



Atlantic Menhaden Spatial Modeling

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Background



At the 2021 Winter Meeting, the Board tasked the ERP WG & Atl. Menhaden TC with providing further details on the research recommendation to “develop a spatially-explicit model,” including:

- Data needs
- Timeline for development and implementation
- Whether or not a spatial model would resolve Chesapeake Bay management questions


Spatial Model Approaches



- The TC and ERP WG developed a preliminary list of potential spatial approaches
 - Approaches cover a range of spatial complexity, data needs, and timelines
 - Provide different levels of information to support management
 - Data needs and model considerations are based on current understanding of feasibility (subject to change)
- The appropriate approach will depend on management goals, as well as data and funding availability

Spatial Model Approaches



Attributes	Approach
 <p>Coarse spatial scale, min. additional data requirements</p>	Coastwide BAM + NWACS-MICE + supplemental Bay information
	Coarse spatial BAM + coastwide NWACS-MICE
	Coarse spatial BAM + coarse spatial NWACS-MICE
	Detailed spatial BAM + detailed spatial NWACS- MICE

Coastwide ERPs + Supplemental Bay Info.



- These approaches would use BAM + NWACS-MICE to develop coastwide ERPs (as is done now), but supplement it with Chesapeake Bay specific information
- **Supplemental Bay Menhaden Abundance**
 - Would use Bay abundance in proportion to coastwide TAC to inform the Bay Cap
 - Requires menhaden abundance estimates in the Bay
 - e.g., 5-7 years of an aerial survey
- **Supplemental Bay Multispecies Indicators**
 - Uses existing data sets to develop menhaden & predator indicators in the Bay (e.g., abundance, body fat condition)
 - Likely only qualitative context for Bay Cap

Coarse Spatial Approaches



- These approaches provide info. on a coarse spatial scale, e.g., North, Mid, and South Atlantic plus a Chesapeake Bay region
 - CB region would include coastal waters
 - Could be explored with existing data
 - May introduce uncertainty, e.g., migration rates not differentiated by age (would assume all ages share the same migration patterns)
 - Could provide info. for both Bay Cap & regional allocations
 - May be available in 5-7 years, depending on existing data sufficiency, funding, and personnel availability
- **Coarse Spatial BAM w/Coastwide NWACS-MICE**
 - BAM with coarse spatial dynamics, NWACS-MICE would produce coastwide ERPs
- **Coarse Spatial BAM and Coarse Spatial NWACS-MICE**

Complex Spatial Approaches



- These approaches further refine the spatial scale
 - Could provide CB specific info. (w/out coastal waters)
 - ERPs could be coastwide or spatially refined
 - May be available in 10+ years, depending on availability of necessary data, funding, and personnel
- **Refined Spatial BAM with NWACS-MICE ERPs**
 - Data Needs:
 - Fine-scale migration rates at age between regions of interest (e.g., new comprehensive tagging study)
 - Seasonal spatial distribution maps and trends in abundance and catch
 - Not feasible until movement data are available

Complex Spatial Approaches Cont'd



- **Detailed Spatial BAM and ERPs**

- Most complex approach, fully-realized fine-scale spatial multispecies or ecosystem model
- Use NWACS-MICE or other modeling approach
- Data Needs:
 - Fine spatial resolution (10-minute squares) that represent habitat gradients and jurisdictional boundaries
 - Static or spatial-temporal habitat maps
 - Information on species-interactions, movement, diet
- Requires software development
- Not feasible until spatial data are available

Spatial Model Approaches



Approach	Single-spp. CB	Multi-spp. CB	Regional Allocation	Fine-scale Spatial	Possible w/ Existing Data	Timeline
Coastwide BAM + NWACS-MICE + Bay abundance	✓					5-7 yrs
Coastwide BAM + NWACS-MICE + Bay indicators	✓*	✓*			✓	5-7 yrs
Coarse BAM + coastwide NWACS-MICE	✓**				✓	5-7 yrs
Coarse BAM + NWACS-MICE	✓**	✓**	✓		✓	5-7 yrs
Refined BAM + NWACS-MICE	✓	✓	✓			10+ yrs
Detailed BAM + detailed ERPs	✓	✓	✓	✓		10+ yrs

Funding Considerations



- Funding needs depend on the approach
- Model development funding could shorten timelines
- Chesapeake Bay menhaden abundance survey
 - Required for coastwide ERPs + CB abundance approach
 - Could be used for other approaches as well
- Spatially and seasonally explicit diet data and spatial distributions for key predator and prey species
 - Useful for coarse and detailed approaches, though coarse approaches may be feasible without this data
- Fine-scale migration rates between regions by age
 - Needed for refined/detailed approaches

Management Input



- What is the primary goal for spatially-explicit modeling?
 - e.g., advice on Chesapeake Bay Cap, regional allocation advice, enhance accuracy of coastwide ERPs, something else
- Are there secondary goals?
- What tradeoffs is the Board willing to make between achieving these goals and the benchmark assessment timeline?

Management Input



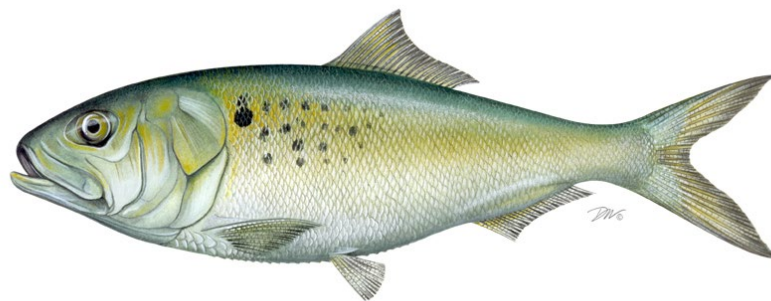
- Are the ecosystem management objectives for the Chesapeake Bay the same as those used for coastwide ERPs?
- Would the Board be satisfied with a “Chesapeake Bay region” that includes coastal waters if modeling the Chesapeake Bay separately is not feasible for the next benchmark?



QUESTIONS



Menhaden Work Group Report



Atlantic Menhaden Management Board

August 4, 2021

Outline



- Board Motion
- WG (State Members: CT, MA, MD, ME, NC, NJ, & VA)
- Report
 - Background
 - Topics
 - Allocation
 - Incidental Catch and Small Scale Fisheries
 - Episodic Event Set Aside
 - Additional Strategies to address Amendment 3 provisions
 - Quota Transfers
- Questions



Board Motion



Move to create a workgroup to develop allocation options to better align jurisdictions' commercial quotas with current landings and fish availability while providing a level of access to the fishery by all Atlantic coast jurisdictions, to review the incidental catch provisions including gear type eligibility, and reduce the need for quota transfers.

The work group will report back to the Board at the August 2021 meeting and the Board will initiate an addendum at that time.



Background



- Amendment 3 (2017) key current provisions
 - Jurisdictional Allocations
 - Incidental Catch and Small-Scale Fisheries
 - Episodic Event Set Aside Program (EESA)
- Total Allowable Catch (TAC) for 2021 and 2022 based on Ecological Reference Points (ERPs)
 - 194,400 metric tons
 - TAC for 2023 and beyond will be determined next year
- Changing dynamics in jurisdictional fisheries
 - Increase landings in the Gulf of Maine



Allocation



- Issues:
 - Mismatch between quota and fish availability
 - Change in state fisheries and landings since the 2009-2011 time period
 - Seasonality of fisheries presents issues around quota transfers
 - Fixed minimum quota has resulted in latent (unused) quota
 - Variety of harvest levels across the coast
 - Fixed minimum could vary in value each year, depending on the value of the TAC **Note: the TAC was the same from 2018-2020**



Jurisdictional Allocations



State	Amendment 2 Allocation (%)	Amendment 3 Allocation (%)
Maine	0.04	0.52
New Hampshire	0	0.50
Massachusetts	0.84	1.27
Rhode Island	0.02	0.52
Connecticut	0.02	0.52
New York	0.06	0.69
New Jersey	11.19	10.87
Pennsylvania	-	0.50
Delaware	0.01	0.51
Maryland	1.37	1.89
PRFC	0.62	1.07
Virginia	85.32	78.66
North Carolina	0.49	0.96
South Carolina	0	0.50
Georgia	0	0.50
Florida	0.02	0.52



Allocation: Potential Strategies



Strategy Approach	Benefits	Challenges
Consider a 50/50 split between the current allocation timeframe and more recent years	Considers recent changes in the fishery as well as historical landings	Sometimes weighted allocations do not result in significant changes to allocation; quota transfers may still be needed
Consider a more recent allocation timeframe	Reflects current distribution of landings amongst jurisdictions and would likely reduce quota transfers	Would not recognize historic trends in effort and landings in the fishery
Consider a longer time series, examining landings data from 2009 and forward (i.e. not using landings data prior to 2009)	Considers a broader landings history from all jurisdictions, including times of higher and lower landings; incorporates more recent years in the timeframe	May not reflect the most recent changes in the fishery given the pace of recent change



Allocation: Potential Strategies



Strategy Approach

Benefits

Challenges

Consider a tiered approach to the fixed minimum [some jurisdictions at 0.5% and others at 0.1% for example]

Reflects that jurisdictions primarily fishing under a 0.5% fixed min have a wide range of landings; still provides each jurisdiction an opportunity to participate in the menhaden fishery

Establishing criteria to determine which jurisdictions fall into which fixed minimum tier

Consider a jurisdiction's best year of landings in a time-series, as opposed to an average

Allows jurisdictions to benefit from their highest landings and not be penalized for a year of lower landings

Potential for outliers in a jurisdiction's landings history to impact allocations

Continue to review allocation regularly (i.e. 3-5 years)

Addresses concerns regarding continued changes in the distribution of menhaden and resulting impacts on allocation; allows for incorporation of new landings information and new science on spatial distribution of menhaden if/when available

Requires a higher level of time and attention on the part of the Board and staff

Limit the percent reduction in allocation for jurisdictions (for example to 20%)

Can limit a jurisdiction's lost fishery revenue due to changes in the allocation timeframe and dampen impacts on existing shore-side infrastructure

Quota transfers may still be required if the resulting allocation does not match current landings



Incidental Catch and Small Scale Fisheries



- Issues:
 - Increase in landings in recent years, to a new time series high in 2020
 - Since 2017, majority of landings come from purse seines (88%), an increase since Amendment 3 was implemented (57% prior to Amend 3)
 - Terminology is problematic, having both directed and non-directed fishing under the same provision
 - There is possibility that TAC could be exceeded if total landings continue to increase. Moving some landings to directed fishery may improve accountability
 - These landings are accounted for in the Assessment Models, but not in management as part of the TAC or set-aside



Potential Strategies



Strategy Approach	Benefits	Challenges
Separate small-scale and incidental catch fisheries	Will clarify the intent of the program and better reflect 'incidental catch'	Separating gear types may be difficult; additional provisions may make management more complicated
Adjust which gear types are eligible for small-scale fisheries	Will limit the landings occurring under this category	Landings by certain gear types would need to be attributed elsewhere (i.e. jurisdictional quota, transferred quota, EESA), and significant quota transfers may still be required without adjustments to allocation
Reduce trip limit for incidental catch/small-scale fisheries	Could limit the landings occurring under this category	May negatively impact small-scale fisheries; may cause discarding in incidental fisheries; may not reduce landings if capacity continues to increase
Count all incidental catch and small-scale fisheries landings towards the TAC (e.g., using a set-aside of the TAC), with a management trigger	Creates accountability in managing landings from the incidental catch/small-scale fisheries category	Developing an accountability system that may be in addition to the current quota management system



Potential Strategies Cont'd



Strategy Approach	Benefits	Challenges
Develop a landings cap for small-scale fisheries (e.g. % of TAC or total volume) with a management trigger	Limits the landings occurring under this category (while still not counting them against jurisdictional quotas or the TAC)	Developing an accountability system that may be in addition to the current quota management system
Require states to utilize their full directed allocation prior to entering the incidental catch fishery, regardless of in-state allocations	Better aligns implementation with the provisions of Amendment 3	May result in long closures for certain fishery sectors; may increase discards if no bycatch landings are allowed
Eliminate the small-scale fisheries provision (revert to bycatch allowance only)	Realigns program more directly with 'incidental catch'	Landings by certain gear types would need to be attributed elsewhere (jurisdictional quota, transferred quota, EESA)



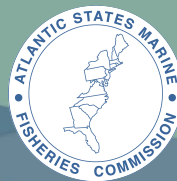
Episodic Event Set Aside Program



- Issues:
 - Incentives states to use up quota as fast as possible
 - Has become a secondary regional quota (ME-NY)
 - Current set aside percentage (1%) may no longer align with current magnitude of the episodic event landings



EESA: Potential Strategies



Strategy Approach

Benefits

Challenges

Adjust the set-aside percentage (e.g., 5%), to be reviewed regularly (e.g., every 3 years as part of allocation review).

Allow for more landings under EESA with a higher fixed percentage in response to high availability in New England waters that may potentially reduce the need for quota transfers.

Administrative burden of EESA participation and race-to-fish characteristics of regional quota management. As stand-alone change, may require additional constraints on EESA use by participating states.

For any particular year, allow (or potentially require) states to transfer unused quota or relinquish quota into the EESA.

Provide more flexibility in how states donate quota within a year, potentially adding to EESA amount and reducing quota transfers.

More uncertain as to how much EESA will be available in a year than a change to the set-aside percent.



EESA: Potential Strategies



Strategy Approach	Benefits	Challenges
Permanently reallocate states' latent quota (or a portion thereof) to the EESA.	Increase the EESA amount without drawing down the allocations of jurisdictions that are utilizing their quota.	May not provide enough EESA quota to reduce quota transfers in NE.
Roll back unused EESA sooner than October 31.	Improve the opportunity for non-eligible states to utilize unused EESA in a year.	Relies on accurate and timely reporting of state EESA landings.
Additional restrictions on state use of EESA (e.g., weekly limits, landing days, state cap).	May be necessary to control pace and shared use of EESA landings if competition among states is increased.	Administrative burden.
Allow state EESA access at less than 100% quota use.	Provide flexibility to states moving between quota, EESA, and incidental/small scale fisheries.	Accounting for landings between directed allocation and EESA may become more difficult, specifically in determining whether a jurisdiction has met or exceeded their quota



Additional Strategies to address Amend 3 provisions



Strategy Approach	Benefits	Challenges
Create a 'quota or allocation bank' where jurisdictions could opt to relinquish commercial quota that would go only to the bait fishery	Allow jurisdictions to relinquish quota into a bait fishery only set-aside, which has been identified as a problem with the current relinquished allocation model- it can go to both reduction and bait fisheries based on historical allocations	Determining a process for further redistribution or applying to receive allocation within the quota bank is needed and may create new complexities if added on top of the current relinquish/redistribution provision in Amendment 3
'Pooled' Quota, landings evaluated against the pooled total. Similar to Coastwide Cap used for American eel management	Could allow for jurisdictions to have increased landings annually without the need to manage to jurisdictional quota and reduce the need for quota transfers.	Accountability may be challenging and determining which years are used as the basis for pooling state will be very important to ensure overages are not a regular problem.



Quota Transfers



- Issues
 - Administrative burden
 - Example: tracking multiple state transfers on different timelines
 - Timing and securing transfers is challenging
- Considerations
 - WG: promote the use of quota transfers if jurisdictions are not fully utilizing their quota
 - Potential change- ‘compelling’ quota transfers if jurisdictions are not using quota
 - Adjust the fishing season from calendar year to be offset with peaks in fishing pressure
 - Spiny Dogfish example



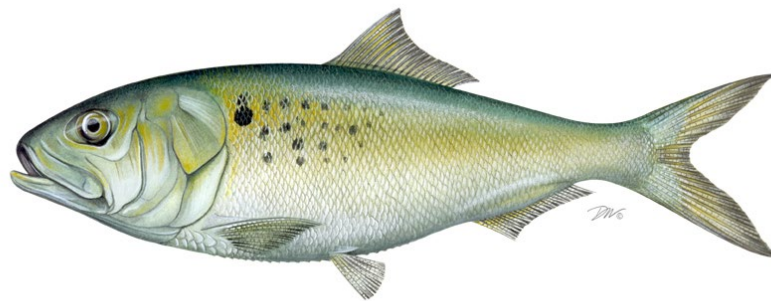


Questions





Consider Initiation of Addendum on Commercial Fishery Measures



Atlantic Menhaden Management Board

August 4, 2021

Amendment 3 considerations



- The following items specific to the WG Report can be adjusted through an addendum (pg. 49-50):
 - TAC Specifications
 - Quota allocations
 - Quota transfers
 - Quota rollovers
 - Episodic events set aside program
 - Incidental catch and small-scale fishery provision
 - Fishing year and/or seasons
 - Trip limits
 - Gear restrictions including mesh sizes
 - Area closures



Board actions for considerations

- Initiate an addendum outlining the issues to be addressed as well as goals and objectives to guide the PDT (yet to be formed) in developing the document





Questions?

