict navigation aid moorings, known as sinkers, to reef sites in Nantucket Sound. The USCG delivers and deploys materials to areas on the reef designated in advance by MA DMF at no cost to the state.

Future reef deployments will focus on barge loading of materials from coastal construction projects, with direct delivery to reef sites. In order for this to be a successful, economically feasible option, MA DMF will be required to maintain several open reef permits in several locations.

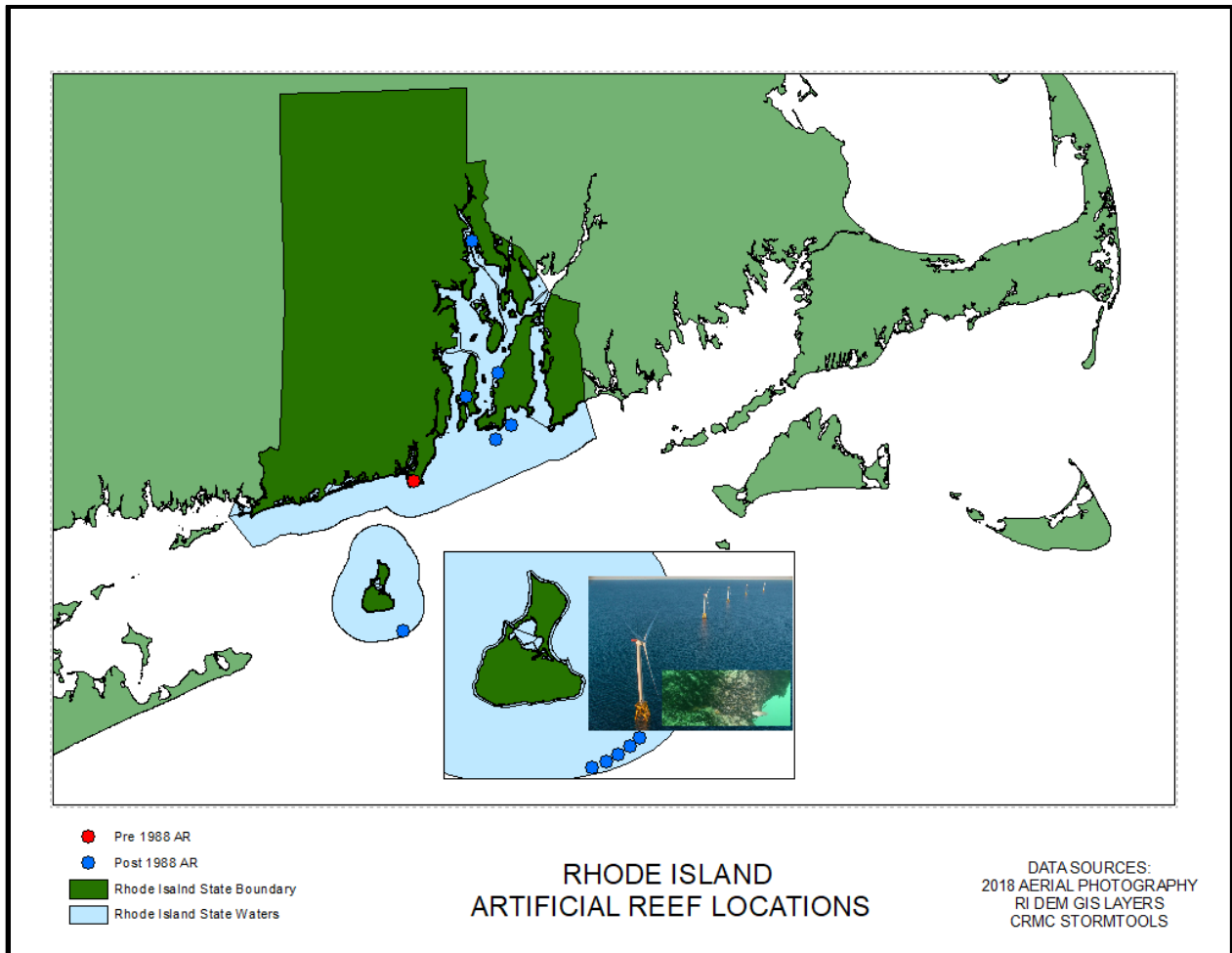
Figure 6. Material from the MA Department of Transportation South Coast Railway Project stored at the Clean Energy Center's Marine Commerce Terminal in New Bedford. Photo credit: Mark Rousseau, MA DMF.



# RHODE ISLAND

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	3 in offshore waters 4 in inshore state waters
<b>Number of Mitigation Reefs</b>	1
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	New England Fishery Management Council, Rhode Island Department of Environmental Management Division of Marine Fisheries (RI DMF)
<b>Average Annual Operating Budget</b>	\$10,000
<b>State Artificial Reef Plan</b>	No official state plan, reviewing the current guidelines for artificial reef planning
<b>Reef Coordinator</b>	Patrick Barrett; <a href="mailto:Patrick.Barrett@dem.ri.gov">Patrick.Barrett@dem.ri.gov</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Eric Schneider; <a href="mailto:Eric.Schneider@dem.ri.gov">Eric.Schneider@dem.ri.gov</a> Patrick Barrett; <a href="mailto:Patrick.Barrett@dem.ri.gov">Patrick.Barrett@dem.ri.gov</a>
<b>Artificial Reef Website, with list of deployments</b>	<a href="http://www.dem.ri.gov/programs/marine-fisheries/surveys-pubs/habitat.php">http://www.dem.ri.gov/programs/marine-fisheries/surveys-pubs/habitat.php</a>
<b>Research Collaborations</b>	<p>Sheehy, D. 1976. Utilization of artificial shelters by the American lobster (<i>Homarus americanus</i>). Journal of the Fisheries Research Board of Canada 33: 1615-1622.</p> <p>Sheehy, D.J. 1982. The use of designed and prefabricated artificial reefs in the United States. Marine Fisheries Review 44(6-7): 4-15.</p> <p>Castro, K.M., J.S. Cobb, R.A. Wahle &amp; J. Catena. 2001. Habitat addition and stock enhancement for American lobsters, <i>Homarus americanus</i>. Marine and Freshwater Research 52(8): 1253-1261.</p>



ARs in Rhode Island. Red circles indicate reefs placed before 1988, and blue circles indicate reefs placed after 1988.

### State of the Rhode Island Artificial Reef Program

ARs were first deployed in Rhode Island waters during the early 1970s. During this time there was no state sponsored ARP, but the state supported research projects undertaken by the University of Rhode Island (URI) to investigate the use of pre-fabricated concrete modules as a tool to increase species specific abundance in otherwise unstructured benthic marine habitat (i.e. sand bottom). Specifically, this work focused on determining if ARs can be used as a tool to increase the carrying capacity of lobsters in areas devoid of natural shelter. The results suggested that these species-specific modules were readily occupied by lobster and can significantly increase the abundance of lobster at certain locations (Sheehy 1976). These lobster modules were the only ARs on record in Rhode Island at the time of the ASMFC's 1988 *Profile on Artificial Reef Development*. Findings from this work provided promising results and garnered the state's interest in ARs as a fisheries management tool. However, AR planning and development did not expand until the late '90s.

Figure 7. Lobster occupying two-piece single-chamber shelter, and map of lobster module enhancement areas as cited in Sheehy 1982 and 1976 respectively.

In 1997, a second AR project conducted by the University of Rhode Island was developed with the same purpose of improving the stock of American lobster. Instead of pre-fabricated modules, this deployment consisted of six reefs split into two grades of cobble stone (10-20 cm and 20-40 cm) deployed off the western side of Jamestown, near Dutch Island (Castro et al. 2001). Castro found that the ARs increased the abundance of adult lobsters relative structured and unstructured habitat controls. The success of these two reefs provided the state with more confidence that the implementation of ARs can be used as a successful management tool. Not too long after, ARs returned to Narragansett Bay as part of a mitigation measure taken by the U.S. Navy post remediation of the McAllister Point Landfill. From 1955-1970s, the McAllister Landfill accepted all waste from the Newport Naval Station. In 1989, the landfill, in conjunction with other sites on the base, were included on the Environmental Protection Agency's (EPA's) National Priority List. As a post remediation mitigation measure, specifically post-dredging of the nearby marine sediment, the U.S. Navy was required to conduct post-eelgrass restoration and AR enhancement work at the sites dredged and backfilled during the remediation work. While some projects arise out of a necessity to react, others arose more opportunistically.

In 2003, the Rhode Island Department of Transportation (DOT) started to plan the removal of the Old Jamestown Bridge that was closed after the completion of the Jamestown-Verrazano Bridge in 1992. Since the bridges spanned the east passage of Narragansett Bay, Rhode Island was presented with a unique opportunity to repurpose this old bridge material as an AR, which proved to be a more cost effective option than landfill disposal. The demolition of the Old Jamestown Bridge began in 2006 and with funds acquired by the Rhode Island DOT from the Federal Highway Administration, the state was able to construct two ARs, Gooseberry Island and Sheep Point Reef, in nearshore waters off the coast of Newport. In addition to the recycled bridge materials (i.e., concrete slabs, rebar, concrete rubble) these ARs were improved by cryptic habitat units that enhanced vertical relief and protected juvenile and cryptic fishes.

Figure 8. The through truss span of the Old Jamestown Bridge, just before it hits the water following the first controlled explosive demolition in 2006.

Currently, there is no official ARP but a draft guideline for AR planning in Rhode Island was developed by Rhode Island Division of Marine Fisheries (RI DMF) in conjunction with a 2013 permit application for a reef ball project in estuarine waters. The project permit was withdrawn but the document and AR site suitability analysis stands as the most up to date plan for AR enhancement in the state. This work is currently being reviewed and considered for potential improvements in order to adopt into an official plan state plan.

Currently, all habitat restoration falls under one of two programs, either the Shellfish Restoration Program or the Fish Habitat Enhancement Program. AR work is conducted under the Fish Habitat Enhancement Program consisting of a couple members of the state's Habitat Team. Since last year, the RI DMF Habitat Team has continued to monitor essential fish habitat (EFH) such as oyster reefs, eelgrass, and kelp, in addition to siting potential locations for AR work. Over the last four years the team, in collaboration with The Nature Conservancy, has been using a combination of monitoring techniques (e.g. multi gear surveys, benthic video monitoring, and dive surveys) to determine suitable locations for fish habitat enhancement projects in the Upper Narragansett Bay and Providence River. This research has led to the first permitted AR project specifically aimed towards enhancing fish habitat since 2006. Deployment of the Sabin Point AR project was completed in October 2019.

## **Program Highlights**

### **Jamestown Bridge Artificial Reef Project**

Gooseberry Island and Sheep Point reefs were completed in August 2007. The main goal of the work was to enhance inshore, flat sandy bottom habitat, with more complex structure with the understanding that these improvements to the benthic structural complexity will likely result in increased fish biomass, juvenile fish abundance, and provide additional recreational fishing and scuba diving opportunities in Rhode Island. These reefs were constructed in 65-85 feet of water on sandy, unstructured, habitat, and surveyed via transect methods on SCUBA. In addition to these materials, cryptic habitat units were deployed and hauled at various intervals to measure the colonization of cryptic and juvenile finfish species.

Figure 9. Cryptic habitat units prior to be deployed. Photo credit: Natasha Pinckard.

### **Sabin Point Artificial Reef Project**

The goal of this project is to enhance fish abundance at a site, which currently provides fishing access but supports a moderate-low fish abundance. This work aims to enhance the size and abundance of targeted species (e.g. scup, tautog, black sea bass), as well as support juvenile fish and prey species by adding structure to relatively featureless bottom habitat to a location in close proximity to a local fishing pier. The project site has been carefully chosen to balance the goal and objectives of the project while taking into consideration the environmental constraints, logistics of implementation, and competing uses. This is the first AR project since 2006, and the first AR to use Reef Balls in Rhode Island.

Figure 10. AR being deployed at Sabin Point. Photo credit: Grace Kelly, ecoRI.

### **Artificial Reef Productivity Monitoring**

As AR work continues to grow in Rhode Island, DMF is looking to identify the best monitoring methods to evaluate the success of their AR work. DMF will be using the Sabin Point project as a pilot study for the use of Reef Balls in Rhode Island waters, as well as to identify monitoring guidelines for future AR projects. DMF is also interested in determining the relative habitat value produced by creating ARs in the bay, both from a biological and social standpoint. DMF intends to utilize a dive transect monitoring protocol that is designed to sample common algae, invertebrates, and fish species to monitor changes to AR habitats over time. From this work they will establish fish habitat linkages by comparing productivity estimates on AR in relation to sand flat controls, and other important finfish habitats (e.g. oyster reefs, kelp, eelgrass). In addition to the biological surveys DMF is also interested in conducting recreational angler interviews to see how perception of the park, and the fishing opportunity, has changed at Sabin Point since the creation of the AR.

# CONNECTICUT

## Artificial Reef Program Overview

Artificial Reef Details	
Number of Permitted Sites	1 (in inshore state waters)
Number of Mitigation Reefs	1
Program Details	
Artificial Reef Management Authority	Connecticut Department of Energy and Environmental Protection, Fisheries Division, Marine Fisheries Program (CT DEEP)
Average Annual Operating Budget	\$0
Reef Coordinator	David Molnar; <a href="mailto:David.Molnar@ct.gov">David.Molnar@ct.gov</a>
Shellfish Reef Program Contact (separate from the ARP)	David Carey; <a href="mailto:David.Carey@ct.gov">David.Carey@ct.gov</a>
List of deployments	<a href="https://www.nfwf.org/sites/default/files/finalreports1/1401.13.03_9429-final_report.pdf">https://www.nfwf.org/sites/default/files/finalreports1/1401.13.03_9429-final_report.pdf</a>

### State of the Connecticut Artificial Reef Program

ARs were first deployed in Connecticut waters in 2014. During this time there was no state sponsored AR program, but the state authorized research projects undertaken by Sacred Heart University (SHU) to investigate the use of pre-fabricated concrete modules “Pallet Reef Balls” and native vegetation as a tool to decrease erosion of intertidal sediments and restore intertidal wildlife habitats. Specifically, this work focused on determining if ARs can be used as a tool to reduce wave action and stabilize the shoreline, subsequently aiding in marsh grass restoration and species recolonization. The results suggested that wave energy has been reduced and sedimentation has increased (NFWF 2018).

### Program Highlights

#### Stratford Point Living Shoreline Project

Stratford Point was formerly owned by Remington Gun Club for 50 years and was used as a gun firing range, subsequently leading to lead pollution in the intertidal shoreline from the bullets. DuPont acquired the land and conducted remediation efforts in the early 2000s to remove the pollution, however, in the process, the cleanup disturbed the intertidal habitat. In 2011, Dr. Mattei, Professor at SHU, became involved in Stratford Point’s ecological system.

Pallet Balls were installed at Stratford Point Living Shoreline in May 2014. The main goal of the work was to protect coastal shorelines from storm-generated erosion (NFWF 2018). The deployment of 64 Pallet Balls helped improve the benthic habitat, serving as substrate for marine organisms such as juvenile finfish, oysters, barnacles, algae, sponges, clams, snails, and crabs. The installation of smooth cordgrass (*Spartina alterniflora*) helped the establishment of a fringe marsh and provided additional wave attenuation. These reefs were constructed during low tide, approximately 18 meters seaward of the mean high water elevation. As part of the project, and per requirements of the state's Certificate Permission, subsequent monitoring of abiotic and biotic data was collected for five years to determine if the living shoreline was successful in terms of increasing coastal resilience over time. Presently, the attenuation of wave energy has been reduced by 30% and within the first year of the installation, 15 cm of sediment accreted landward of the Pallet Balls (NFWF 2018).

Funding for this project was provided by U.S. Army Corps of Engineers (USACE) Connecticut In-Lieu Fee Program (\$250,000), Connecticut Institute for Resilience and Climate Adaptation (CIRCA) Matching Funds (\$91,000), and Long Island Sound Futures Fund (\$115,198). The leading stakeholders involved in this project are SHU professors, DuPont, Connecticut Audubon Society and National Audubon Connecticut, AECOM (formerly URS) and CIRCA.

Figure 11. Need caption and photo credit, and possibly higher quality photo.

Figure 12. Need caption and photo credit, and possibly higher quality photo.

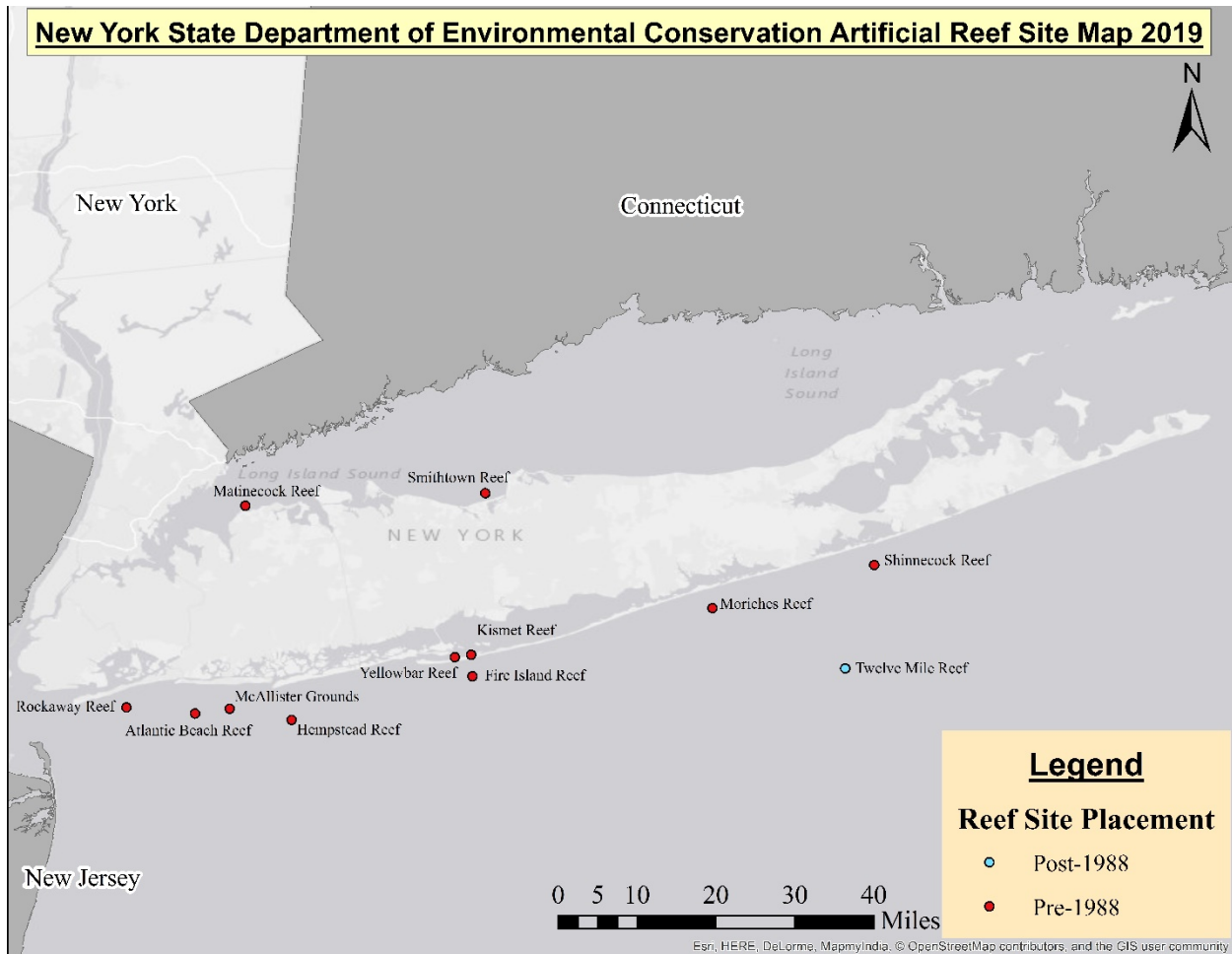
### Reference

National Fish and Wildlife Foundation (NFWF). "Final Programmatic Report Narrative" 23 Dec. 2019, [http://www.nfwf.org/finalreports1/1401.13.039429-final\\_report.pdf](http://www.nfwf.org/finalreports1/1401.13.039429-final_report.pdf)

# NEW YORK

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	3 in federal waters (2,007 acres) 5 in offshore waters (1,321 acres) 4 in inshore waters (61 acres)
<b>Number of Mitigation Reefs</b>	0
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	New York State
<b>Average Annual Operating Budget</b>	\$0
<b>Artificial Reef Plan</b>	<a href="https://www.dec.ny.gov/docs/fish_marine_pdf/dmrreeffsgeis.pdf">https://www.dec.ny.gov/docs/fish_marine_pdf/dmrreeffsgeis.pdf</a>
<b>Reef Coordinator</b>	Christopher LaPorta; <a href="mailto:Christopher.LaPorta@dec.ny.gov">Christopher.LaPorta@dec.ny.gov</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Debra Barnes; <a href="mailto:debra.barnes@dec.ny.gov">debra.barnes@dec.ny.gov</a>
<b>Map of deployments</b>	<a href="https://www.dec.ny.gov/docs/fish_marine_pdf/dmrreeffsgeis.pdf">https://www.dec.ny.gov/docs/fish_marine_pdf/dmrreeffsgeis.pdf</a>
<b>Artificial Reef Website</b>	<a href="https://www.dec.ny.gov/outdoor/7896.html">https://www.dec.ny.gov/outdoor/7896.html</a>



ARs in New York. Red circles indicate reefs placed before 1988, and blue circles indicate reefs placed after 1988.

### State of the New York Artificial Reef Program

The New York State Department of Environmental Conservation (NYSDEC) ARP was established in 1962 to enhance and restore fisheries habitat as part of New York State’s Marine Fisheries Management Program and provide additional fishing and diving opportunities.

*A Generic Environmental Impact Statement and Plan for the Development of Artificial Reefs in New York’s Marine and Coastal District (GEIS/Reef Plan)* was written by NYSDEC in 1993 to establish programmatic guidelines and goals and to secure permits authorizing the construction, repair and maintenance of ARs in both New York and adjacent federal waters.

The GEIS/Reef Plan was updated through the completion of a Supplemental GEIS/Reef Plan (SGEIS). The SGEIS was completed in 2020 and addressed the advancements in science and knowledge surrounding AR development and the programmatic questions raised in the 1993 GEIS. The SGEIS will be an integral part of the ARP’s path forward toward significantly increasing overall reef area through the expansion of existing sites and the creation of new sites.



The ARP maintains 12 reef sites in New York's Marine and Coastal District including eight sites in the Atlantic Ocean, two in Great South Bay and two in Long Island Sound. All but one site (Twelve Mile Reef) were permitted prior to 1988 (see map). Reef sites are strategically positioned in proximity to major inlets for increased boating access.

Program compliance and performance monitoring of the sites is conducted through aerial surveys, SCUBA, bathymetric surveys, remote operated vehicle (ROV), trap surveys, and contracted biological monitoring surveys. Supplemental monitoring information is also received through volunteer angler and diver surveys.

Materials of opportunity are utilized to create patch reefs on ARP sites. Reef building materials that have been used include, but are not limited to, rock (dredged and jetty), concrete (pipes, blocks, slabs, bridge decking, rubble), steel (vessels, barges, pipe, buoys, automobile bodies), wood (drydocks, barges, vessels) and tires. A majority of these materials were used because of their abundance and availability. Over time performance monitoring determined which materials proved to have superior reef building characteristics (stability and durability) for sustained use. Car bodies and tires are no longer used by the ARP due to their poor performance as reef material. In the past other available and abundant materials such as wood (barges and vessels) have been predominantly replaced by the significantly more stable and durable rock and steel.

Historically, the ARP had no dedicated budget to acquire, prepare and deploy materials on its sites. Some project and monitoring funding has been secured through the New York State Environmental Protection Fund.

A majority of deployed materials have been acquired through ARP partnerships. Federal agencies, such as the USACE and the National Marine Fisheries Service (NOAA Fisheries) have donated reef building materials ranging from large volumes of dredge rock to steel fishing vessels.

Other partnerships with construction companies have produced large volumes of material (concrete and steel) from demolition projects where reefing was more economically feasible than alternate disposal methods. Additional reef building collaborations were forged with local fishing clubs and saltwater angler based organizations (Fisherman and Fishing Line magazines) through specific reef site sponsorship.

Perhaps the most significant challenge encountered by the New York ARP has been the increased value of and preparation cost for reef building materials that were once readily available and commonly used. A key factor has been the exorbitant increase in scrap steel value making acquisition of steel vessels, barges, and pipes among other steel products onerous due to greater scrapping value.

## **Program Highlights**

### **Atlantic Beach Reef**

The most significant ARP material deployment was the result of a successful partnership with New York District USACE during an ongoing New York Harbor Channel Deepening Project. This project produced large volumes of dredged bedrock from New York Harbor to allow deep draft vessels access to the Port

of New York. The partnership was a “win-win” for the USACE, who aquatically recycled large volumes of disposal material, and the ARP who gained large volumes of high-quality reef building material at no cost.

Reef placements occurred from 1998 through 2001 producing over 200 deployments yielding approximately 600,000 cubic yards of rock. To date this is the largest patch reef created in ARP history located on the Atlantic Beach Reef.

After blasting and dredging, the rock was loaded into hopper barges and towed to a series of designated target coordinates on the Atlantic Beach Reef for deployment. The rock drops created an extended patch reef that defines the northern boundary of the site easily located by the large number of vessels frequenting it.

The Atlantic Beach Reef “rockpile” remains one of the most popular and frequented destinations to date as is evidenced by the photo of the “rack-line” of boats enjoying the fishing and diving opportunities this massive patch reef offers.

SCUBA monitoring of this large reef has documented a considerable number of large interstitial spaces that could easily house a “double-digit” lobster or tautog!

Figure 13. Insert vessel lineup photo here.

Figure 14. Insert lobster in rocks photo here.

Figure 15. Insert photos of rock topside.

### Moriches Anglers Reef

The largest vessel deployed by the New York ARP began its life as a 167-foot steam freighter. The vessel currently known as *The Boat* went by many prior monikers such as *Philip J*, *SS Newport*, *Boulogne Sur Mer*, and *Bad Bob’s Big Boat* before going to its final resting place on the Moriches Anglers Reef.

The original steam freighter was gutted and converted into the floating Four Star French Restaurant *SS Newport* that was berthed in Newport Harbor, Rhode Island for 10 years. When the *SS Newport* fell on hard times it was sold and converted into its final incarnation as the floating Nightclub *Bad Bob’s Big Boat* berthed in Newport Harbor for 20 years. *Bad Bob’s Big Boat* had a colorful reputation as an upper-class destination but eventually declined and became a hangout for rowdy crowds. Over time the Newport City Council issued an eviction notice for the vessel and eventually a settlement spelled out terms for *The Boat’s* removal from Newport Harbor. The last owner of *The Boat* was a SCUBA diver who was familiar with the New York ARP. He contacted the ARP and offered to donate the vessel. The vessel’s dimensions of 167-foot long, 27-foot beam, and 25-foot keel made it a good candidate for reefing.

Local divers have reported that *The Boat* rests on its keel in 70 feet of water on the Moriches Anglers Reef. The large voids and open decks of *The Boat* have been documented to hold large numbers of tautog, black sea bass, and scup. This patch reef remains one of the more popular diving destinations of the New York sites due to its size.

The project was sponsored by the local fishing club The Moriches Anglers who adopted the Moriches Anglers Reef because many club members frequented the site to fish and dive. Over time members of

the club created the not for profit organization Moriches Offshore Reef Fund (MORF) that was ultimately responsible for improving over half the reef site with patch reefs primarily in the form of steel vessels and barges preferred by club members. MORF's long-term sponsorship of the Moriches Anglers Reef has been the most successful single site sponsor partnership with the New York ARP to date.

Figure 16. Insert above and under water photos of "The Boat" here.

### Governor Cuomo's Reef Initiative/Tappan Zee Bridge

Demolition of the Tappan Zee Bridge and the resulting opportunity to "aquatically recycle" materials to reduce landfill burden produced significant changes for the ARP. Starting in 2018 Governor Andrew Cuomo's Artificial Reef Initiative (Reef Initiative) rejuvenated the ARP through the provision of resources, acquisition and deployment of unprecedented volumes of surplus reef building materials located throughout New York. Materials were received from the following state agencies: New York Power Authority (NYPA), New York Thruway Authority (NYTA), New York Department of Transportation (NYDOT) and New York Canals Corporation (NYCC). The New York City (NYC) Department of Transportation, National Grid (NAGD) and the USACE also contributed materials to the Reef Initiative.

The concerted multi-agency Reef Initiative effort resulted in the first ever deployment of materials onto all 12 New York reef sites from 2018 through 2019 totalling nearly 100 individual patch reefs.

Materials recycled through the Reef Initiative included surplus NYCC steel vessels and barges, NYPA and NAGD power producing equipment (steel rotors and turbines), NYDOT concrete and steel bridge and highway demolition materials and NYTA steel trusses and concrete supports and decking from Tappan Zee Bridge. All materials were either transported over land or via waterways (Erie Canal and Hudson River) to New York's Coastal Marine District for deployment.

One Reef Initiative project of interest was the result of a marine contractor who used a variety of NYCC materials to create a steel sculpture. The sculpture design was made from various steel parts (miter gate, lift bridge section and pontoons) welded together with the understanding that greater surface area and increased profile are important characteristics for reef building success. The fabricated sculptures produced large surfaces of attachment for marine colonizers with increased conduit for water flow resulting in enhanced shelter and foraging opportunities for various reef-associated species.

In addition to the imaginative reef material design, a new method of material deployment was devised and named the "slip-and-slide." This method employed large spare steel I-beams welded together to form a movable base. The sculptures and other reef materials (70-ton steel turbine runners) were placed on this base for overboard deployment. A large crane was used to control lifting of the onboard section of the "slip-and-slide" until the materials literally slipped off and over the side of the barge. The attached photographic sequence illustrates the deployment of the steel bridge/miter gate/pontoon sculpture off the "slip and slide."

Figure 17. Insert Mitergate/liftbridge/pontoon sequence here.

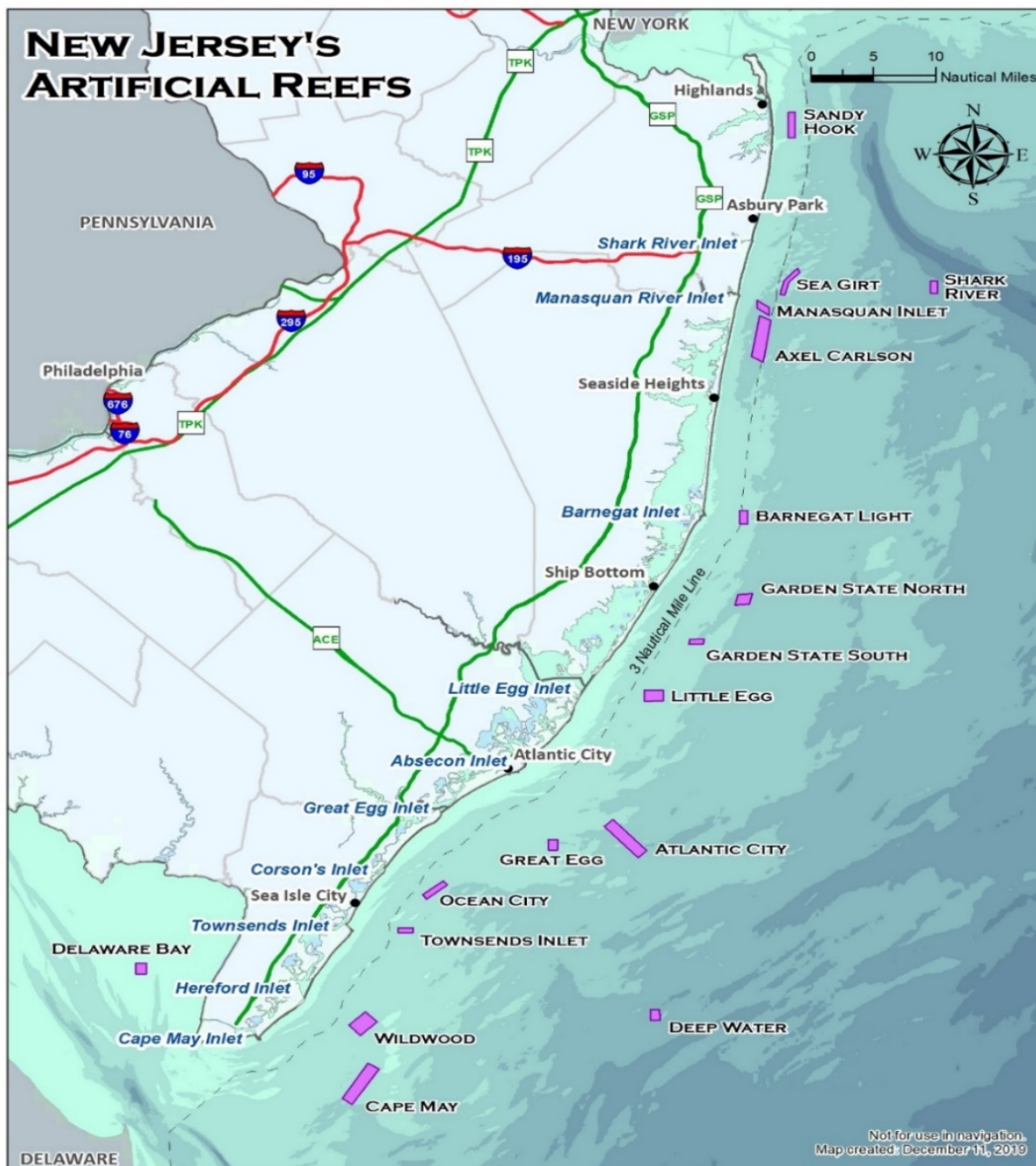
Figure 18. Insert 70-ton steel turbine sequence here.

# NEW JERSEY

## Artificial Reef Program Overview

### Artificial Reef Program Overview

Artificial Reef Details	
Number of Permitted Sites	14 in federal waters 4 in offshore state waters
Number of Mitigation Reefs	0
Program Details	
Artificial Reef Management Authority	New Jersey Division of Fish and Wildlife (NJDFW) ARP
Average Annual Operating Budget	\$180,000 plus donations
Reef Coordinator	Peter Clarke; <a href="mailto:Peter.Clarke@dep.nj.gov">Peter.Clarke@dep.nj.gov</a>
Artificial Reef Website	<a href="https://www.nj.gov/dep/fgw/artreef.htm">https://www.nj.gov/dep/fgw/artreef.htm</a>



ARs in New Jersey. The 17 reef sites are depicted in purple shaded symbols, four occur in state waters (0-3 nm), 14 are in federal waters (3-200 nm). The gray dotted line indicates the state waters boundaries.

### State of the New Jersey Artificial Reef Program

In 1984, NJDFW initiated its ARP with permitting through USACE in order to develop a hard-bottom habitat that is beneficial to marine life. This permitting provided the development of an AR system with standardized oversight using best environmental practices. NJDFW started with four reef locations: the

Sea Girt Reef off Monmouth County, the Garden State North and Garden State South reefs off Long Beach Island in Ocean County, and the Atlantic City Reef off Atlantic County. By 1994, the network increased to include a total of 14 permitted reef sites ranging from Sandy Hook to Cape May. An additional reef was added in 2005, with two more added in 2017, bringing the total to 17 reef sites covering 7.8%, or 35 square miles, of seafloor managed by NJDFW at present. With over 4,300 deployments made over the 17 reef sites, 91% of the total permitted area is still undeveloped. Four of the reef sites are located inside of the three-mile state waters territory, while the remaining 13 sites are in federal waters (see map of ARs above). New Jersey has one estuarine reef site located in the Delaware Bay.

Historically, ARs have been constructed out of a wide range of materials, but recently they have been limited to three material types: steel, rock, and concrete. Steel is generally acquired as ex-fishing vessels, barges, tug boats, army tanks, and subway cars that are no longer considered suitable for their intended use. Rock is often provided through many river and port deepening projects and consists of the largest quantity of material encountered during the project period, preferably larger than a basketball and frequently bigger than a car. Concrete typically originates from bridge decommissioning projects, old piers and pilings, road culverts, and other pre-cast material. Rather than these materials going to recycling, NJDFW is able to repurpose them to create new underwater habitat. All material is inspected for suitability before it is deployed. If determined fit for deployment, it is cleaned and prepared using the best environmental practices.

## **Program Highlights**

### Monitoring

Currently, NJDFW is conducting an independent fixed gear reef survey on three reef sites within the New Jersey reef network. This project was initially a collaborative effort with Rutgers University for years one through three and is now conducted entirely by New Jersey. Sampling includes three seasons consisting of five-week sampling events equating to a total of 15 weeks of trap hauls per year. Reefs sampled include Sea Girt, Manasquan Inlet, and Little Egg Inlet reefs. Measurements include the initial absence of marine life and evaluating the rate of presence as fish species develop on the material, enumerating species as development occurs, weighing and measuring all species collected. Sampling techniques include video recordings, side scan sonar, and fixed gear with bottom temperature monitoring.

### Funding

The NJDFW ARP receives funding through two sources. The operating budget for staff salaries and fringe/indirect benefits including monitoring and supplies averaged over five years is roughly \$180,000 of Sport Fish Restoration Funds. All funds for material acquisition, preparation, and deployment are supplied by outside sources from sport fishing clubs and environmental advocacy groups.

### Recent Deployments

In 2019, the New Jersey ARP performed eight deployments; these included two Reef Ball deployments on the Ocean City Reef; three barges on the Townsends Inlet Reef; two Caisson Gates, one on the Atlantic City Reef, the second on the Cape May Reef; and a concrete bridge rubble deployment on the

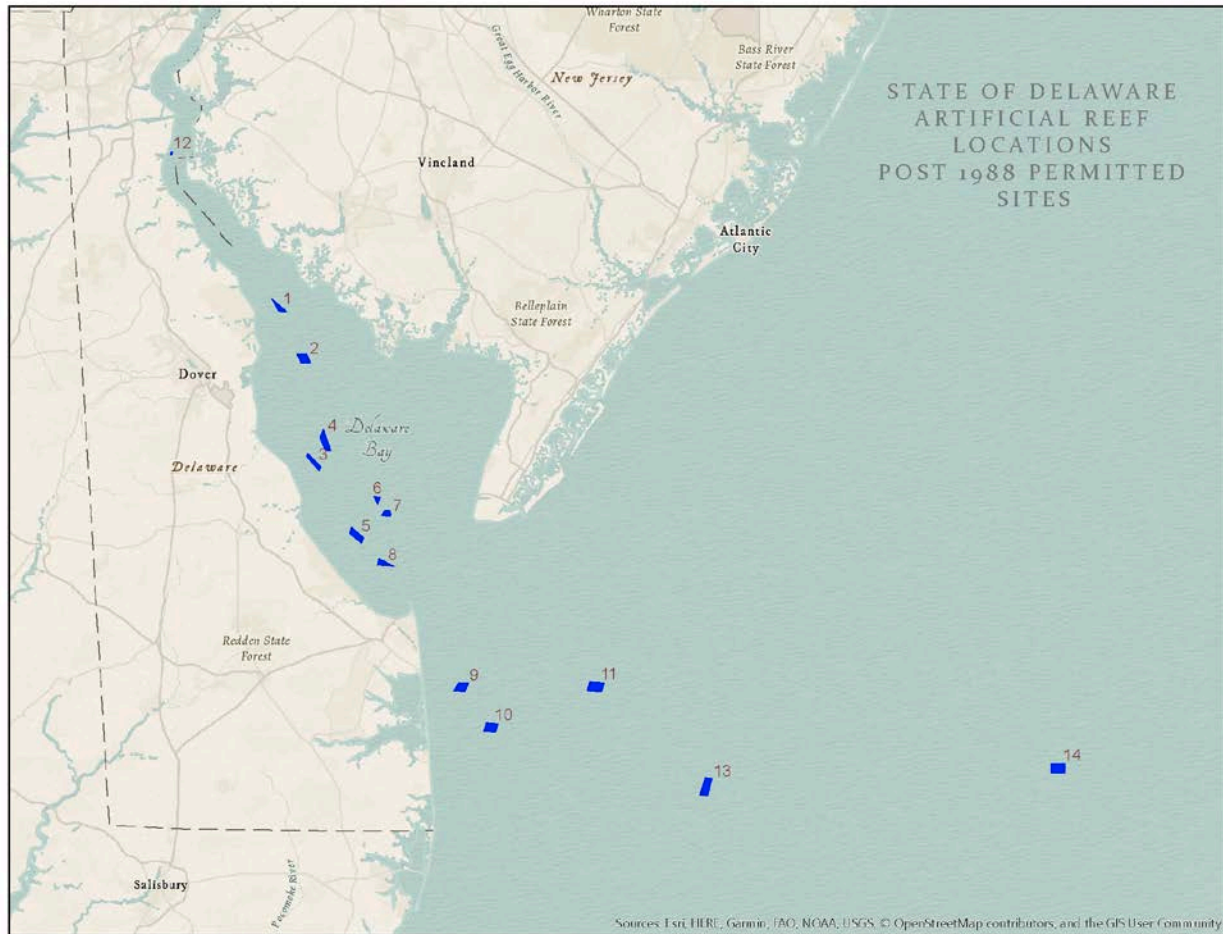
Townsend's Inlet Reef. In total, material deployed in 2019 equaled roughly 5,000 cubic yards of new habitat.

# DELAWARE

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	5 in federal waters 9 in inshore waters
<b>Number of Mitigation Reefs</b>	2: USACE Mitigation Reef and Public Service Electric and Gas reef deployment funding
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	Delaware Division of Fish and Wildlife (DE DFW); permitting under USACE (federal waters) and Delaware Division of Water, Wetlands and Subaqueous Lands Section (state waters)
<b>Average Annual Operating Budget</b>	\$600,000 plus additional funding for large projects.
<b>Reef Coordinator</b>	Jeff Tinsman; <a href="mailto:Jeffrey.Tinsman@delaware.gov">Jeffrey.Tinsman@delaware.gov</a>
<b>Artificial Reef Website</b>	<a href="http://www.dnrec.delaware.gov/fw/Fisheries/Pages/ArtificialReef">http://www.dnrec.delaware.gov/fw/Fisheries/Pages/ArtificialReef</a>
<b>List of Deployments</b>	<a href="http://www.dnrec.delaware.gov/fw/Fisheries/Documents/2015-16%20DELAWARE%20REEF%20GUIDE.pdf">http://www.dnrec.delaware.gov/fw/Fisheries/Documents/2015-16%20DELAWARE%20REEF%20GUIDE.pdf</a>





ARs in Delaware. All were permitted post-1988.

### State of the Delaware Artificial Reef Program

Delaware was the last state along the Atlantic coast between New York and Texas to initiate a state-sponsored reef program, with development starting in 1995. Most of Delaware's salt water access is along Delaware Bay and most reef sites (8 of 14) are estuarine. Delaware uses materials of opportunity such as concrete products and retired vessels as reef materials. Concrete piles deployed from an anchored barge are stable after initial settling and provide a high profile. All types of concrete are very durable, gaining strength over time. Delaware Bay provides foraging and breeding habitat for tautog and juvenile habitat for black sea bass, as well as seasonal habitat for flounder, triggerfish, scup, spadefish, croaker and a variety of pelagic types. The cost of production of donated concrete products is used to provide the required 25% match for federal Sport Fish Restoration funding. Match from concrete donations is more than enough to match the cost of the concrete deployment and excess can be used for vessels and other materials which do not generate match. Since December 2017, Delaware has been receiving rock from the Delaware Main Channel deepening project. Both bedrock and glacial rock have been placed on sites four, six and seven in Delaware Bay. To date, more than 2.1 million tons of granite have been placed on these sites. Benefits go beyond enhanced fishing as this habitat should enhance

the growth and survival of estuarine-dependent juvenile black sea bass. Black sea bass are not harvested in Delaware Bay, but at ocean sites after they recruit into the recreational size category (12.5 inches). Delaware's ocean sites are the resting place for retired vessels of various sizes as well as non-traditional materials like retired NYC subway cars. Black sea bass, tautog and summer flounder are most commonly caught on these sites. Delaware uses a variety of monitoring efforts to characterize various aspects of the reefs. Periodic sidescan sonar surveys are used to ensure permit compliance for materials deployed and remaining stable on the reef. Diver sampling of the invertebrate community can be used to estimate the food resources available to fish, compared with the natural bottom. A randomized aerial flight survey estimates fishing effort on each site and these data are used to estimate the economic value of the reef program to the coastal economy of the tristate region, about \$7 million/year in recent years. Delaware does not use state employees, prison, or volunteer labor to operate the program, but contracts with a marine contractor. For many years the reef program operated with annual projects. In 2018, DE DFW switched to a five-year federal aid project and issued a request for proposals (RFP) seeking a marine contractor to do all concrete work, and to find, purchase, prepare, clean, tow, and deploy mutually agreed upon vessels. Each vessel just requires an addendum to the five year contract, which runs concurrent with the federal aid project. This five year format allows more time to generate match, which must be used in the project segment in which it is generated and the five year contract for the reef contractor eliminates the repetitious need to write a new contract for each project. With a steady funding source and a contractor dedicated primarily to reef work, Delaware has one of the most active reef programs along the Atlantic coast.

## **Program Highlights**

### Use of Non-traditional Materials

Reef materials should be thought of as having common characteristics, like stability, durability and being non-toxic. Materials not stable are subject to moving off the permitted site in storms. Materials not durable enough to last decades would be hard to justify the cost of deployment. Toxic materials will harm the environment. All of Delaware's usual materials, like concrete and steel ships, meet these criteria. When something different is offered it should be judged against these measures. In 2001, NYTA was retiring about 1,500 1960s vintage subway cars, painted red and nicknamed "Redbirds." These contained small amounts of non-friable asbestos, making remediation and recycling prohibitively expensive, so they were offered to the Atlantic coast reef programs. Delaware was able to effectively make the argument that asbestos was not an issue in the marine environment, and by comparison to a few Southeastern Pennsylvania Transit Authority cars surviving on a New Jersey reef site, that stability and durability were adequate. Delaware held a public meeting with National Oceanic and Atmospheric Administration (NOAA) and EPA representatives and local and regional environmental groups invited in order to educate the interested public. In the end, there was no opposition, and Delaware became the first of five states to accept cars, and did so early enough to make the project viable. After two rounds of deployments (2001-2003 and 2007-2009) Delaware accepted 1,329 cars and Site #11 (Redbird Reef) went from bare bottom to fully developed. This is one of the most successful of Delaware's reef projects. A huge amount of reef material was deployed at no cost to the program in a short amount of time. The value of the donation of effort to clean the cars and barge them to Delaware was over \$8 million and this provided match for other reef projects for 15 years.

### Three State Effort (Delaware, New Jersey, and Maryland) to Sink the Retired Destroyer *Arthur W. Radford*

In early 2009, the U.S. Navy announced that they would make a retired 653 foot Spruance-class destroyer (*Arthur W. Radford*) available to the reefing community. This opportunity was rumored by 2006 and allowed time for planning and preparation. Delaware and New Jersey reef personnel got permission to tour the vessels, docked in Philadelphia. The states invited a marine contractor to join in order to get an idea of preparation costs and the volume of non-ferrous metals onboard, which would mitigate costs. Delaware had two deeper water reef sites permitted in 2006, to accommodate the vertical profile of a destroyer. These sites were selected to be nearly equidistant from Indian River Inlet (Delaware); Cape May, New Jersey; and Ocean City, Maryland. With joint development by three states as a goal, the sites were named Del-Jersey-Land Inshore (135 feet deep) and Offshore (190 feet deep). Delaware, being the permit holder was the lead agency. Delaware had to change its policy of not accepting title until after sinking, in order to comply with the U.S. Navy's policy of always transferring title to a state. This situation necessitated that the ARP deal with the State Insurance Commissioner regarding liability insurance. This was paid by the state with no cost to the Delaware ARP. In order to meet the rigorous application schedule, the three states had to tour the vessels again, advertise for a marine contractor and include them in the tour, issue an RFP to interested contractors, review and rank the proposals, then submit the winning bid with our application for the vessel to the U.S. Navy. There was much back and forth prior to the awarding of the vessel, including preparing an EFH Assessment. In June 2010, the *Radford* was moved to a private dock in the Philadelphia Navy Yard for preparation and the title passed to Delaware. One of DE DFW's goals was to show that properly done, large vessel projects need not take nearly a decade to complete, or cost \$5-10 million, as has been the case with some other large vessel projects in other locations in the past. In our case, the *Radford* was sunk on August 10, 2011, 15 months after Delaware accepted title. Cost was less than \$1 million, shared between Delaware, New Jersey, Maryland and the U.S. Navy. It is the longest vessel ever reefed in the Atlantic. Delaware was able to make this project work because they had an adequate reef site previously permitted; the vessel was docked in Philadelphia, minimizing the cost of towing; and it was relatively clean, having been built toward the end of the polychlorinated biphenyl (PCB) era. The contractor, American Marine Group, was a dedicated, experienced group specializing in reef development and intimately familiar with the Best Management Practices for preparing vessels for reefing. They performed all tasks from clean-up to creating diver safe spaces to towing and sinking, rather than subcontracting many tasks.

### A Great, Once in a Generation Windfall from Another Project

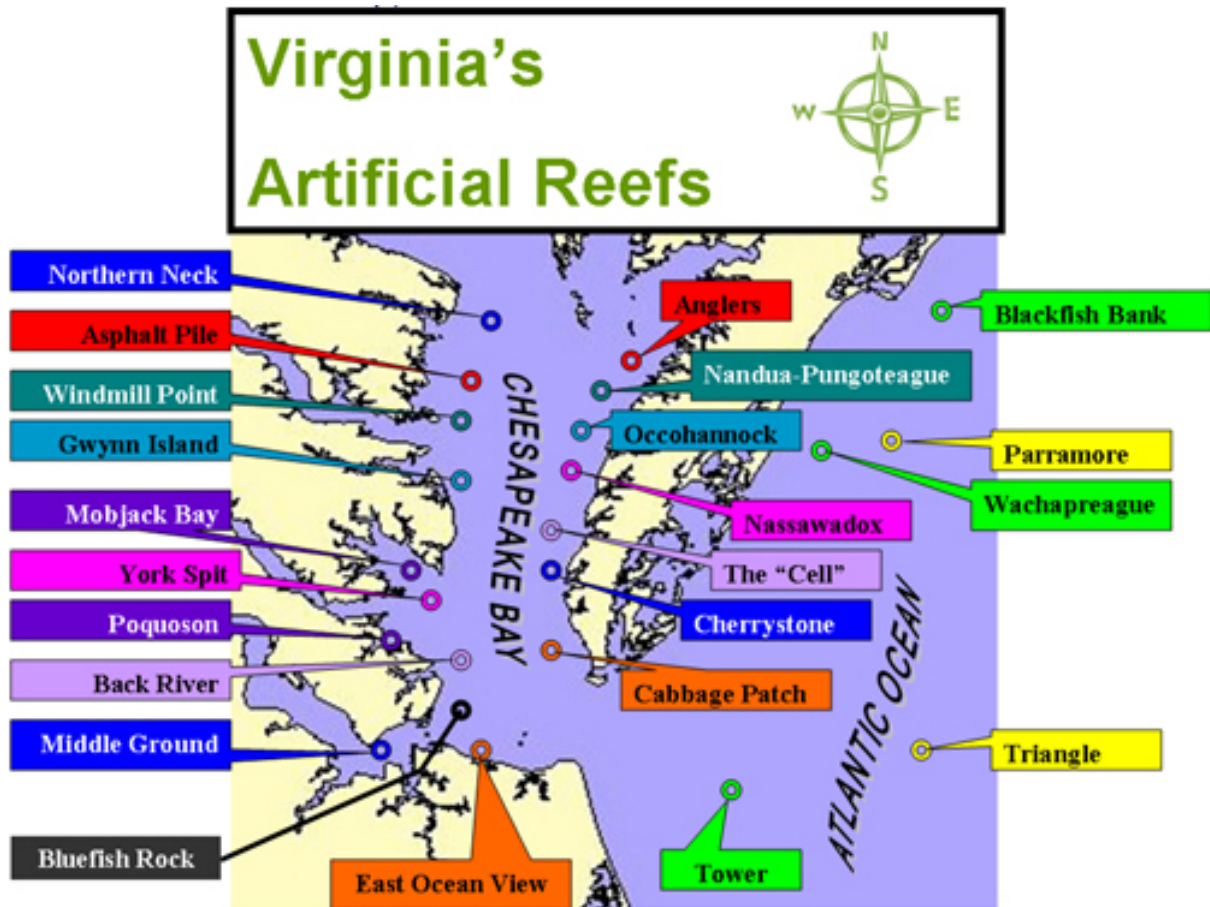
During the 1990s when reef development was just getting underway, the USACE was in the planning stages of deepening the Delaware Main Navigational Channel from 40 to 45 feet in depth to accommodate the upstream passage of more modern, deeper draft commercial vessels and to keep Delaware River ports (Wilmington, Delaware; Philadelphia, Pennsylvania and Trenton, New Jersey) competitive with other East Coast ports. Delaware Bay and the lower reaches of the river are all fine sediments, but as you approach upstream ports, two types of rock are encountered: bedrock which is blasted to the 45 foot depth profile, and large glacial boulders buried in sand. This rock is separated from fine sediment and small rocks and loaded by clamshell dredge into a hopper barge. A tug transports the barge to the permitted site where the rock is discharged at identified target locations.

Rock placement continued until the required clearance above structure, generally 15 feet at bay sites, was approached. From December 2017 until March 2019, more than two million tons of rock were placed on these three sites. In that short time span, over 90% of the materials on the Delaware reef sites had become natural rock. Delaware may receive additional rock in the future from maintenance dredging of the spur channels. Based on the volume of the material, the fact that it was delivered at no cost to the reef program, and that it has promise to enhance black sea bass juvenile habitat, this project ranks very high as one of Delaware's best.

# VIRGINIA

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	5 in federal waters 18 in inshore state waters
<b>Number of Mitigation Reefs</b>	0
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	Virginia Marine Resources Commission (VMRC) under permits from the USACE
<b>Average Annual Operating Budget</b>	\$69,520
<b>State Artificial Reef Plan</b>	
<b>Reef Coordinator</b>	Alicia Nelson; <a href="mailto:Alicia.Nelson@mrc.virginia.gov">Alicia.Nelson@mrc.virginia.gov</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Andrew Button; <a href="mailto:Andrew.Button@mrc.virginia.gov">Andrew.Button@mrc.virginia.gov</a>
<b>Artificial Reef Website</b>	<a href="https://webapps.mrc.virginia.gov/public/maps/artificial_reefs_list.php">https://webapps.mrc.virginia.gov/public/maps/artificial_reefs_list.php</a>
<b>Map of Deployments</b>	<a href="https://webapps.mrc.virginia.gov/public/maps/artificial_reefs.php">https://webapps.mrc.virginia.gov/public/maps/artificial_reefs.php</a>



ARs in Virginia.

### State of the Virginia Artificial Reef Program

Virginia became formally involved in AR development in 1972 with the acquisition of six surplus World War II Liberty Ships, under Public Law 92-402. Virginia was awarded six ships, and VMRC was deemed as the state's authorized recipient for these vessels, which were sunk at two offshore reef sites (Parramore Reef and Triangle Reef). In the 1980s Virginia began acquiring its own reef permits. Initially, permits in Virginia were held by private organizations, but were eventually turned over to VMRC over concerns with liability and financial responsibility for wash ups. Additional reefs were developed through a siting plan written as part of a three-year AR study, conducted for VMRC, by Old Dominion University (ODU). This siting plan was largely responsible for the present system of bay AR sites.

VMRC now holds USACE construction permits for 18 bay and five ocean reefs. Three of these reefs: Back River, Gwynn Island, and Wachapreague were initially permitted to ODU for use as test sites. They were turned over to VMRC after the conclusion of the study. Additional sites were chosen with considerations based on the recommendations of the three year study and after reviewing such factors as water depth, existing users, bottom type, and distance to ramps and other facilities. Input was gathered from the sport fishing community, both by ODU and by the ARP, before making final site selection decisions. The

most recent reef site was permitted in 2006. No new locations are planned at this time. Instead, the ARP has focused on providing updated material to the existing 23 locations within the ARP.

The current ARP is constrained by loss of the majority of the annual funding and all dedicated AR personnel over the last 10 years. The ARP exists almost entirely on donations of material from local construction programs, and is exploring partnerships with local fishing clubs and organizations for targeted deployments near popular fishing areas.

When material is offered for donation, VMRC staff inspect the material prior to deployment for compliance with USACE and EPA regulations. The most common reason for rejection is crumbling pieces or exposed rebar which can be trimmed. VMRC staff is present for deployments and verifies the location and clearances of the materials deployed. Occasionally, the program receives donations by the U.S. Navy and local USCG of armored cable or concrete block.

Despite the reduced capabilities of the program in recent years, VMRC has focused on providing the deployment information in a more efficient way to the angling public. Beginning in 2017, new material locations were mapped using an online interactive mapping system and mobile application. These new interactive maps allow users to pinpoint GPS locations, zoom in and out of map features, and get metadata (such as date placed and amount of material) for each new deployment. Where available, previous deployment sites were incorporated into the new system.

## **Program Highlights**

In 2016 and 2017, the Virginia ARP was very active due to multiple large deployments of bridge material from the replacement of the Lesner Bridge in Virginia Beach.

Permits for the bridge replacement required donation of usable materials to the ARP. Including this requirement early in the process simplified the donation. ARP staff met with representatives from McLean Contracting Company prior to demolition to clarify the donation process, choose sites (and backup sites) within the permitted locations, and to agree on protocol for material inspection and deployment.

As the demolition progressed, VMRC staff had to be available to inspect material and monitor deployments in a timely manner so that construction would not be delayed. The material consisted of concrete girders, pieces of deck, pile caps, columns, and footings. Pre-deployment inspections were performed on every loaded barge of material. The most frequent issue found was protruding rebar, which was trimmed from the material prior to deployment. Planning around weather conditions was difficult, as the VMRC observation vessel is smaller and less able to handle the conditions than most of the construction vessels.

Two preferred sites were chosen for the materials, one on each side of the Chesapeake Bay. This was done to provide options for the deployment teams based on wind and wave conditions on the scheduled days of activity. Most of the material (almost 10,000 tons of concrete) was placed at the Cabbage Patch Reef, while several deployments were placed at Blue Rock Reef when weather conditions were more favorable there. In total, over 13,000 tons of material from the Lesner Bridge replacement were deployed to ARs in the Chesapeake Bay.

While this type of deployment is entirely dependent on local construction projects, it is the most frequent type of the deployment for the Virginia ARP. There are several upcoming construction projects in the area that include plans to donate any usable material to the ARP. Despite the sporadic availability of large-scale construction projects, the number of bridge and other large construction projects in the areas surrounding the Chesapeake Bay provide a large resource in potential material for the ARP.

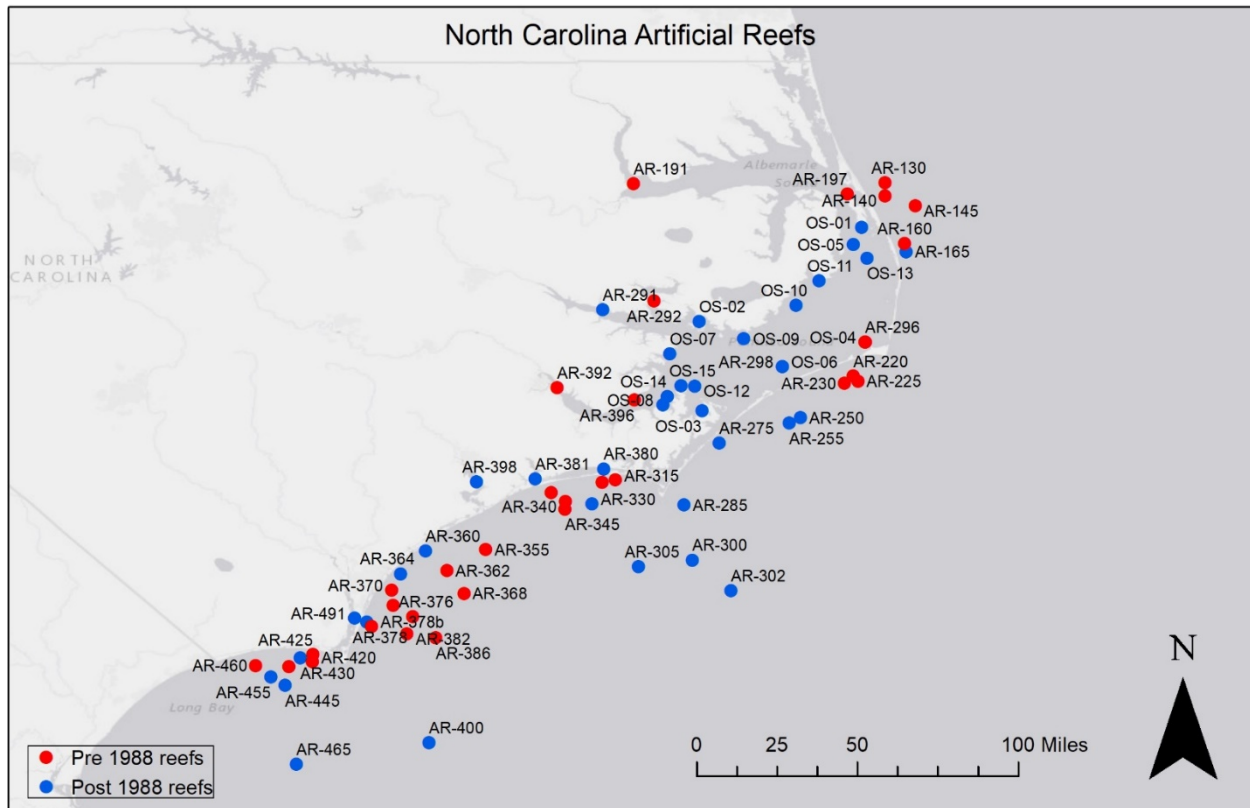
(pictures and maps are provided in a second document).

# NORTH CAROLINA

## Artificial Reef Program Overview

Artificial Reef Details	
<b>Number of Permitted Sites</b>	30 in federal waters 13 in offshore state waters 25 in inshore state waters
<b>Number of Mitigation Reefs</b>	0
Program Details	
<b>Artificial Reef Management Authority</b>	North Carolina Division of Marine Fisheries (NCDMF)
<b>Average Annual Operating Budget</b>	\$1,869,000
<b>State Artificial Reef Plan</b>	<a href="http://portal.ncdenr.org/c/document_library/get_file?uuid=d7ddb18-f546-48c8-98d1-4cc43016ed2a&amp;groupId=38337">http://portal.ncdenr.org/c/document_library/get_file?uuid=d7ddb18-f546-48c8-98d1-4cc43016ed2a&amp;groupId=38337</a>
<b>Reef Coordinator</b>	Jordan Byrum; <a href="mailto:Jordan.Byrum@ncdenr.gov">Jordan.Byrum@ncdenr.gov</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Jason Peters; <a href="mailto:Jason.Peters@ncdenr.gov">Jason.Peters@ncdenr.gov</a>
<b>Artificial Reef Website</b>	<a href="http://portal.ncdenr.org/web/mf/artificial-reefs-program">http://portal.ncdenr.org/web/mf/artificial-reefs-program</a>
<b>State Reef Publications</b>	<a href="http://portal.ncdenr.org/c/document_library/get_file?uuid=24160156-4b96-49e6-9126-4fa488b49cbb&amp;groupId=38337">http://portal.ncdenr.org/c/document_library/get_file?uuid=24160156-4b96-49e6-9126-4fa488b49cbb&amp;groupId=38337</a>
<b>Map of Deployments</b>	<a href="https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=3b27e8594cb6444c88b5525bf763aa55">https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=3b27e8594cb6444c88b5525bf763aa55</a>





ARs in North Carolina. Red circles indicate reefs placed before 1988, and blue circles indicate reefs placed after 1988.

### State of the North Carolina Artificial Reef Program

Since 1988 the North Carolina ARP has permitted and constructed 17 offshore reefs and 20 inshore ARs. These reefs have been distributed throughout the four major bays on the North Carolina coast and in each major sound. Various donated and pre-fabricated materials have been deployed on offshore and inshore reefs in efforts to create cost-effective habitat, such as recycled concrete, boat molds, and aircraft. Deployment locations and material types have historically been led by partnering groups with less focus on biological impact or material suitability. Monitoring of these materials for stability and longevity has limited the accepted material types to concrete structures and steel vessels, as all other types are susceptible to movement and quick deterioration.

In recent years, changes to legislation surrounding fishing license revenues have resulted in a large budget for materials and deployment for the ARP. This has enabled the ARP to regularly construct large projects offshore and continue to annually build small inshore reefs. In fall 2019, NOAA Fisheries issued a long-awaited programmatic Section 7 consultation, which evaluated the ARP’s impact to protected species. This increase in funding and streamlined permitting process have expedited reef building in North Carolina. Planning of ARs is now aimed at maximizing the habitat value through material comparison with nearby natural reefs, planned longevity, and strategic methods of creating complex vertical structure.

The ARP has conducted several projects on ocean reefs recently. Annual deployments of Eternal Reef Balls occur at AR-360, just offshore of Topsail Island. This is the result of a partnership between NCDMF and Eternal Reefs. The ARP also sank a 100 foot class tugboat, *Fort Fisher*, at AR-320 in September 2018. Almost 700 Reef Balls have been poured to be deployed at AR-250 and AR-255 off Ocracoke and AR-368 off Wilmington alongside a 180-200 foot class vessel. The construction of these sites was planned for early 2020 and is the second year of a four-year budget designated for reef material purchase, transportation, and deployment grant. Purchasing for a reef construction project is also in process at AR-165 off the Outer Banks using state funding secured by the Outer Banks Anglers Club. During late spring 2019, demolition of the Herbert C. Bonner Bridge over Oregon Inlet began. This bridge connected the islands of the Outer Banks and has recently been replaced with a new bridge. The old bridge is being disassembled and deployed at four nearby offshore reef sites: AR-130, AR-140, AR-145, and AR-160, totaling around 80,000 tons of concrete bridge material. As of November 2019 the project was around 50% complete.

In 2018, the ARP constructed two new inshore reefs, AR-380 and AR-381 in Bogue Sound. Both reefs are accessible by small boats or kayaks. AR-380 was constructed using 96 bay balls, and AR-381 used 50 NCDMF designed reef units. Each of these reefs were constructed with a division-owned vessel. Planning and purchasing for reef construction is underway for AR-197, located north of Roanoke Island, and will also be constructed using division-owned vessels.

The ARP continues to utilize a dedicated mapping vessel to survey all new reef enhancements and prospective sites. ARs are also monitored via SCUBA for material condition and by water quality sondes for seasonal changes in water quality. In early 2018, a new buoy system was implemented on all estuarine reef sites. These new buoys are small and can be serviced by outboard-powered vessels rather than a large self-propelled barge.

## **Program Highlights**

In early 2016, construction of a new bridge over Oregon Inlet on North Carolina's Outer Banks began. This project was the culmination of efforts between numerous contractors, state and federal agencies, local groups, and municipalities. After completion of the new bridge, the old bridge was scheduled for demolition. This was anticipated to produce approximately 80,000 tons of concrete that would cost millions to crush and transport to landfills for disposal. Because of a well-maintained relationship with the North Carolina Department of Transportation (NCDOT), the NCDMF ARP was included in these discussions. Through coordination between NCDOT, their contractor, and NCDMF, a plan was developed to dispose of the bridge material on four ARs located offshore of Oregon Inlet.

As the permit holders, a major concern for the ARP included routine issues of accuracy of deployment within AR boundaries and avoidance of pre-existing reef material. The bridge material is loaded onto 250-foot barges with around 1,500 tons of material per barge. These are towed offshore by a tugboat. The material is seated on a set of rails fitted with hydraulic cylinders used to push the bridge pieces off. Maneuverability and fine-scale positioning of a barge under tow are somewhat limited, particularly in

the ocean. In order to provide the highest likelihood of successfully placing materials in the desired area, deployment areas were designated as roughly 40 acres.

In order to ensure materials are deployed in the correct location and meet vertical clearance requirements, NCDMF staff are typically on-site for all deployments. Due to moving shoals and no regular maintenance dredging, Oregon Inlet is particularly dangerous and unpredictable. Decisions regarding reef deployments often are made with little advance notice. Deployment of bridge material is restricted by the tugboat's ability to navigate the inlet with the barge. The lack of regular schedule, long travel distance from NCDMF office, and concerns about marginal weather in smaller NCDMF vessels made on-site monitoring challenging. To alleviate concerns about monitoring deployments, NCDMF is instead using Automatic Identification System (AIS) tracking software to monitor the tugboat and barge. The software allows for real-time monitoring of the deployment vessel's location with accuracy within the minute, as well as visualization of the deployment boxes within each reef.

As of November 2019, bridge deployments were just over 50% completed, all occurring well within the permitted boundaries and with very little outside of the designated deployment areas. Sidescan and bathymetric surveys were conducted after about 35% of deployments were completed. These confirmed the AIS tracking records of the deployments remaining in or very near deployment boxes, and all material remaining within each reef boundary. Continual sidescan and bathymetric surveys will be conducted at completion intervals. The project is estimated to be completed by spring or summer 2020.

Figure ##: Blueprint from PCL Construction showing the deployment barge loaded with bridge material.

Figure ##: Deployment Plan for AR-140.

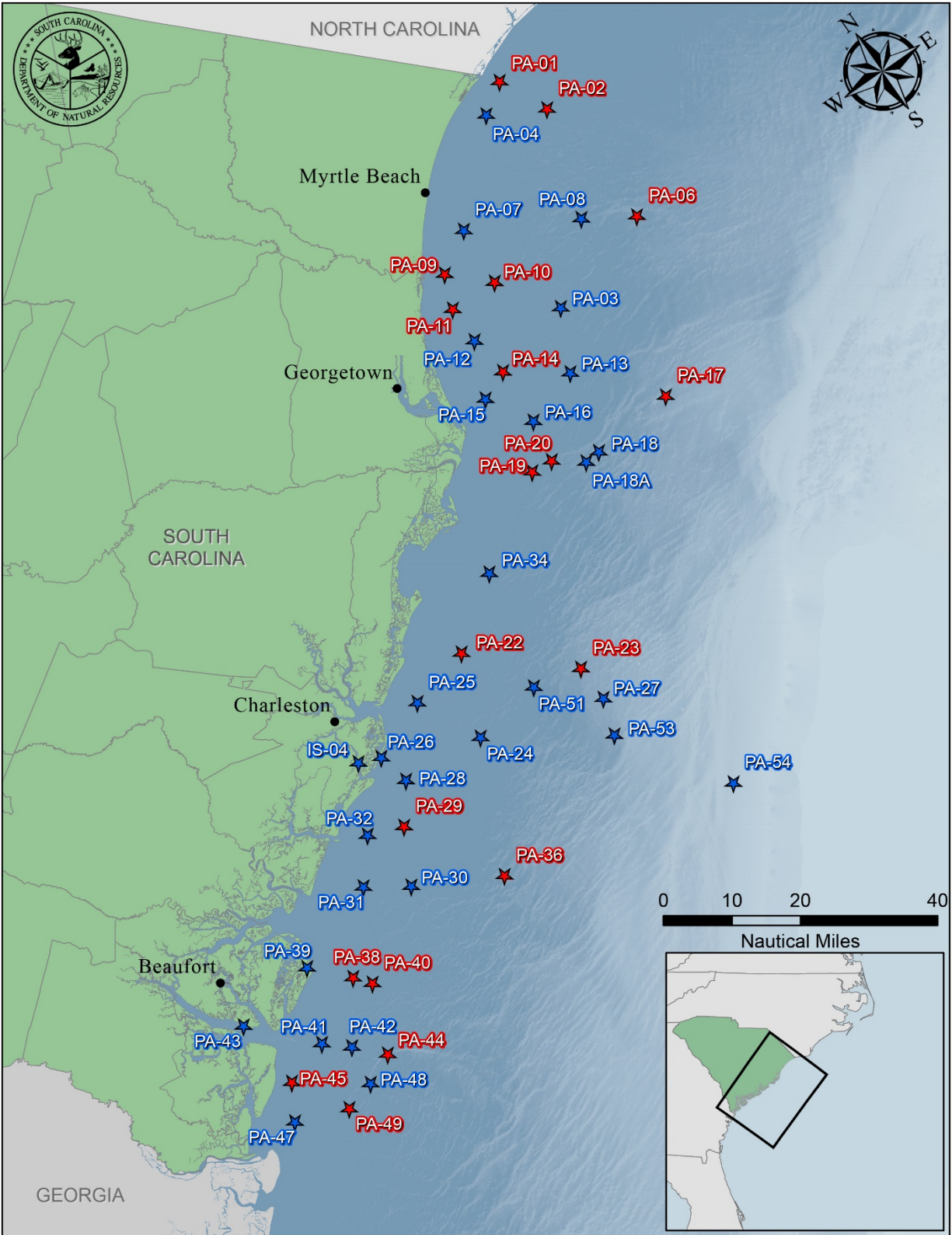
Figure ##: AIS Tracking of Deployment Barge on AR-160.

Figure ##: Sidescan imagery of AR-140 bridge deployments.

# SOUTH CAROLINA

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	35 in federal waters 9 in offshore state waters 3 in inshore state waters
<b>Number of Mitigation Reefs</b>	0
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	South Carolina Department of Natural Resources (SCDNR)
<b>Average Annual Operating Budget</b>	\$500,000
<b>Reef Coordinator</b>	Robert Martore; <a href="mailto:MartoreB@dnr.sc.gov">MartoreB@dnr.sc.gov</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Ben Dyar; <a href="mailto:DyarB@dnr.sc.gov">DyarB@dnr.sc.gov</a>
<b>Artificial Reef Website</b>	<a href="http://saltwaterfishing.sc.gov/artificialreef.html">http://saltwaterfishing.sc.gov/artificialreef.html</a>
<b>List of Deployments</b>	<a href="http://www.dnr.sc.gov/artificialreefs/docs/ReefGuide2015.pdf">http://www.dnr.sc.gov/artificialreefs/docs/ReefGuide2015.pdf</a>



ARs in South Carolina. Red indicates reefs placed before 1988, and blue indicates reefs placed after 1988.

## State of the South Carolina Artificial Reef Program

The South Carolina Marine Artificial Reef Program (SCMARP) was created in 1973 to enhance recreational fishing and diving opportunities in the state's coastal waters and to enhance marine and estuarine fishery stocks by increasing the amount of productive hard bottom habitat on the ocean bottom. Initially, SCMARP was minimally staffed with state-supported personnel, but had no dedicated funds to support reef construction activities. ARs were constructed solely through donated materials and services or through funds specifically appropriated for individual projects. Reef construction activities were, as a consequence, sporadic, with little long-term planning or coordination. Prior to 1988 there were 23 AR sites in South Carolina estuarine and offshore waters constructed primarily of surplus materials.

In 1991, the state enacted the Recreational Fisheries Stamp Program (now the Saltwater Recreational Fisheries License Program) whereby anglers were required to purchase a license to fish in saltwater off the coast of South Carolina. A portion of the funds raised was dedicated to finance the SCMARP. With the addition of dedicated funding AR construction expanded considerably across the state. To better manage this anticipated growth, the SCDNR drafted the South Carolina Marine Artificial Reef Management Plan (1991). The plan outlines appropriate materials for use in reef construction, cleaning protocols for surplus materials, and provides long-term planning goals for equitable distribution of reef sites and materials across all coastal counties. SCMARP currently maintains 47 AR construction sites along approximately 160 miles of coastline. These sites range in location from estuarine creeks to as far as 50 miles offshore. Each manmade reef site consists of a permitted area ranging from several thousand square yards to as much as 24 square miles. A total of approximately 40 square miles of coastal and open ocean bottom has been permitted. The increase in number of permitted reef sites is not the only measure of growth for the program. Since introduction of the Recreational Fisheries Stamp Program the average number of yearly deployments on these sites has risen from less than six per year to 16.

Since adoption of the Artificial Reef Management Plan, materials used in reef construction on South Carolina reefs have been much more highly regulated. Donated surplus items such as car and truck tires and automobile bodies were commonly used on the state's first ARs. Decades of observations of these materials has shown their limited value as long lasting reef structure, therefore, these items are no longer allowed for use in the SCMARP. Concrete structures, both surplus and designed, are currently the most commonly used materials in reef building. Surplus materials like culvert pipe or concrete junction boxes are usually donated to the SCMARP. Construction of designed structures are either contracted out or built in-house. SCMARP has designed, built, and tested over a dozen different designs of concrete reef habitat modules. Tens of thousands of these units have been placed on all reef sites across the state. Steel-hulled vessels are the next most commonly utilized material on South Carolina ARs. Hundreds of vessels ranging in length from 40-460 feet have been deployed on all reef sites across the state including barges, tugboats, freighters, trawlers, landing craft, as well as army and naval ships.

## Program Highlights

Figure ##. The design of concrete cones made by SCDNR allows stacking on a barge so that hundreds of units can be deployed at one time.

In addition to reef construction, SCMARP is responsible for monitoring and research activities on all South Carolina reef sites. SCMARP utilizes sidescan and hull mounted sonar, aerial surveys, and SCUBA to monitor colonization of reef materials, development of fish assemblages, and structural stability of reef materials. Past research projects have included examining heavy metals and PCBs in organisms found on ARs, feeding habits and trophic relationships of fishes on ARs, succession and biodiversity, and development of invertebrate assemblages. SCMARP is currently looking at the effect of invasive lionfish on ARs. To help better determine utilization patterns on ARs, acoustic receivers have been placed on numerous reef sites along South Carolina's coast to detect the presence of fish implanted with radio tags. They continue to show the seasonal presence of highly migratory species from as far away as Massachusetts and Florida, as well as local migrants (inshore to offshore) like sturgeon.

Many reef construction projects off South Carolina are conducted with assistance from outside organizations. From 1997-2014, SCMARP carried out joint reef building projects with the South Carolina Army National Guard. The Guard provided materials and assisted with de-militarization and cleaning of those materials while the state permitted all reef sites, provided permanent marker buoys on the sites, and conducts all follow up monitoring and underwater surveys. To date over 500 armored military vehicles, 250 steel shipping containers, and approximately 35,000 tons of concrete have been deployed through this cooperative program, creating over 1,120,000 cubic feet of new reef habitat. Nearly every AR site off South Carolina has received material from this project.

Figure ##. Armored personnel carriers are deployed on a South Carolina AR site.

Over the past decade, SCMARP has deployed numerous steel-hulled vessels with the assistance of the Coastal Conservation Association (CCA) of South Carolina. A typical project would involve reef program personnel identifying an appropriate vessel, coordinating either vessel purchase or donation, and arranging a contractor for cleaning, preparation, and towing of the vessel. Total costs would then be split between the SCMARP and CCA. Vessels procured through this partnership include barges, shrimp trawlers, landing craft, and tugboats. The long-term goal of this joint venture is to place smaller vessels on near-shore reefs and larger vessels on deeper reefs off each of South Carolina's coastal counties and, eventually, place CCA-sponsored material on every reef site off the state.

Figure ##. Two CCA sponsored 106-foot long tugboats sunk on 100-foot deep South Carolina ARs. The *General Oglethorpe* (top) and the *Grace McAllister* (bottom).

To better manage the use of permitted manmade reefs in offshore waters and to ensure their long-term viability the SCDNR has, through the South Atlantic Fishery Management Council (SAFMC), obtained special management zone (SMZ) status for 29 of the 35 permitted reef sites located in federal waters (the remaining, newer sites are now also under consideration by the Council for SMZ status). Fishing on those reef sites granted SMZ status is restricted to hand-held hook and line gear and spearfishing (without powerheads) and take is limited to the current recreational bag limits. In 2014 the program began construction of a first-of-its-kind deep-water (>300 feet) AR marine protected area (MPA) with the goal of creating spawning habitat for deep-water snapper and grouper species and protecting spawning stocks. To create structures of sufficient size to be effective as reef material in 300 feet of water items such as steel I-beams, cell phone towers, 40-foot long container boxes, and a surplus derrick crane were welded to the decks of two 260-foot barges to create vertical structures nearly 100 feet in height. Subsequently, a 170-foot long steel bridge truss, also welded to the deck of a barge, was added to the site named the Charleston Deep Reef, creating the first AR MPA in the nation. Since creation of



this protected reef site two of SCDNR’s experimental ARs, originally permitted to examine the feasibility and possible benefits of establishing no-take manmade reefs solely for the purpose of stock and habitat enhancement, have been granted Spawning SMZ status by the SAFMC. Like the Type II MPAs in deeper water, fishing for or possessing species from the Snapper-Grouper Management Unit is prohibited within these areas. South Carolina now has three ARs deployed and maintained exclusively for the protection and enhancement of its reef fish fisheries resources.

Figure ##. Barges with added profile and a steel bridge truss welded to a deck barge were used to create the Charleston Deep Reef Marine Protected Area. Photo credits: Robert Martore, SCDNR.

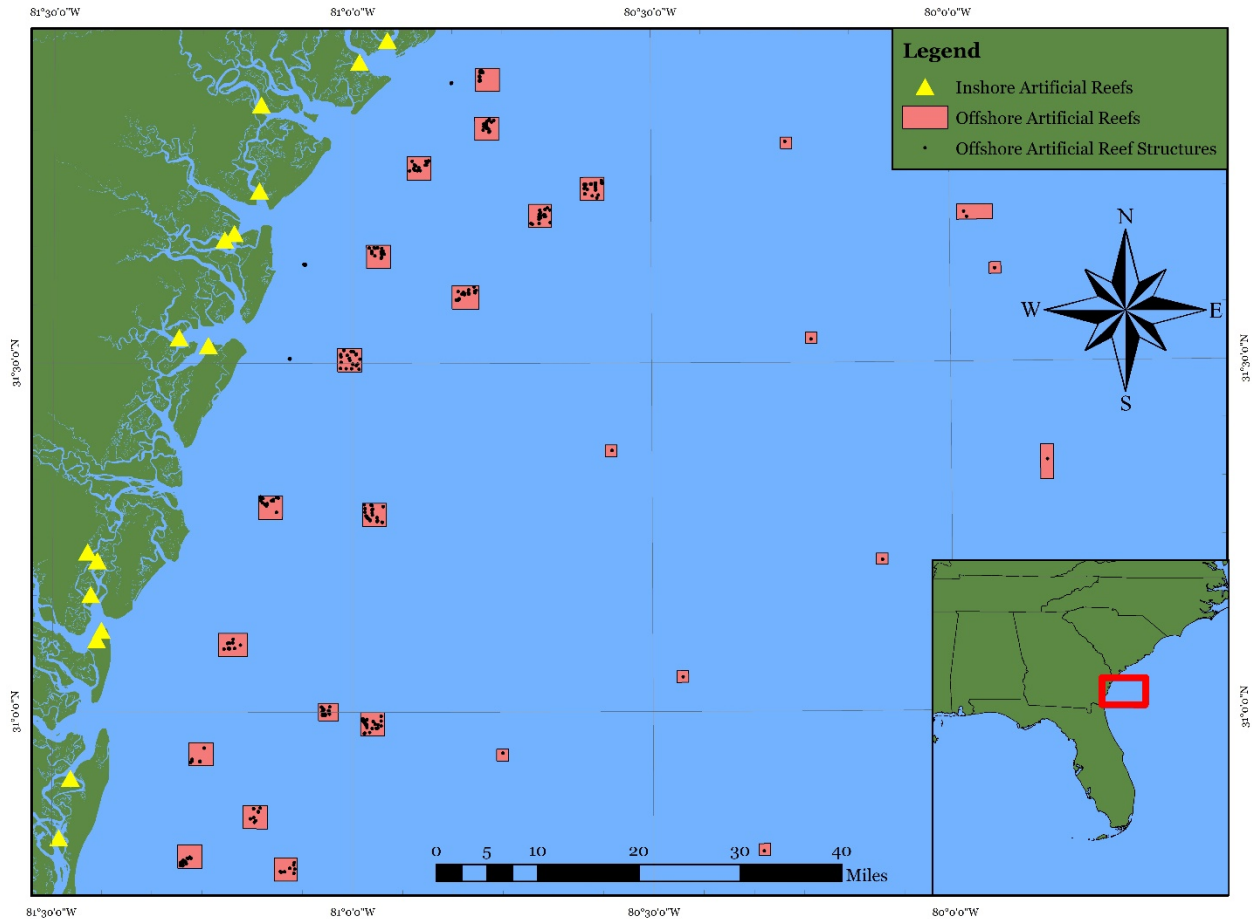
Figure ##. Warsaw grouper on the Charleston Deep Reef MPA. Photo credit: NOAA ROV footage, 2016.

# GEORGIA

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	28 in federal waters 3 in offshore state waters 15 in inshore state waters
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	Georgia Department of Natural Resources (GADNR), Coastal Resources Division under permits from the USACE and Georgia Coastal Marshlands Protection Act
<b>Reef Coordinator</b>	Paul Medders; <a href="mailto:Paul.Medders@dnr.ga.gov">Paul.Medders@dnr.ga.gov</a>
<b>Artificial Reef Website</b>	<a href="https://coastalgadnr.org/HERU">https://coastalgadnr.org/HERU</a>
<b>Map of Deployments</b>	<a href="https://coastalgadnr.org/sites/default/files/crd/Reefs/Reef%20Booklet%202016%20Update%20%28Edited%205-24-17%29.pdf">https://coastalgadnr.org/sites/default/files/crd/Reefs/Reef%20Booklet%202016%20Update%20%28Edited%205-24-17%29.pdf</a>  <a href="https://coastalgadnr.org/sites/default/files/crd/Reefs/InshoreReefWeb.pdf">https://coastalgadnr.org/sites/default/files/crd/Reefs/InshoreReefWeb.pdf</a>
<b>State Reef Publications</b>	<a href="https://coastalgadnr.org/HERU/downloads">https://coastalgadnr.org/HERU/downloads</a>





## State of the Georgia Artificial Reef Program

The Offshore Artificial Reef (OAR) Project in Georgia began in 1970 under the authority of the Georgia State Game and Fish Commission and is currently administered by GADNR's Coastal Resources Division (CRD). In the mid-1980s as inshore saltwater fishing's popularity grew in Georgia, so did anglers' desire for additional fishing sites. The CRD responded with Sport Fish Restoration, state, and private funds, to establish an Inshore Artificial Reef Enhancement Project.

The GADNR OAR Project is currently funded through federal dollars from the U.S. Fish and Wildlife Service's Federal Aid in Sport Fish Restoration Program. Historically, state funding was limited during the 1980s, although some budget increases were afforded sporadically during the 1990s and beyond through occasional legislative appropriations. Following the licensing of recreational fishermen in Georgia's marine waters in 1998, funding for the OAR Project increased and stabilized. In recent years additional funding has been generated for marine habitat enhancement through the sale of specialty license plates. The first projects funded through this revenue source are in progress.

Items used for AR enhancement in Georgia are typically materials of opportunity. For example, in 2015, the CRD deployed approximately 400 concrete transmission line poles and bases donated from the Georgia Power Corporation, the Georgia Transmission Corporation at AR F.

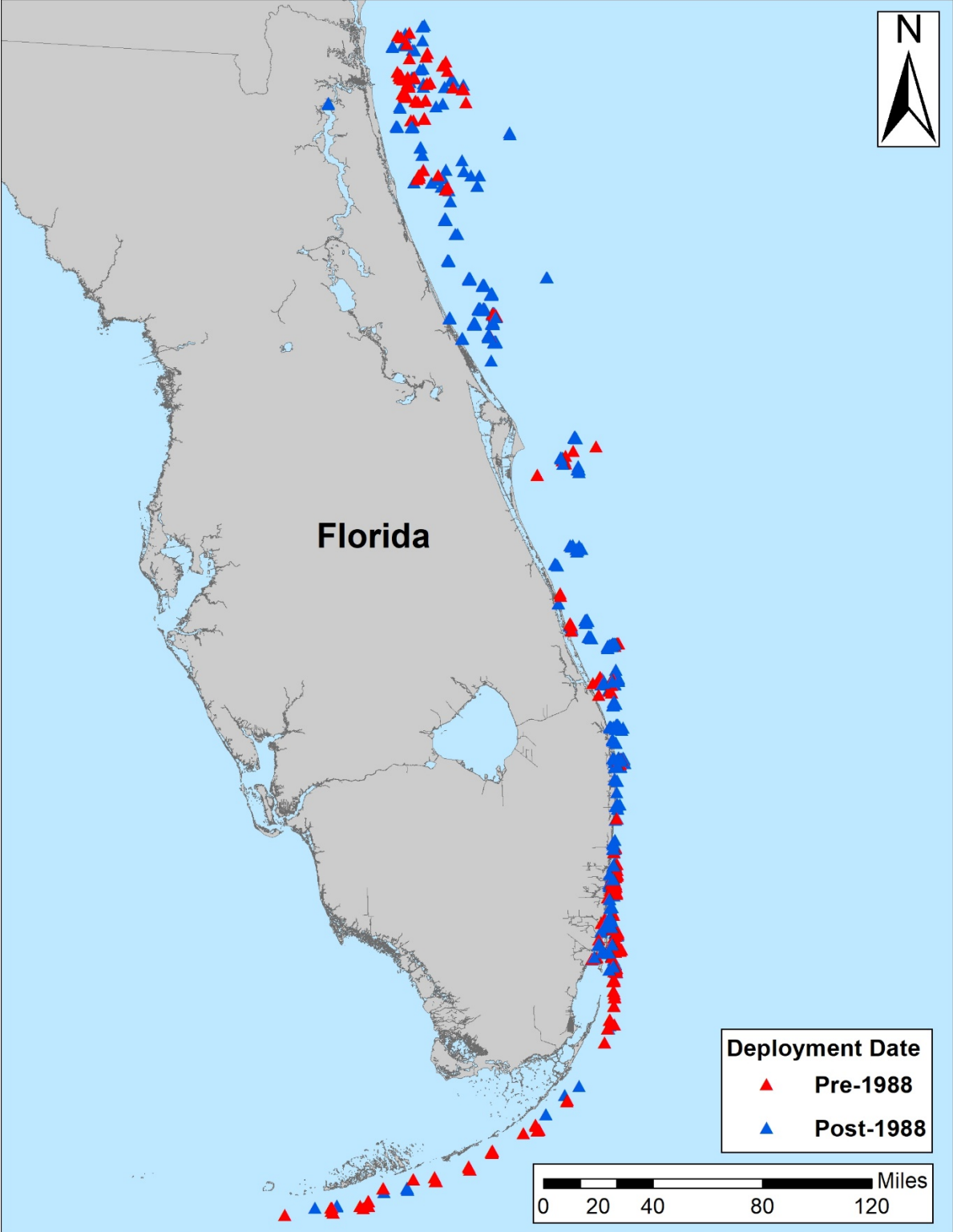
In 2018, the CRD deployed ~3,000 tons of concrete and metal materials, as an enhancement to AR DRH. The size of this deployment was only possible through the support of a numerous partners. This included funding from Federal Aid in Sport Fish Restoration, the Sapelo Saltwater Fishing Club, CCA of Georgia, and the Building Conservation Trust – CCA’s National Habitat Program – as well as the donation of materials from the City of Brunswick, Georgia and Claxton Poultry Company.

Partnerships also provide opportunities to acquire materials that are not normally available such as subway cars. Through a multi-year partnership with NYTA the CRD has deployed total of 182 subway cars, the most recent of which was a deployment of 44 cars at reef JY in 2009.

# FLORIDA

## Artificial Reef Program Overview

<b>Artificial Reef Details</b>	
<b>Number of Permitted Sites</b>	48 in federal waters 38 in offshore state waters 10 in inshore state waters
<b>Number of Mitigation Reefs</b>	Not tracked by the Florida Fish and Wildlife Conservation Commission (FWC) ARP
<b>Program Details</b>	
<b>Artificial Reef Management Authority</b>	The FWC ARP provides financial and technical assistance to local coastal governments, nonprofit organizations, and universities to develop and monitor ARs. ARs must be deployed in designated permitted areas that are regulated by the USACE and must also meet additional Department of Environmental Protection (DEP) permit requirements in state waters.
<b>Average Annual Operating Budget</b>	\$600,000
<b>Reef Coordinator</b>	Keith Mille; <a href="mailto:Keith.Mille@myfwc.com">Keith.Mille@myfwc.com</a>
<b>Shellfish Reef Program Contact (separate from the ARP)</b>	Katie Konchar; <a href="mailto:Katie.Konchar@myfwc.com">Katie.Konchar@myfwc.com</a>
<b>Artificial Reef Website</b>	<a href="https://myfwc.com/fishing/saltwater/artificial-reefs/">https://myfwc.com/fishing/saltwater/artificial-reefs/</a>
<b>Map of Deployments</b>	<a href="http://myfwc.maps.arcgis.com/apps/View/index.html?appid=4675e1db32ac43a9a4308e757965d17d%20%20">http://myfwc.maps.arcgis.com/apps/View/index.html?appid=4675e1db32ac43a9a4308e757965d17d%20%20</a>
<b>State Artificial Reef Plan</b>	<a href="https://myfwc.com/media/4889/flarstrategicplan2.pdf">https://myfwc.com/media/4889/flarstrategicplan2.pdf</a>



ARs on the east coast of Florida. Red triangles indicate reefs placed before 1988, and blue triangles indicate reefs placed after 1988.

## State of the Florida Artificial Reef Program

The FWC Division of Marine Fisheries Management administers a state ARP that was legislatively created in 1982. In November 2003, the FWC adopted a state Artificial Reef Strategic Plan developed by an advisory board of interested stakeholders. The plan listed several goals of the ARP to ensure that ARs are utilized to benefit Florida's economy and fisheries, while also being incorporated into research projects to obtain a better understanding of how ARs impact the ecological function of an area. Over the last 37 years, Florida has distributed more than \$26 million in state and federal funds to local coastal governments, non-profit organizations and state universities for AR-related activities. Florida tracks ongoing AR deployments using patch reef designations, which is defined as any material within 150 feet of each other. Of the greater than 3,600 artificial patch reefs that have been constructed and deployed offshore of Florida: 38% are secondary-use concrete materials, 33% are prefabricated concrete modules, 15% are vessels/barges, 8% are metal, 4% are boulders, and 2% are other materials. Each year, approximately 140 patch reefs are added in Florida waters.

The ARP allocates federal funds from the U.S. Fish and Wildlife Service Federal Aid in Sport Fish Restoration Program through an annual grant cycle, which is awarded to applicants based on a suite of criteria. The funds available for this program have been steadily funded for the past decade, providing funding for typically seven to eight construction projects and two to three monitoring projects annually. Competition for grant funds is high due to rising AR deployment costs and the lack of available material, so the total funding requested through the grant program is typically double the available funds. In addition to managing annual grant awards, the FWC ARP also conducts fish censuses, sidescan sonar mapping, material evaluation, and other monitoring activities. These activities are conducted in-house by small team within the ARP, which consists of an environmental administrator, two permanent fishery biologists and one temporary fishery biologist. The information gained from these monitoring activities is used to evaluate the change in fish community spatially and temporally, impacts from environmental perturbations (e.g. hurricanes, red tide, etc.), and durability of various AR material. One of the current monitoring projects being conducted by FWC staff is using underwater hydrophones to record boat noise in proximity to ARs to quantify and compare boater visitation rates at different reef sites. FWC also recently funded another project that will evaluate the difference in permit (*Trachinotus falcatus*) spawning aggregation behavior and fishing mortality at natural and AR sites in the Florida Keys. These monitoring projects are examples of how the FWC ARP selects specific projects for funding to help achieve AR and fisheries management objectives.

In addition to grant management and monitoring, another important role of the FWC ARP is to provide opportunities for stakeholders to discuss issues related to AR management. The FWC ARP and Florida Sea Grant organize regional AR workshops every two years, and a statewide AR summit every five years. These venues provide an opportunity for a diverse group of stakeholders (e.g. county managers, fishers, non-profit organizations, researchers, etc.) to disseminate information regarding AR best practices, new research findings, and future challenges for AR development in Florida.

## Program Highlights

With over 3,600 AR patch reefs state-wide, Florida has a diverse assemblage of AR habitats between the Atlantic Ocean, Gulf of Mexico, and estuarine regions throughout the state. Recent trends include an

increase in the use of concrete module ARs, including more requests for artform ARs (e.g. statues), and an increase in efforts for more purpose-built ARs to provide habitat to satisfy fisheries management objectives. Large steel vessels continue to be popular and deployed statewide despite rising costs to prepare and deploy. Large bridge demolition projects continue to comprise the greatest tonnage of AR deployments overall, while use of secondary-use concrete such as concrete culverts and manholes are in decline due to lower availability from an increase in concrete recycling. The use of ARs as mitigation to offset impacts from beach nourishment or ship groundings continues, with advancements in material design such as the ability to be used as nurse areas for reef-building corals. The following paragraphs spotlight three recent projects off southeast Florida.

### **Palm Beach Reef Darts**

During 2017, Palm Beach County worked with one of the oldest recreational fishing clubs in Florida (Palm Beach Fishing Club) to design a “reef dart” module that uses concrete power poles to create an array of high relief features to attract grouper and pelagic fish species. Ultimately, the Palm Beach Fishing Club want to focus on building deepwater reef habitat to attract snapper and grouper species at depths greater than 400 feet. There have been three deployments of this module type as of 2019, so the long-term success of this module type is still unknown.

The first version of the reef darts was deployed offshore Palm Beach in a depth of 105 feet. Post-deployment dives observed that several of the poles had snapped during deployment upon impact to the seafloor, and the reef darts were placed too far apart (>100 feet). The reef dart design was upgraded with a reinforced power pole base to prevent it from breaking on impact, and a larger (40 feet) power pole made from pre-stressed concrete. Each module measures 45 feet tall, weighs 8 to 10 tons, and costs ~\$3,500 to create. The improved reef darts were deployed in the same location as the first deployment but were placed closer together in order to create more complex habitat. The strong current made the deployment challenging and some of the reef darts were damaged when they landed on top of one another during deployment. The majority of the reef darts were undamaged and provide the relief and complexity that the fishing club was hoping for.

The most recent deployment of reef darts occurred in 2019 offshore Palm Beach at a depth of 500 feet. The deeper reef darts were deployed to create habitat that was attractive to deep water grouper species. Researchers from the Florida Fish and Wildlife Research Institute are planning on placing acoustic receivers at both the shallow and deep reef dart site to track fish movements around each site. In addition, the West Palm Beach Fishing Club is planning to deploy deep water video gear to monitor changes in the fish community at the deep reef dart site.

The reef dart initiative is a great example of the collaboration between local fishermen, county managers, and state agency representatives to create ARs to achieve a specific goal defined by the local stakeholders. Additionally, the partners involved have plans to monitor the sites to evaluate project performance, user satisfaction, and to determine if their goal is being met.

Figure ##. Reef darts that were deployed offshore Palm Beach, where some of the structures were damaged during deployment. Each structure is around 30 feet tall and was designed by a local fishing club. Photo credit: FWC.

## **USS Vandenberg**

The U.S. Navy and the U.S. DOT Maritime Administration (MARAD) will occasionally have large decommissioned military vessels available as a donation to the states for shallow water ARs (less than 500 foot depth) as an authorized disposal option. Availability of large military ships for donation is typically greatest when the value of scrap steel and other metals is low, resulting in high costs to otherwise scrap the decommissioned vessels. A 540 foot long former missile tracking ship, the *USS Vandenberg*, became available from MARAD for reefing in 2001 but the estimated cost of cleaning and deploying the vessel was \$5.69 million. The high cost was due to the size of the vessel, the deteriorating hull and cleaning of PCBs. MARAD committed to covering a portion of the cleanup costs, but funds had to be raised by Monroe County, the City of Key West, the state of Florida (FWC and the Florida Office of Tourism and Economic Development), and private donors before the title would be transferred.

By the time the *Vandenberg* entered dry dock in April 2007, PCB remediation costs were significantly higher than expected and the vessel was eventually seized by the U.S. Marshal due to back bills owed to the shipyard. FWC and Florida's Governor's Office approved another \$2.6 million to salvage the project and cover outstanding debts. The *Vandenberg* was towed to Key West in 2009 where a series of walkthrough inspections were conducted by FWC and the EPA to ensure cleanup was completed in accordance with all state and federal regulating requirements. In May 2009 the *Vandenberg* was successfully sunk within a designated permitted area six miles off Key West at a depth of 142 feet within the boundaries of the Florida Keys National Marine Sanctuary.

In September 2017, a major Category 4 storm (Hurricane Irma) impacted the Florida Keys. Post-hurricane dives on the *USS Vandenberg* indicated that the vessel was still upright but it had shifted towards deeper water and one of the radar dishes was ripped off. However, this vessel still remains an iconic dive spot for visitors and residents of the Florida Keys. Divers visiting the vessel can observe a wide range of reef fish species from smaller tropical fish (damselfish, *Chromis*, butterflyfish, etc.), resident Goliath grouper, and large pelagic species (amberjack, sharks, horseeye jacks, etc.). A socio-economic study also found that the *Vandenberg* contributed to significant increases in business for dive operators resulting in an increase in sales, income, and employment in the Florida Keys economy.

Figure ##. Bow of the *USS Vandenberg* offshore Key West after it was deployed in 2009. Photo credit: FWC.

## **Boca Step Reef**

Palm Beach County has been constructing nearshore limestone boulder reefs since 2009 to create "stepping stone" reefs to promote offshore movement of recreationally and commercially important fish species from inshore nursery habitat. Southeast Florida has experienced a decline in nearshore hard bottom habitat due to beach nourishment, so the step reef concept is trying to regain some of this critical habitat. Four of the nearshore boulder reefs were monitored by a non-profit organization in 2018, and the limestone boulder sites had the highest average abundance of fish compared to other reef types and over 40 unique fish species between the reef sites. The fish species observed at these sites included schooling baitfish as well as juvenile/sub-adult grunts, wrasses, jacks, and snapper.

However, it has yet to be determined as to whether these nearshore reefs have increased the density of fish species at adjacent offshore reefs.

The FWC ARP funded Palm Beach County to deploy another nearshore limestone boulder reef in 2018. The limestone boulders were deployed in a depth of 35 feet to create a patch reef consisting of 15 foot tall limestone boulder piles that are approximately 100 feet apart. Each pile is comprised of approximately 250 tons of 3-4 foot diameter boulders at the cost of about \$60,000 per patch reef (\$240 per ton). They were placed in an area devoid of hard bottom so there would be no unintentional impacts to the existing natural reefs in the region. Monitoring of over two dozen ARs offshore Palm Beach County conducted by a non-profit organization in 2015 found that the three AR sites with the highest abundance of fish were all step reefs.

Figure ##. Florida Fish and Wildlife biologist inspecting the recently deployed Boca Step Reef boulders in Palm Beach. Photo credit: FWC.



# Conclusion

ARPs on the Atlantic coast have seen many changes over the past three decades. These range from changes in material selection, usage of new technology, and increasing complexity in permitting reef projects. Despite some differences in program structures, funding, and objectives, many similarities exist across state lines.

Since 1988, program use of most reef materials have shifted towards those with superior performance value such as heavy concrete structures, aggregate rock, and steel vessels rather than tires, vehicles, and other assorted scrap metal which lack stability and durability. This transition was just beginning at the time the state profiles were originally published in 1988. With recently updated material guidance (Guidelines for Marine Artificial Reef Materials citation) there is reef building consistency among state programs on the Atlantic and Gulf coasts. Interestingly, in the 1988 report, several states described plans to build prefabricated concrete structures. These structures are ubiquitous among reef programs today.

Nearly every state has embraced new technologies like ROVs, underwater video cameras, sidescan sonar, multi-beam surveys, and GPS to designate new sites, map existing materials, and evaluate established reef habitats. These technologies provide considerably more information about reef sites than was previously known and provide more accurate methods (GPS) for users to locate deployed materials. Many state reef programs have developed reef guides and other related online and printed reef resources so anglers and divers can identify reef site locations and compositions.

Over the past three decades it's become commonplace to conduct bathymetric surveys and benthic characterizations before reef construction permits are authorized. Survey requirements are not the only changes to the permitting process. In many states, USACE now requires consultation with NOAA Fisheries Protected Resources Division to assess impacts of ARs to protected species and essential fish habitat. Additional consultations are also required with many state and federal agencies including but not limited to the USCG, EPA, U.S. Fish and Wildlife Service, and National Ocean Service. Mapping technology advancements have improved each reef program's ability to identify key areas for AR enhancement, avoid impacts to essential fish habitat, and adhere to changing state and federal requirements. However, this process has slowed reef construction in several states and is a topic of increased concern for ARPs. With the limited resources and budgets for many ARPs, meeting these requirements has significant costs and ultimately decreases the programs' ability to effectively enhance fish habitat through AR projects.

Though there are many differences in individual state reef program characteristics (e.g. size and funding), some overarching themes are consistent. Large reef projects are often made possible through donation of acceptable materials and services from local entities such as the state's DOT or private companies. Reefing of project material (i.e. concrete and steel bridge material) is most attractive to companies looking for a low-cost disposal method. Many projects are located on or near the water which facilitates the transport of the material to a reef site. State programs typically do not have funding to conduct projects of this scale on their own.

Research needs are broadly similar among states. Some reef programs are affiliated with local universities interested in evolving reef research issues. Emphasis is given to existing habitat enhancement, fisheries production, population dynamics, and reef usage by fishermen and divers.

ARPs continue to provide beneficial use of aquatically recycled materials of opportunity that create new research, fishing, and diving opportunities in the coastal U.S., as well as contribute to responsible fisheries management.

## Appendix: Abbreviations and Acronyms

*(in order of appearance)*

ARP: artificial reef program

AR: artificial reef

MA DMF: Massachusetts Division of Marine Fisheries

USCG: United States Coast Guard

UVC: Underwater Visual Census

BRUVS: Baited Remote Underwater Video Stations

NEU: Northeastern University

EPA: Environmental Protection Agency

DOT: Department of Transportation

RI DMF: Rhode Island Division of Marine Fisheries

EFH: Essential Fish Habitat

SHU: Sacred Heart University

USACE: United States Army Corps of Engineers

CIRCA: Connecticut Institute for Resilience and Climate Adaptation

NYSDEC: New York State Department of Environmental Conservation

GEIS: Generic Environmental Impact Statement

SGEIS: Supplemental Generic Environmental Impact Statement

ROV: Remote Operated Vehicle

NOAA Fisheries: National Oceanic and Atmospheric Administration National Marine Fisheries Service

MORF: Moriches Offshore Reef Fund

Reef Initiative: Governor Andrew Cuomo's Artificial Reef Initiative

NYPA: New York Power Authority

NYTA: New York Transit Authority

NYDOT: New York Department of Transportation

NYCC: New York Canals Corporation

NYC: New York City

NAGD: National Grid

NJDFW: New Jersey Division of Fish and Wildlife

DE DFW: Delaware Division of Fish and Wildlife

RFP: request for proposals

PCB: polychlorinated biphenyl

VMRC: Virginia Marine Resources Commission  
ODU: Old Dominion University  
NCDMF: North Carolina Division of Marine Fisheries  
NCDOT: North Carolina Department of Transportation  
AIS: Automatic Identification System  
SCDNR: South Carolina Department of Natural Resources  
SCMARF: South Carolina Marine Artificial Reef Program  
CCA: Coastal Conservation Association  
SAFMC: South Atlantic Fishery Management Council  
SMZ: Special Management Zone  
MPA: Marine Protected Area  
GADNR: Georgia Department of Natural Resources  
OAR: Offshore Artificial Reef  
CRD: Coastal Resources Division  
FWC: Florida Fish and Wildlife Conservation Commission  
DEP: Department of Environmental Protection  
MARAD: Maritime Administration