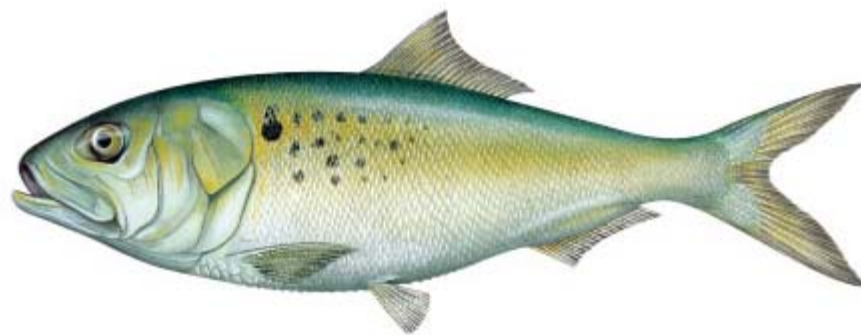




Timeline for Atlantic Menhaden Action



Atlantic Menhaden Management Board
October 2016

Winter Meeting 2017



1. Review public comment on PID
2. Board provides direction on what management options should be included in Draft Amendment 3
3. Review results of the socio-economic study

Spring Meeting 2017



1. FMP Review of the 2016 Fishery
 - Review 2016 landings and quotas for 2017
2. Board provides projection runs for the 2018 TAC
3. BERP Working Group update

Summer Meeting 2017



1. Consider approving draft Amendment 3 for public comment
2. Consider approving 2017 stock assessment update for management use
3. Set fishery specifications for 2018

Annual Meeting 2017



1. Review public comment on draft Amendment 3
2. Select final management options and implementation deadline

BERP Working Group



2017

- In-person meetings and conference calls to review the multi-species catch-at-age model and the production model with time-varying parameters

2018

- Two data workshops

2019

- Two assessment workshops
- Peer-review workshop at end of year which includes review of BAM model



QUESTIONS?



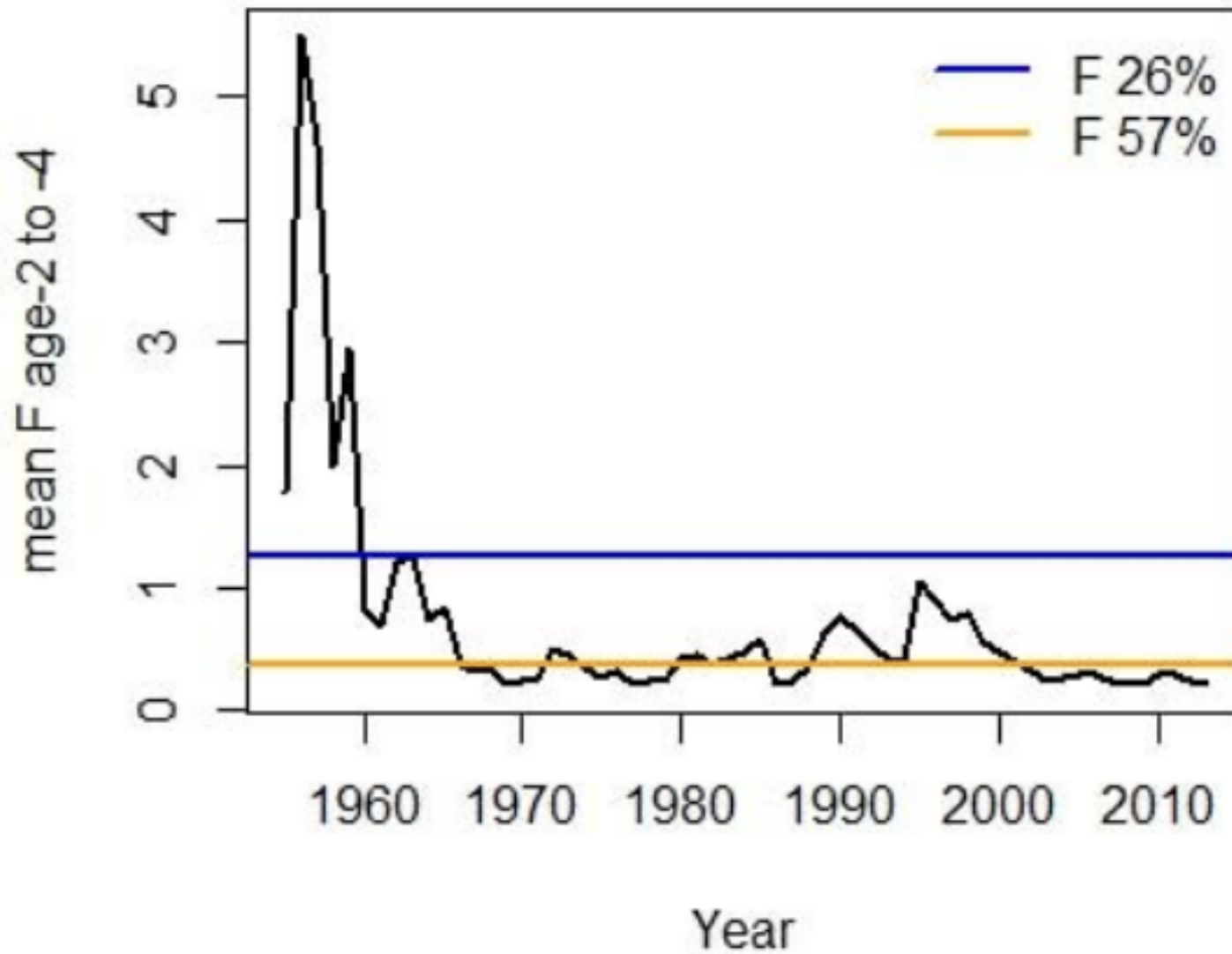
Atlantic Menhaden Technical Committee Stock Projection Review

October 2016
Bar Harbor, ME

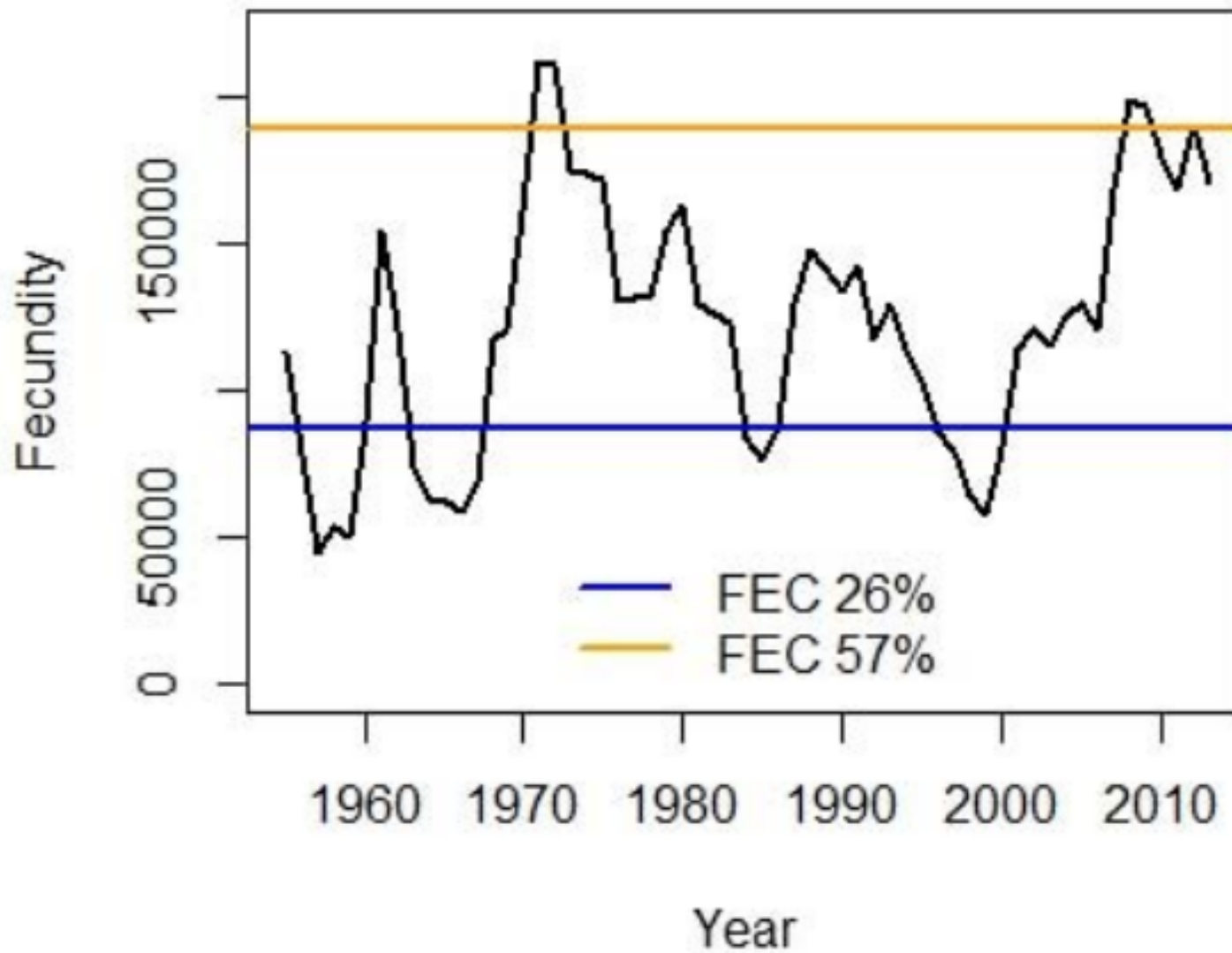


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Current Stock Status



Current Stock Status



Projection Runs Performed



| Projection Run | TAC | Risk of exceeding Ftarget | Risk of exceeding Fthreshold |
|-------------------------------|---------|---------------------------|------------------------------|
| 1. Current TAC | 187,880 | 13% | 0% |
| 2. 5% increase to current TAC | 197,274 | 17.5% | 0% |
| 3. 10% incr to current TAC | 206,668 | 20.5% | 0% |
| 4. 20% incr to current TAC | 225,456 | 27.5% | 0% |
| 5. 30% incr to current TAC | 244,244 | 38% | 0% |
| 6. 40% incr to current TAC | 263,032 | 48.5% | 0% |

Projection Runs Performed



| Projection Run | TAC | Risk of exceeding Ftarget | Risk of exceeding Fthreshold |
|--|---------|---------------------------|------------------------------|
| 7. 50% probability of being below the F target in 2017 | 267,500 | 50% | 0% |
| 8. 55% probability of being below the F target in 2017 | 259,500 | 45% | 0% |
| 9. 60% probability of being below the F target in 2017 | 250,100 | 40% | 0% |

Projection Caveats



- Did not include structural (model) uncertainty
- Conditional on set of functional forms (e.g., selectivity, recruitment)
- Fisheries were assumed to continue at current proportions of allocation (Bait and Reduction) using current selectivity
 - New mgmt regs that alter the proportions or selectivities would likely affect projection results

Projection Caveats



- If future recruitment is characterized by runs of large or small year classes, possibly due to environmental or ecological conditions, stock trajectories may be affected
- Projections apply the Baranov catch equation
 - Assumes mortality occurs throughout the year
 - If assumption is violated (e.g., seasonal closures), additional, unquantified uncertainty will be introduced into the projection results

Juvenile Indices



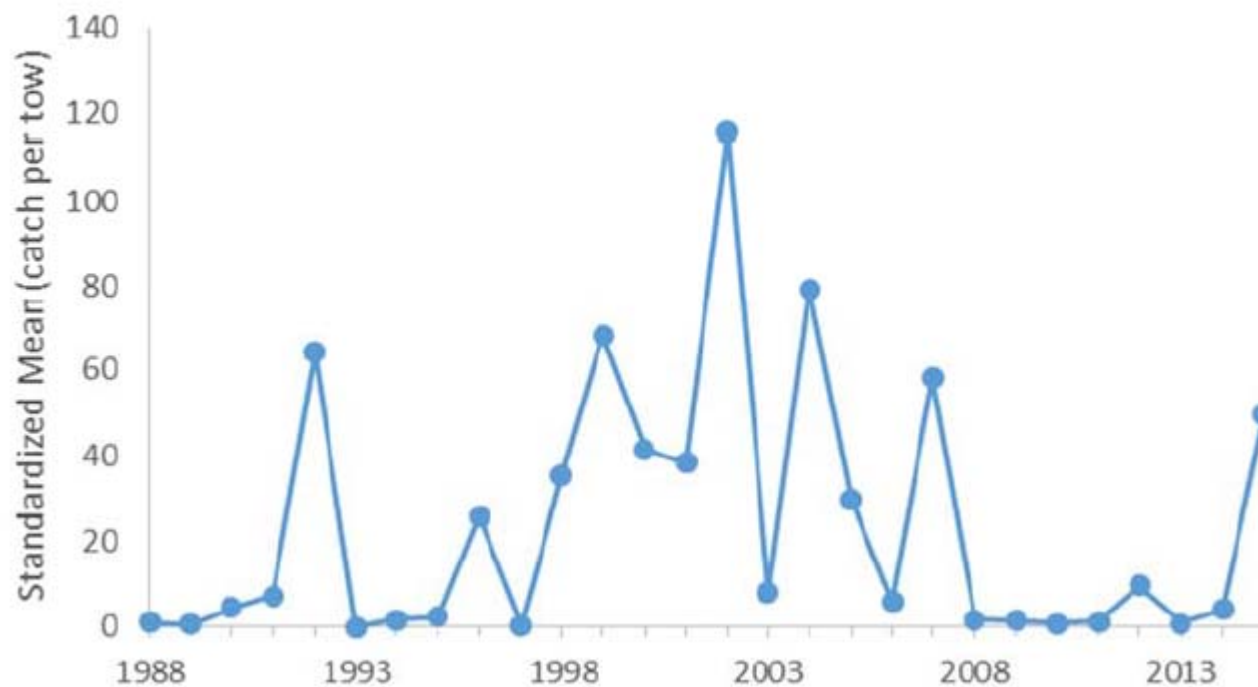
- August 2016 meeting, the Menhaden Board requested the TC provide information on recent recruitment trends
- Recruitment info derived from BAM Model and can only be updated during an assessment
- TC thought investigating juvenile abundance indices (JAIs) as a proxy for recruitment

Juvenile Indices

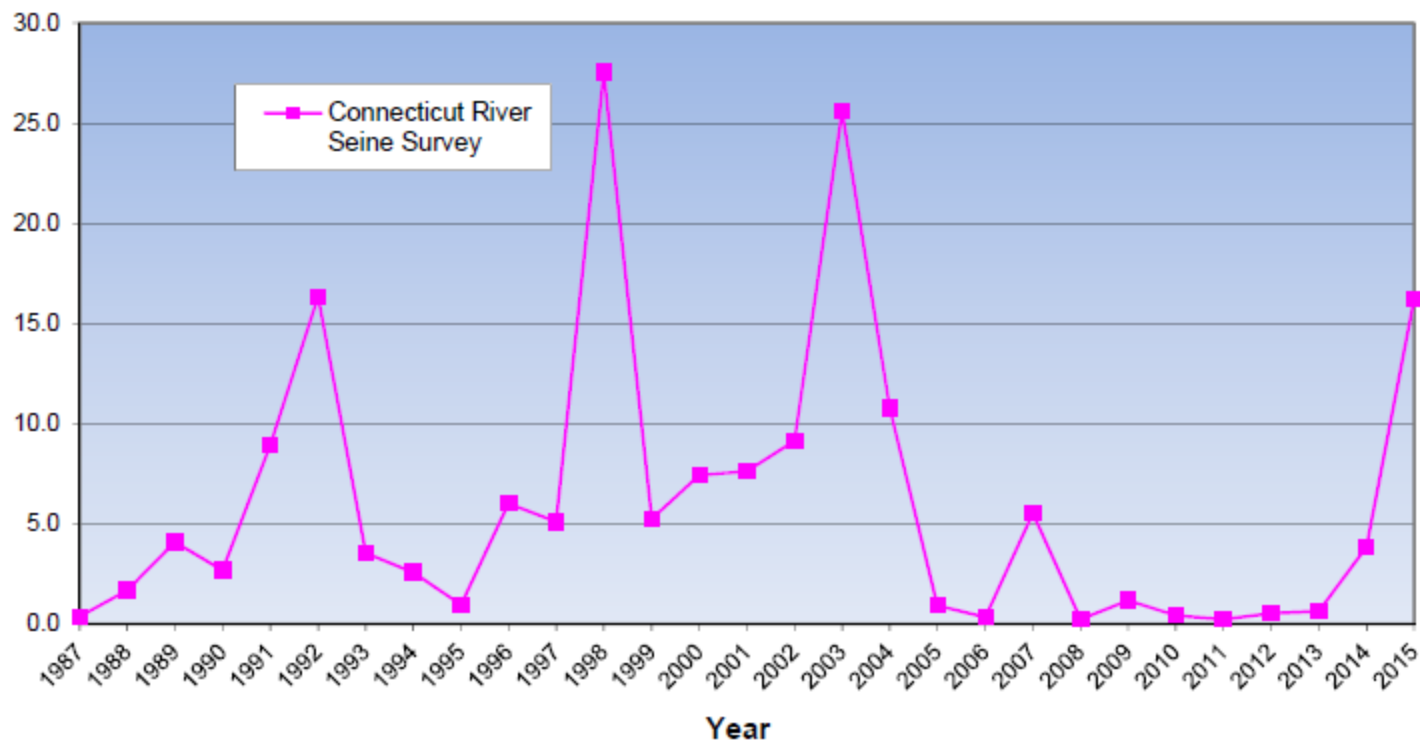


- Only 8 indices from six states could be updated in time
- These juvenile indices are presented in an attempt to provide the Board with some information on the juvenile portion of the menhaden population

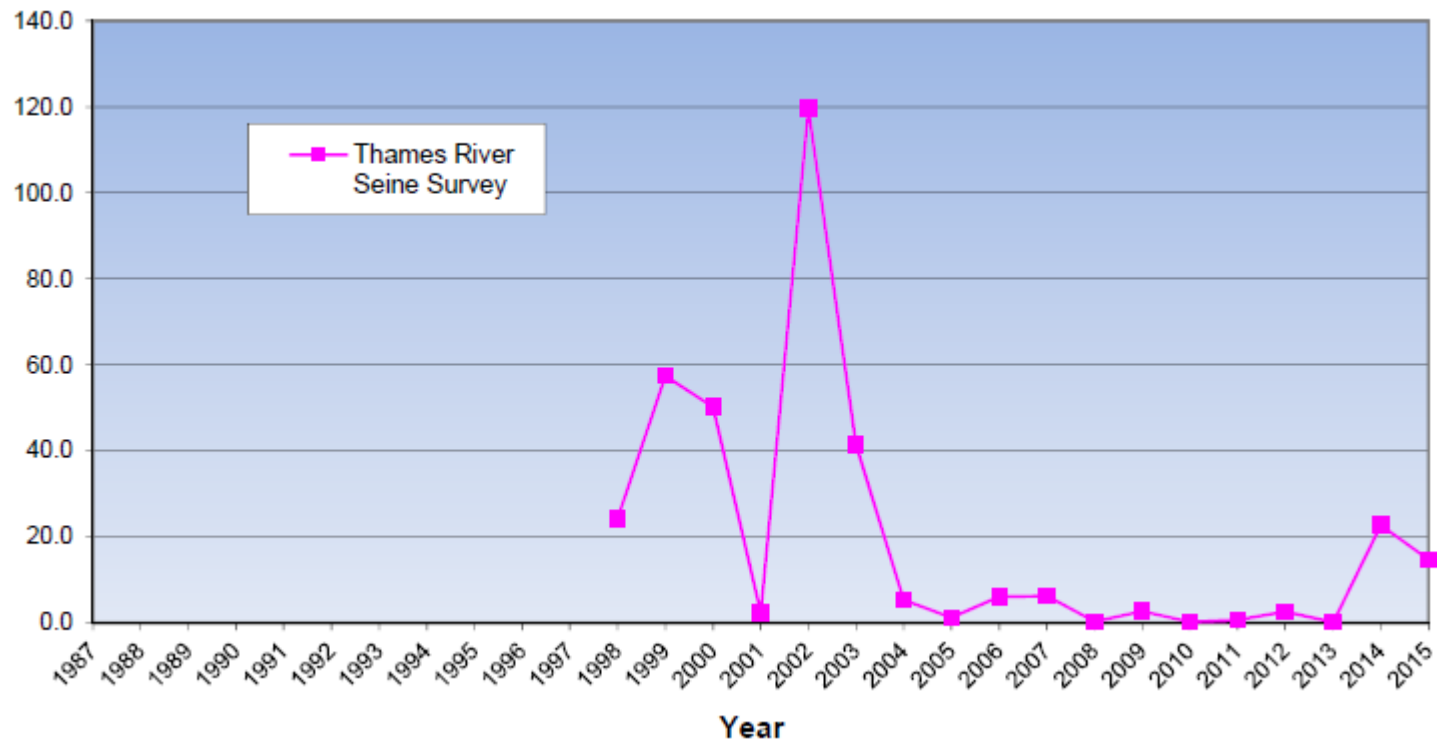
Juvenile Indices – RI Seine



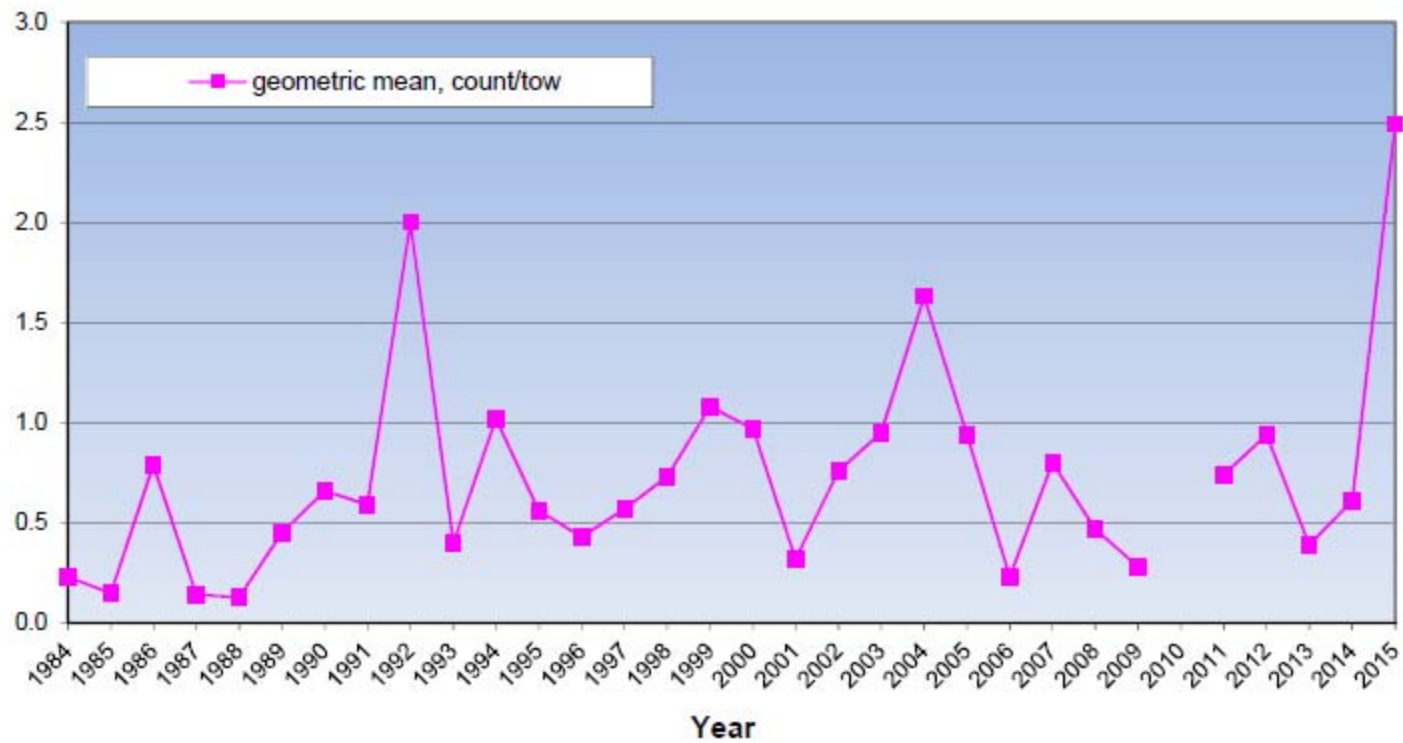
Juvenile Indices – CT Seine



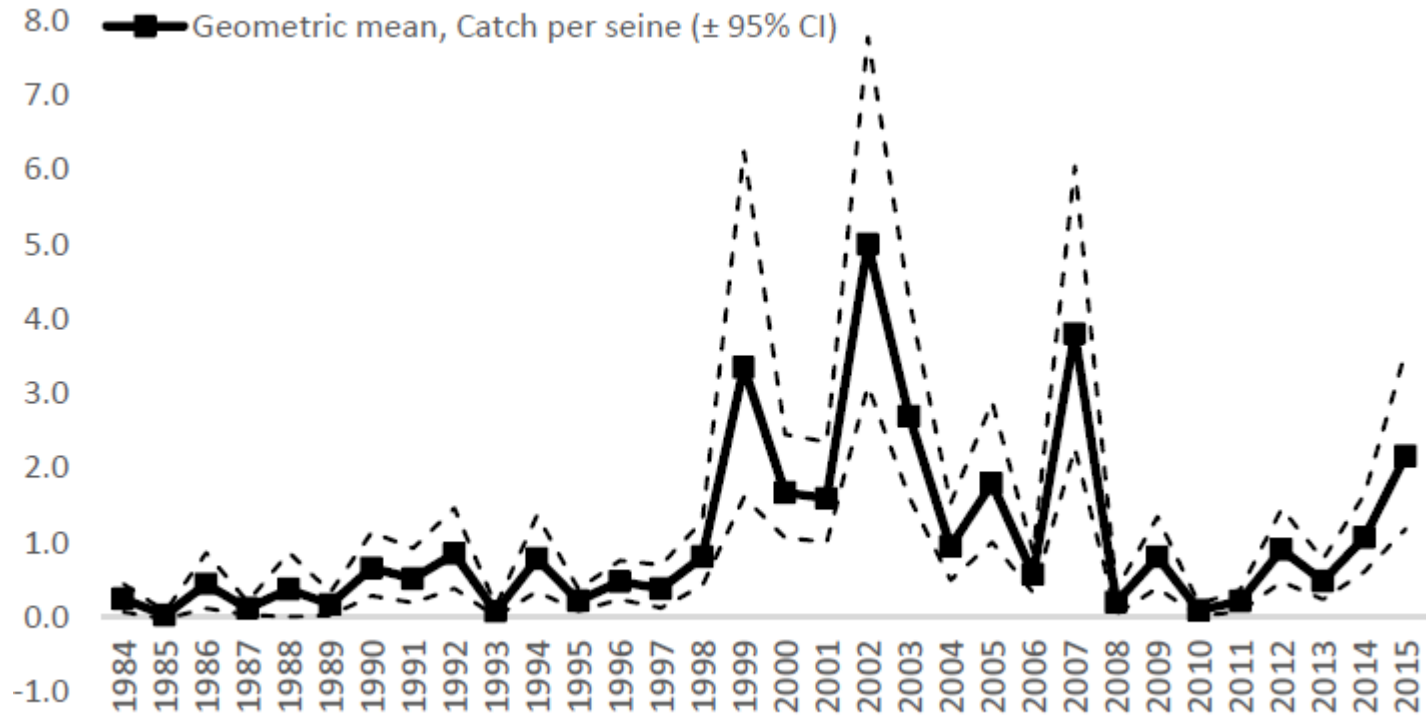
Juvenile Indices – CT Seine



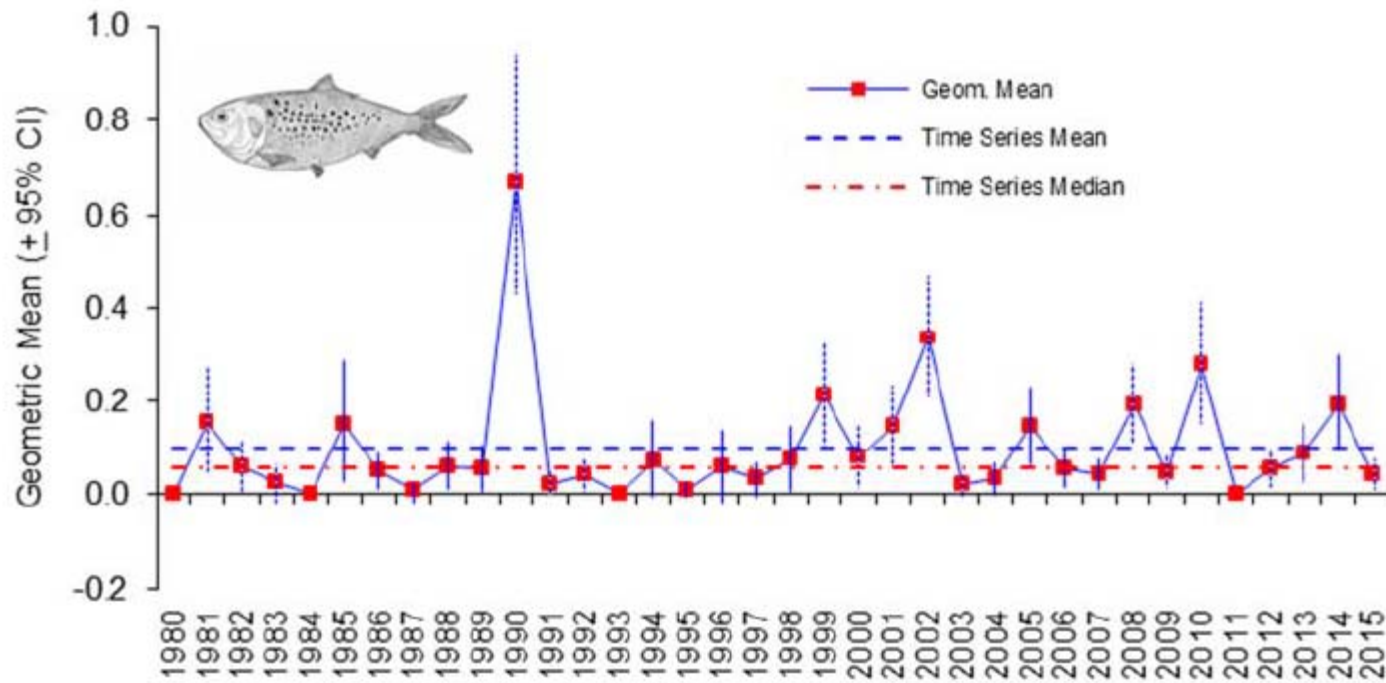
Juvenile Indices – CT Trawl



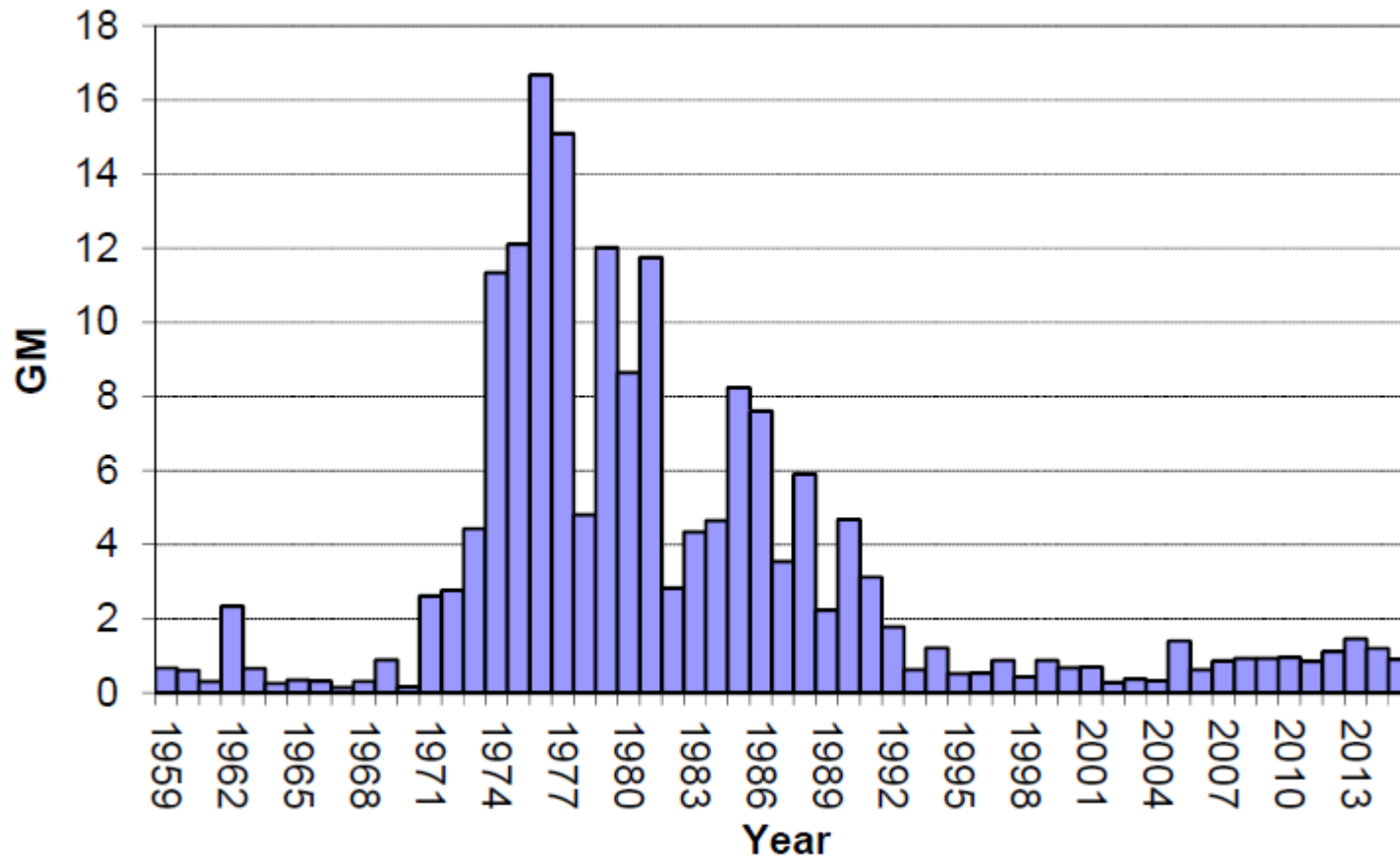
Juvenile Indices – NY Seine



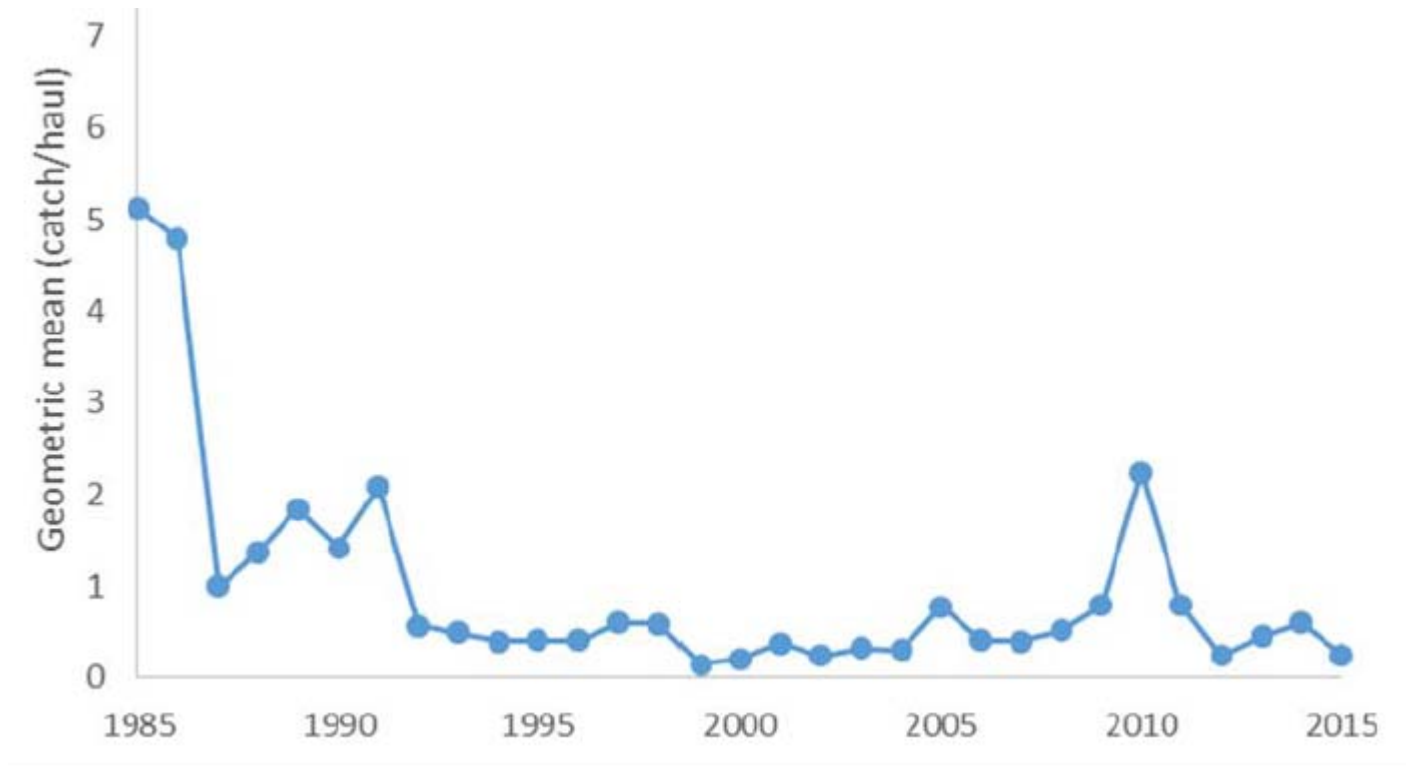
Juvenile Indices – DE Trawl



Juvenile Indices – MD Seine



Juvenile Indices – VA Seine



Summary



- TC highlights that these indices do not provide a comprehensive picture of juvenile abundance along the coast
- As a result, the TC is not able to provide a statement on recruitment in 2015 nor are they able to predict the magnitude of the young-of-year population in 2015

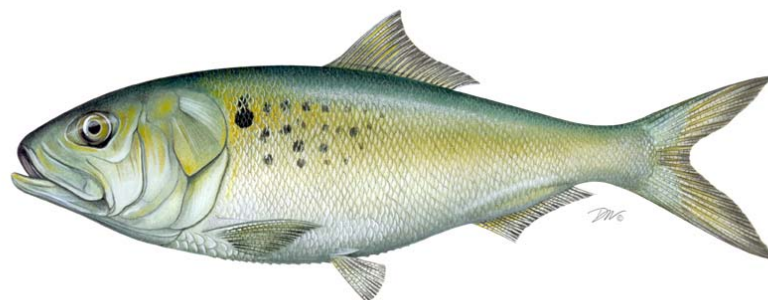
Projections and Juvenile Indices



Questions?



Amendment 3 PID for Public Comment



Atlantic Menhaden Management Board
October 2016

Amendment Process



1. Public Information Document (PID)

- broad scoping document
- provides public opportunity to identify major issues and mgmt. alternatives
- asks public how they would like to see the fishery managed

2. Draft Amendment

- a more focused document which details the suite of management options for each issue
- provides public opportunity to comment on specific management options



Timeline



| | Oct 2016 | Nov 2016 – Jan 2017 | Feb 2017 | Mar - July 2017 | Aug 2017 | Sept – Oct 2017 | Nov 2017 |
|--|----------|---------------------|----------|-----------------|----------|-----------------|----------|
| Approval of Draft PID by Board | X | | | | | | |
| Public Comment on PID | | X | | | | | |
| Board review public comment; Board direction on Draft Amendment 3 | | | X | | | | |
| Preparation of Draft Amendment 3 | | | | X | | | |
| Approval of Draft Amendment 3 by Board | | | | | X | | |
| Public Comment on Draft Amendment 3 | | | | | | X | |
| Review and approval of the final Amendment 3 by the Board, Policy Board and Commission | | | | | | | X |

Issues Currently in PID



- Reference Points
- Quota Allocation
- Allocation Timeframe
- Quota Transfers
- Quota Rollovers
- Incidental Catch & Small Scale Fishery Allowance
- Episodic Events Set Aside Program
- Chesapeake Bay Reduction Fishery Cap



Reference Points



- Stock currently managed by single-species reference points from 2015 stock assessment
- Board has expressed interest in ERPs
- BERP developing menhaden-specific ERPs which will be peer-reviewed in 2019
- There are also existing guidelines for managing forage fish species
 - 75% rule-of-thumb
 - Pikitch et al. (2012) where F does not exceed $1/2M$; fishing prohibited when biomass falls below 40% unfished biomass
 - F target to achieve 75% unfished biomass; fishing prohibited when biomass falls below 40% unfished biomass



Reference Points



- **Option A: Single Species Reference Points**
 - Board directs BERP to stop work
- **Option B: Existing Guidelines for Forage Fish Species**
 - 75% rule-of-thumb, Pikitch et al. (2012)
 - Board directs BERP to stop work
- **Option C: Single Species Reference Points Until ERPs are Developed by BERP**
- **Option D: Existing Guidelines for Forage Fish Species Until ERPs are Developed by BERP**
 - 75% rule-of-thumb, Pikitch et al. (2012), F target to achieve 75% unfished biomass



Quota Allocation



- Amendment 2 established a TAC for menhaden and divided this among the states.
- Concern the TAC does not strike a balance between gear types and regions.
- Concern historical catch could limit states with minimal quota from participating in growing fishery.
- Board interested in exploring other allocation strategies.
 - Allocation Working Group established in May 2015



Quota Allocation



Option A: State/Jurisdiction Allocation (Status Quo)

Option B: Jurisdiction Allocations w/ Fixed Minimum Quota

Option C: Coastwide Quota

Option D: Seasonal Quota

Option E: Regional Quota

- a. Two-region split (North/South)
- b. Two-region split (Ches. Bay/other)
- c. Three region split (NE/Mid-Atlantic/Ches. Bay and South)
- d. Four-region split (NE/Mid-Atlantic/Ches. Bay/S. Atlantic)

Option F: Disposition Quota

Option G: Fleet Capacity Quota

- a. Two fleet (large fleet vs. small fleet)
- b. Three fleet (large fleet vs. medium fleet vs. small fleet)



Allocation Timeframe



Option A: 2009-2011 (Status Quo)

Option B: Longer Time-Series Average

Option C: Weighted Allocation

- Allocation weighted over two time periods to consider long-term trends and recent changes in harvest



Quota Transfer & Overage Payback



- Amendment 2 allows for quota transfers among jurisdictions.
- Transfers are a useful way to address overages; however, some states may be disadvantaged by the timing of their fishery relative to other states.
- Some FMPs allow for quota reconciliation, where if the coastwide TAC is not exceeded, state-specific overages are forgiven.



Quota Transfers & Overage Payback



Public Comment Questions:

- Should the process for quota transfers be further defined or replaced with quota reconciliation?
- Should state-specific overages be forgiven in years when the coastwide TAC is not exceeded?
- If the coastwide TAC is exceeded but at least one jurisdiction has an underage, should unused quota be pooled and distributed to states with an overage?
- Should there be accountability measures for a state which exceeds its quota by a certain percentage or repeatedly participates in quota reconciliation?



Quota Rollovers



- Amendment 2 allows for unused quota to be rolled over into the subsequent year if the stock is not overfished and overfishing is not occurring; however, specifics not defined.
- 2015 stock assessment showed stock meets requirements of quota rollovers.
- Board agreed to consider details of quota rollovers in Amendment 3



Quota Rollovers



Public Comment Questions:

- Should unused quota be rolled over into the subsequent year?
- If yes, should the amount rolled over be limited to a percent of quota?
- Should all sectors of the fishery be allowed to roll over quota?



Incidental Catch & Small Scale Fishery



- Amendment 2 established a bycatch allowance of 6,000 lbs per vessel/trip for non-directed fisheries.
- Concern that landings under the bycatch provision do not count towards the quota.
- No definition of 'bycatch' or 'non-directed fisheries'.
- Concern the bycatch allowance supports a small-scale fishery rather than incidental catch.
- Concern the bycatch provision dissuades cooperative fishing.



Incidental Catch & Small Scale Fishery



Option A: Incidental Catch Limit per Vessel (Status Quo)

Option B: Incidental Catch Limit per Permitted Individual

Option C: Incidental Catch Included in Quota

- Incidental catch would count towards the quota. Once the quota is met, no landings would be allowed.

Option D: Incidental Catch Cap and Trigger

- Harvest cap for incidental catch. If exceeded, management action triggered to reduce incidental catch.

Option E: Incidental Catch Defined by Percent Composition

Option F: Small-Scale Fishery Set Aside

- Portion of TAC set aside for gears participating in small-scale fisheries.



Episodic Events



- Amendment 2 sets aside 1% of TAC for episodic events; New England states may participate.
- Since 2013, there is an increasing amount of menhaden landed under this program.
- In 2016, NY requested and was approved to harvest under the episodic set aside.
- Prompted questions about the size and geographic spread of the program.



Episodic Events



Public Comment Question:

- Should a percentage of TAC be set aside for episodic events?
- If yes, what percentage of the annual TAC should be set aside?
- If yes, which jurisdictions should be allowed to participate in this program?
- Does the episodic event program need to be reconsidered as the distribution of menhaden changes?
- How should states demonstrate that an episodic event is occurring in state waters?



Ches. Bay Reduction Cap



Ches. Bay reduction fishery currently limited by a harvest cap; however, reduction fishery consistently under performs this cap.

Public Comment Questions:

- Should the Chesapeake Bay Reduction Fishery Cap be maintained?
- It is an important tool for management of Atlantic menhaden?

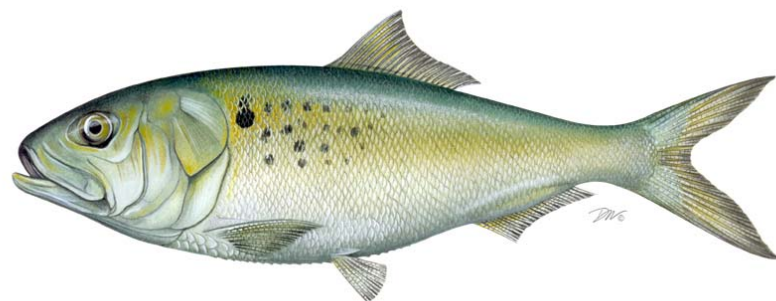




Questions



Advisory Panel Report on Amendment 3 PID



Atlantic Menhaden Management Board
October 2016

Introduction



- AP met via conference call on September 30th
- 14 AP members participated in the meeting
- Purpose of call was to make sure no major issues or options were missing from PID
- Preferred management alternatives were not discussed



Purpose & Need



- Some felt purpose of PID focused too heavily on ERPs and did not reflect the bait and reduction fisheries. Recommendations to:
 - Include stock status in intro
 - Recognize human use of menhaden
 - Represent scale of menhaden fishery
- Others happy with purpose of PID; it accurately portrayed the Board's desire to develop ERPs and address allocation issues
- Recommendation to include standards by which ASMFC manages species



Reference Points



- 4 AP members presented the following ERP for inclusion in the PID
 - Stock biomass target of 75% unfished biomass
 - Stock biomass threshold of 40% unfished biomass
 - F target determined to be consistent with achieving 75% unfished biomass
 - A fishing mortality cutoff (aka threshold) when stock biomass is less than 40% unfished biomass
- Recommended as an interim reference point; BERP should continue work on menhaden-specific ERPs
- Proponents cited Smith et al (2011) as support of the 75% unfished biomass target which is intended for low-trophic level fish such as menhaden



Reference Points



- While not all members supported the ERP, no stated objection to having the reference point discussed by the PDT to determine its appropriateness for inclusion in PID
- Another AP member asked language be added to PID describing on-going work to develop management strategies for forage fish (e.g. soon to be published paper by Hilborn et al.)



Quota Allocation



- AP member disagreed that the current allocation scheme “does not strike an equitable balance between gear types and regions”
 - Based on historic landings
- Request to add an example of a seasonal quota
 - ex: winter quota to allow for sampling of adult pop
- One AP member supported all quota allocation options remaining in the document



Allocation Timeframe



- Several AP members highlighted importance of a longer time-series
- Recommendation to add examples of a longer time-series
 - E.g. 2006-2012 or 1985-2012



Quota Transfers & Overage Payback



- AP asked that the PID indicate whether the fishery has exceeded its coastwide TAC since it was implemented in 2013
- Several AP members asked if quota reconciliation would encourage some states to continually exceed their quota
 - Recommend a public comment question be added to PID asking about accountability measures for states



Episodic Events



- One member asked for a clear connection in the PID between quota allocation and episodic events
- Another members asked if the current definition of an episodic event is appropriate
 - Recommend a public comment question be added asking how to qualify an episodic event given increases in biomass, especially in NE
- One AP member asked that options be added to the PID which look at specific increases in the TAC set aside for the program
 - e.g 2%, 5%, 10%



Chesapeake Bay Reduction Cap



- AP member commented that Ches. Bay reduction fishery under-performs its cap because it does not target age-0 fish.
- Several AP members asked for a more detailed history of landings by the Ches. Bay reduction fishery
 - Staff noted much of this information is confidential



Other Comments



- Two AP members requested a section on research programs and priorities be added to the PID
- One AP member asked that Table 2 in Appendix 1 be expanded to include total landings per year





Questions?

PDT Response to AP



Purpose and Needs

- Added stock status to introduction
- Reference points consider both human use and ecological needs
- Added elements of charter to PID

Reference Points

- Included proposed ERP as another example of a potential guideline that could be used to manage a forage fish species



PDT Response to AP



Quota Allocation

- Clarified that all allocation methods are based on historic catch
- Added an example of a seasonal closure

Allocation Timeframe

- Added examples of longer time-series

Quota Transfers and Overage Payback

- Added info on whether TAC has been exceeded
- Added public comment question about accountability measures for states who exceed quota by a certain percent or repeatedly participate in quota reconciliation



PDT Response to AP



Episodic Events

- Clarified connection between allocation and episodic events
- Added public comment questions on:
 - If the episodic program should be reconsidered given changes in the distribution of menhaden
 - How states should demonstrate an episodic events is occurring in their waters

Other Comments

- Added total landings to Table 2 in Appendix 1





QUESTIONS?

Option H: Allocations Based on Quota Levels



- Quotas allocations to states/jurisdictions from the total allowable catch (TAC) would vary depending on the amount of TAC available in each fishing year.
- When the annual, coastwide TAC is at or below the baseline level of 212,500 metric tons (the average landings for the years 2009 to 2011 from which a twenty percent reduction was taken in Amendment 2), quota allocations will be distributed based on average landings during the reference period.
- Reallocation of the TAC would occur only when the TAC exceeds 212,500 mt. Reallocated quota shares can be redistributed proportionally to all states/jurisdictions, added to the episodic event set-aside, distributed to states with recent and historic bait fisheries, or divided according to agreement among the states and jurisdictions.



Atlantic Menhaden Technical Committee Report

October 2016
Bar Harbor, ME



georgiaconservancy.org

Technical Committee Report



- TC reviewed updated analysis from the paper “The Fate of an Atlantic Menhaden Year Class” by Peter Himchak
- Originally reviewed Mr. Himchak’s work in June and offered feedback
- Board requested an additional review after synthesis of TC feedback

Technical Committee Report



- TC commended Mr. Himchak's efforts to analyze impacts of F on menhaden stock and on his inclusion of natural mortality (M) in the updated analysis
- TC provides the following considerations of the work:
 - Analysis provides one perspective on how a hypothetical year class erodes over time.
 - Helpful to provide a parallel calculation which focuses on the mature portion of the population

Technical Committee Report



- TC provides the following considerations of the work (cont.):
 - Given menhaden reach 50% maturity at age 2, the roughly 13 billion fish which are removed from the population due to M before they mature never contribute to recruitment of stock
 - More appropriate to understand harvest as a percent of the mature population
 - Given selectivity, focus on ages 2+ also addresses the TC's previous recommendation of evaluating impact on harvestable portion of population

Technical Committee Report



- TC provides the following considerations of the work (cont.):
 - Analysis highlights the large impact that M has on the juvenile portion of the menhaden stock
 - While estimate of M at age from 2015 assessment represents best available science, still uncertainty in this calculation
 - As a result, calculation of M in analysis is only as good as the estimates from the assessment
 - Calculations of M at age will be improved through the work being conducted by the Biological Ecological Reference Point (BERP) Working Group

Technical Committee Report



- TC struggled with how to focus comments for the Board
- TC felt it would be helpful for the Board to provide additional context and guidance as to how they plan to use external analyses they ask the TC to review
- This guidance will help the TC direct their comments and recommendations toward what the Boards wishes to understand about the analysis

Technical Committee Report



Questions?



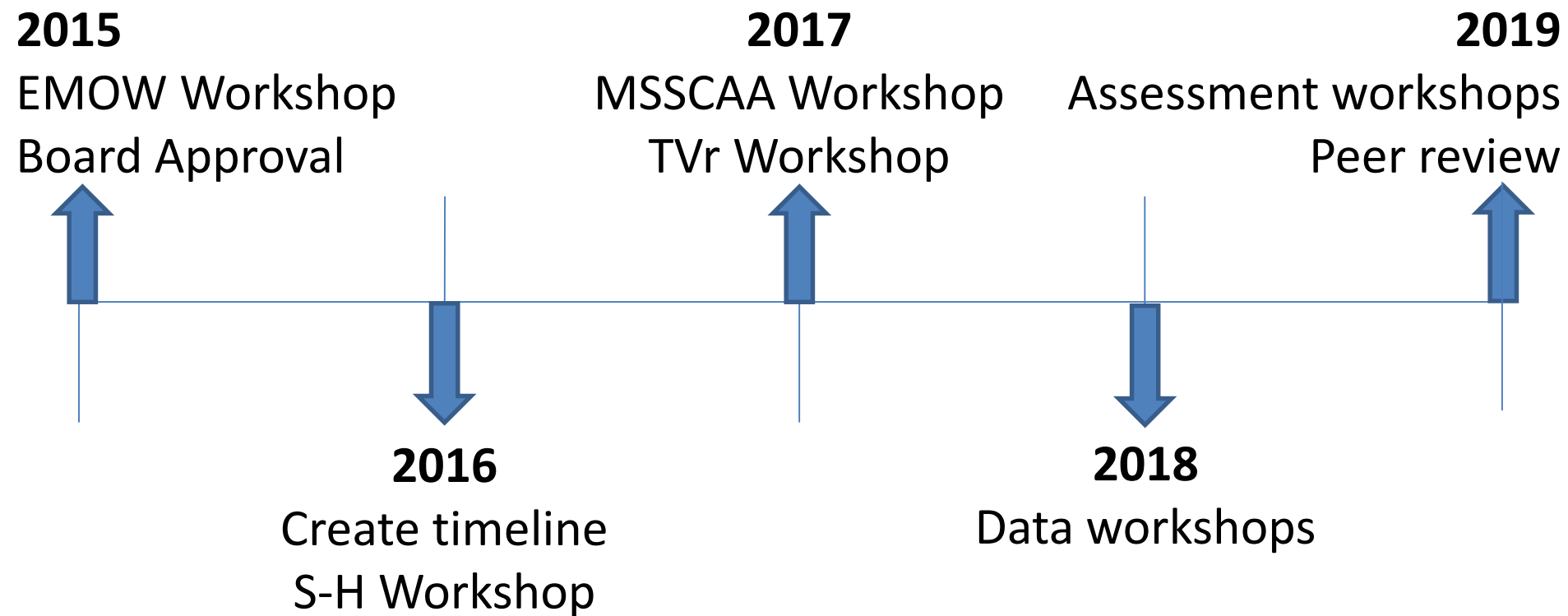
BERP Workgroup Update

October 26, 2016

BERP WG Timeline



- Multiple, multi-species models in a single-species timeframe



July Modeling Workshop



- Focused on Steele-Henderson Model
 - Subcommittee shifted to R modeling package
 - Tested model and suggested improvements
 - Attempting to move into another modeling framework
- Progress updates from other models
- Call in October for progress and simulations with model

BERP WG Near-Future Plans



- Nov/Dec call to discuss further S-H progress
- Winter 2017 TC Meeting Week- Modeling workshop for MSSCCA
- BERP WG update Board Spring/Annual Mtgs