April 2022 Council Meeting

Tuesday, April 5 – Thursday, April 7, 2022

Hybrid Meeting:
Seaview, Dolce Hotel (401 South New York Road Galloway, NJ 08205, 609-652-1800)
or via Webex webinar

This meeting will be conducted as a hybrid meeting. Council members, other meeting participants, and members of the public will have the option to participate in person at the Seaview, Dolce Hotel or virtually via Webex webinar. Webinar connection instructions and briefing materials will be available at: https://www.mafmc.org/briefing/april-2022.

Agenda

Tuesday, April 5th

1:00 p.m. – 2:30 p.m.	**2022 Mid-Atlantic State of the Ecosystem & EAFM Risk Assessment Update Report (Tab 1)** (Dr. Sarah Gaichas, NEFSC) - Review and provide feedback
2:30 p.m. – 3:00 p.m.	**Climate Change Scenario Planning (Tab 2)** - Update on recent webinars and plans for scenario creation workshop
3:00 p.m. – 4:00 p.m.	**Surfclam Species Diagnostics and Population Connectivity Estimates to Inform Management (Tab 3)** (Dr. Matthew Hare and Hannah Hartung, Cornell University)
4:00 p.m. – 5:00 p.m.	**Offshore Wind Energy Updates (Tab 4)** - Update on Ocean Wind project - Update on Atlantic Shores wind project - Update from BOEM

Wednesday, April 6th

9:00 a.m. – 10:00 a.m.	**2023 Golden Tilefish Specifications (Tab 5)** - Review SSC, Advisory Panel, Monitoring Committee, and staff recommendations for 2023 specifications - Recommend changes to 2023 specifications if necessary

10:00 a.m. – 11:00 a.m. **2023 Blueline Tilefish Specifications (Tab 6)**

- Review SSC, Advisory Panel, Monitoring Committee, and staff recommendations for 2023 specifications
- Recommend changes to 2023 specifications if necessary

11:00 a.m. – 12:00 p.m. **Sea Turtle Bycatch in MAFMC Trawl Fisheries (Tab 7)**

- Review results from public outreach and provide feedback to NMFS

-------- Lunch 12:00 p.m. – 1:00 p.m. --------

1:00 p.m. – 2:00 p.m. **2022 Illex Specifications (Tab 8)**

- Review SSC, Advisory Panel, Monitoring Committee, and staff recommendations for 2022 specifications
- Recommend changes to 2022 specifications if necessary

2:00 p.m. – 4:30 p.m. **Atlantic Mackerel Rebuilding 2.0 Amendment: Approve Alternatives for Public Hearing Document (Tab 9)**

- Review Committee recommendations and approve alternatives for public hearing document

Thursday, April 7th

9:00 a.m. – 1:00 p.m. **Business Session**

Committee Reports (Tab 10) – SSC, EOP Committee/AP, RSC-RSA

Executive Director's Report (Tab 11) (Dr. Chris Moore)

Organization Reports – NMFS Greater Atlantic Regional Office, NMFS Northeast Fisheries Science Center, NOAA Office of General Counsel, NOAA Office of Law Enforcement, US Coast Guard

Liaison Reports (Tab 12) – New England Council, South Atlantic Council

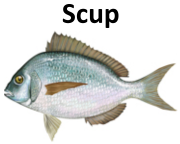
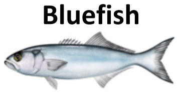
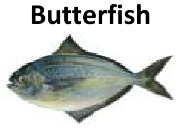
Other Business and General Public Comment

This meeting will be recorded. Consistent with 16 USC 1852, a copy of the recording is available upon request.

The above agenda items may not be taken in the order in which they appear and are subject to change, as necessary. Other items may be added, but the Council cannot take action on such items even if the item requires emergency action without additional public notice. Non-emergency matters not contained in this agenda may come before the Council and / or its Committees for discussion, but these matters may not be the subject of formal Council or Committee action during this meeting. Council and Committee actions will be restricted to the issues specifically listed in this agenda. Any issues requiring emergency action under section 305(c) of the Magnuson-Stevens Act that arise after publication of the Federal Register Notice for this meeting may be acted upon provided that the public has been notified of the Council's intent to take final action to address the emergency. The meeting may be closed to discuss employment or other internal administrative matters.

Stock Status of MAFMC-Managed Species

(as of 3/22/22)

SPECIES	STATUS DETERMINATION CRITERIA		Stock Status	Most Recent Assessment
	Overfishing $F_{threshold}$	**Overfished** ½ B_{MSY}		
Summer Flounder 	$F35\%_{MSP}$=0.422	60.87 million lbs	No overfishing Not overfished	Most recent management track assessment was 2021.
Scup 	$F40\%_{MSP}$=0.200	99.23 million lbs	No overfishing Not overfished	Most recent management track assessment was 2021.
Black Sea Bass 	$F40\%_{MSP}$=0.46	15.92 million lbs	No overfishing Not overfished	Most recent management track assessment was 2021.
Bluefish 	$F_{35\%SPR}$=0.181	222.37 million lbs	No overfishing Overfished	Most recent management track assessment was 2021.
***Illex* Squid (short finned)** 	Unknown	Unknown	Unknown Unknown	Most recent benchmark assessment was 2006; not able to determine current exploitation rates or stock biomass.
Longfin Squid 	Unknown	46.7 million lbs	Unknown Not overfished	Most recent assessment update was 2020; not able to determine current exploitation rates.
Atlantic Mackerel 	$F_{40\%}$=0.22	199.6 million pounds	Overfishing Overfished	Most recent management track assessment was 2021.
Butterfish 	F_{Proxy}=2/3M =0.81	50.3 million lbs	No overfishing Not overfished	Most recent management track assessment was 2020.
Chub Mackerel 	At least 3,026 MT of catch per year	At least 3,026 MT of catch three years in a row	No overfishing Not overfished	No stock assessment.

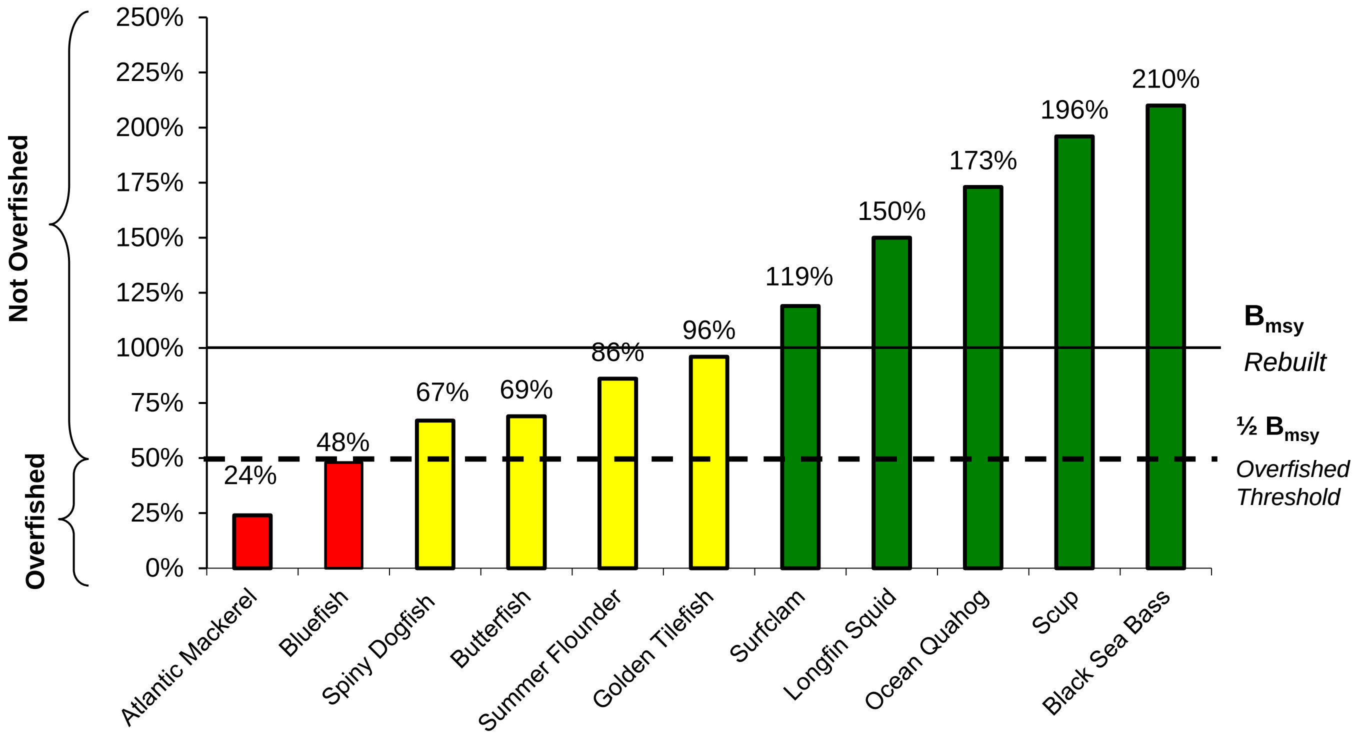
SPECIES	STATUS DETERMINATION CRITERIA		Stock Status	Most Recent Assessment
	Overfishing $F_{threshold}$	Overfished ½ B_{MSY}		
Surfclam 	$F/F_{threshold}$ = 1 [a]	$SSB/SSB_{threshold}$ = 1 [b]	No overfishing Not overfished	Most recent management track assessment was 2020
Ocean Quahog 	$F/F_{threshold}$ = 1 [c]	$SSB/SSB_{threshold}$ =1 [d]	No overfishing Not overfished	Most recent management track assessment was 2020.
Golden Tilefish 	$F_{40\%MSP}$=0.261	12.12 million lbs	No overfishing Not overfished	Most recent management track assessment was 2021.
Blueline Tilefish 	Unknown	Unknown	South of Cape Hatteras: No overfishing Not overfished North of Cape Hatteras: Unknown Unknown	Most recent benchmark assessment was 2017.
Spiny Dogfish (Joint mgmt with NEFMC) 	F_{MSY}=0.2439	175.6 million lbs Female SSB	No overfishing Not overfished	Most recent assessment update was 2018.
Monkfish (Joint mgmt with NEFMC) 	NFMA & SFMA F_{MAX}=0.2	NFMA - 1.25 kg/tow SFMA - 0.93 kg/tow (autumn trawl survey)	Unknown Unknown	Recent benchmark failed peer review and invalidated previous 2010 benchmark assessment results. Operational assessment in 2019 used survey data to scale earlier ABC.

SOURCES: Office of Sustainable Fisheries - Status Report of U.S. Fisheries; SAW/SARC, SEDAR, and TRAC Assessment Reports.

[a] $F_{threshold}$ is calculated as 4.136 times the mean F during 1982 – 2015.
[b] $SSB_{threshold}$ is calculated as $SSB_0/4$.
[c] $F_{threshold}$ is 0.019.
[d] $SSB_{threshold}$ is calculated as $0.4*SSB_0$.

Stock Size Relative to Biological Reference Points

(as of 3/22/22)



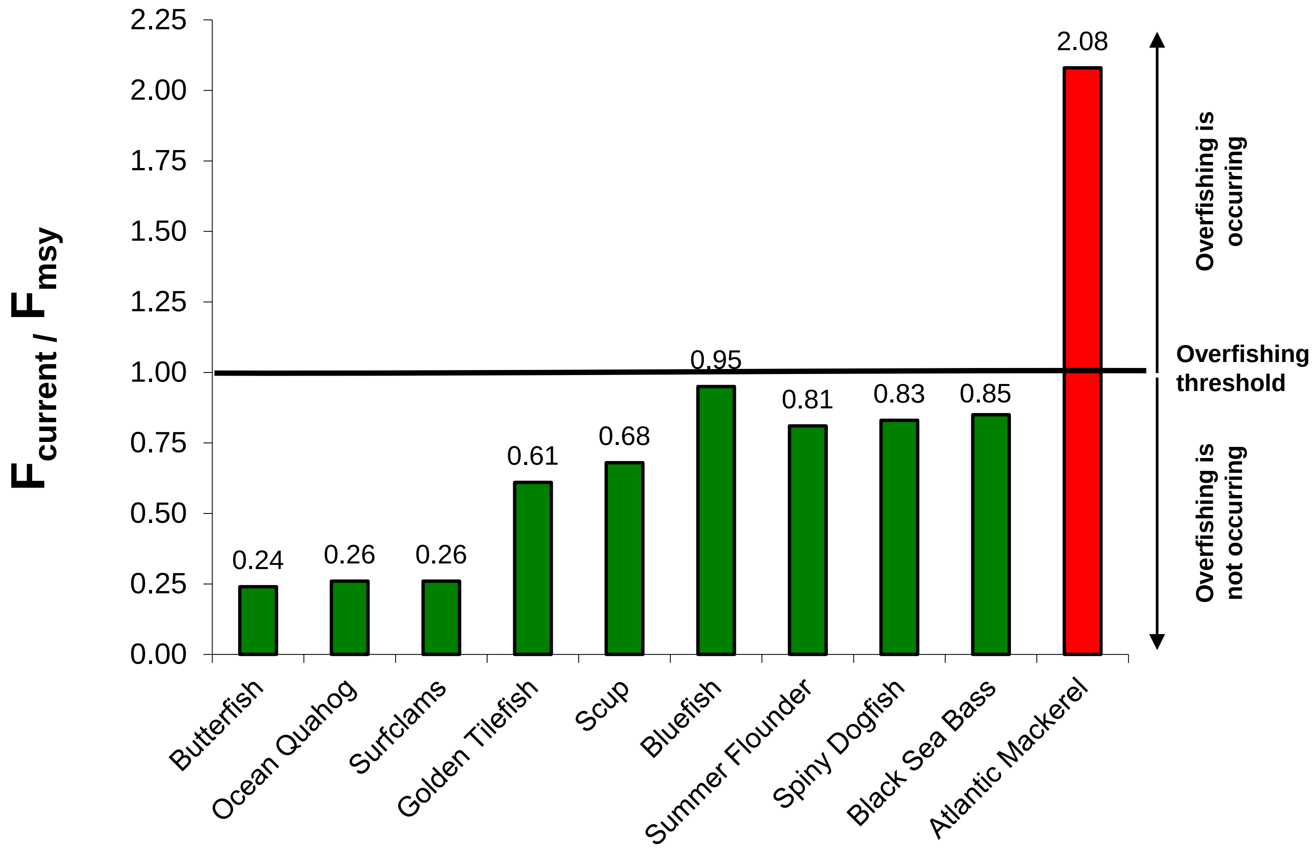
Notes:

- Unknown B_{msy} - *Illex* squid, monkfish (NFMA & SFMA), blueline tilefish (North of Cape Hatteras), and chub mackerel.
- Of the 15 species managed by the Council, 5 are above B_{msy}, 6 are below B_{msy}, and 4 are unknown.

Year of data used to determine stock size	
Atlantic Mackerel	2019
Black Sea Bass	2019
Bluefish	2019
Butterfish	2019
Golden Tilefish	2020
Longfin Squid	2018-2019 (average)
Ocean Quahog	2019
Spiny Dogfish	2018
Surfclam	2019
Scup	2019
Summer Flounder	2019

Fishing Mortality Ratios for MAFMC-Managed Species

(as of 3/22/22)



Year of data used to determine fishing mortality	
Atlantic Mackerel	2019
Black Sea Bass	2019
Bluefish	2019
Butterfish	2019
Golden Tilefish	2020
Ocean Quahog	2019
Spiny Dogfish	2017
Surfclam	2019
Scup	2019
Summer Flounder	2019

Notes:

- Unknown fishing mortality: *Illex* squid, Longfin squid, monkfish (NFMA and SFMA), blueline tilefish (North of Cape Hatteras), and chub mackerel.
- Of the 15 species managed by the Council, 9 are above F_{msy}, 1 is above, and 5 are unknown.

Status of Council Actions Under Development

AS OF 3/22/22

FMP	Action	Description	Status	Staff Lead
Summer Flounder, Scup, Black Sea Bass *and* Bluefish	Recreational Harvest Control Rule Framework/Addenda	The goal of this action is to establish a process for setting recreational bag, size, and season limits for summer flounder, scup, black sea bass, and bluefish such that measures aim to prevent overfishing, are reflective of stock status, appropriately account for uncertainty in the recreational data, take into consideration angler preferences, and provide an appropriate level of stability and predictability in changes from year to year. https://www.mafmc.org/actions/hcr-framework-addenda	The Commission is holding a series of public hearings in March/April 2022. The Council and Policy Board will receive a progress update during their meeting on May 5, 2022. A sub-group of the SSC has been formed to address the Council and Policy Board's request for evaluation by June 2022.	Beaty
	Recreational Reform Initiative Technical Guidance Document	The Council and Policy Board agreed to develop a technical guidance document to address the following topics: (1) identifying and smoothing MRIP outlier estimates, (2) use of preliminary current year MRIP data, and (3) maintaining status quo recreational measures. Some of these topics have been partially developed through the Harvest Control Rule Framework/Addenda. No additional progress has been made on a technical guidance document due to prioritization of the Harvest Control Rule. https://www.mafmc.org/actions/recreational-reform-initiative	Further progress is not expected until after final action on the Harvest Control Rule Framework/Addenda.	Beaty
	Recreational Sector Separation and Catch Accounting Amendment	This joint MAFMC/ASMFC amendment considers (1) options for managing for-hire recreational fisheries separately from other recreational fishing modes and (2) options related to recreational catch accounting, such as private angler reporting and enhanced vessel trip report requirements for for-hire vessels. https://www.mafmc.org/actions/recreational-reform-initiative	The Council and Policy Board initiated this action in October 2020. No additional progress has been made due to prioritization of the Harvest Control Rule Framework/ Addenda. The Council and Policy Board may consider approval of a scoping	Dancy

FMP	Action	Description	Status	Staff Lead
			document for this amendment by the end of 2022.	
Surfclam and Ocean Quahog	Surfclam and Ocean Quahog Species Separation Requirements Amendment	As surfclams have shifted toward deeper water in recent years, catches including both surfclams and ocean quahogs have become more common. Current regulations do not allow surfclams and ocean quahogs to be landed on the same trip or in the same tagged cage. The Council is developing and Amendment to modify species separation requirements in these fisheries in the short-term. In addition, staff/NEFSC will explore longer term solutions for monitoring (such as electronic monitoring testing on the clam survey). https://www.mafmc.org/actions/scoq-species-separation	In December 2021 the Council reviewed a white paper and decided to initiate an Amendment. The Council also requested that the staff/NEFSC explore the feasibility of longer-term solutions. An FMAT was formed in January 2022; first meeting upcoming on April 26.	Coakley/ Montañez
Mackerel, Squid, Butterfish	Mackerel Rebuilding 2.0 Amendment	In 2018 the Atlantic mackerel stock was declared overfished based on the results of the 2017 benchmark stock assessment. The Council subsequently developed a rebuilding plan designed to rebuild the stock by 2023. A 2021 management track stock assessment found that the Atlantic mackerel stock continued to be overfished through 2019 and that rebuilding would not occur as previously projected. This action will re-set Atlantic mackerel rebuilding and consider related management measures, including the river herring and shad cap. https://www.mafmc.org/actions/atlantic-mackerel-rebuilding-amendment	Two public information webinars were held on January 11 and 12. The Council will approve alternatives for a public hearing document at the April Council Meeting.	Didden
Omnibus	Omnibus Amendment for Data Modernization	This action will address any regulatory changes needed to fully implement the Agency's Fishery-Dependent Data Initiative (FDDI).	The Council last received an update at the October 2018 meeting. In 2019 the Council took final action on the Commercial eVTR Omnibus Framework jointly with the NEFMC in support of FDDI.	GARFO/NEFSC

Timeline and Status of Recent MAFMC Actions and Amendments/Frameworks Under Review

As of 3/22/2022

The table below summarizes the status of actions after they have been approved by the Council. For information about the status of Council actions under development, please see the document titled "Status of Council Actions Under Development."

Title	Action Number	Council Approval	Initial Submission	Final Submission	NOA Published	Proposed Rule Published	Approval/ Disapproval Letter	Final Rule Published	Regs Effective	Notes
Excessive Shares Amendment	SCOQ Amd 20	12/9/19	4/24/20	9/25/20						
MSB FMP Goals/Objectives and Illex Permits Amendment	MSB Amd 22	7/16/20	3/15/21							EA edits & letter received 10/8/21 - staff working on edits to re-submit before April Council Meeting.
Black Sea Bass Commercial State Allocation Amendment	TBD	8/4/21	11/19/21							Council/Board took final action in Feb 2021 and then revised their final action on 8/4/21 based on a remand from the ASMFC Policy Board.
Bluefish Allocation and Rebuilding Amendment	Bluefish Amd 7	6/8/21	7/19/21	9/2/21	9/1/21	9/13/21	11/22/21	11/24/21	1/1/22	
Tilefish Multi-Year Specifications Framework	Tilefish FW 6	8/11/21	7/10/21	10/7/21						
Summer Flounder, Scup, Black Sea Bass Commercial/ Recreational Allocation Amendment	TBD	12/14/21								EA currently in development. Implementation expected 1/1/2023.

Timeline and Status of Current and Upcoming Specifications for MAFMC Fisheries

As of 3/22/22

Current Specifications	Year(s)	Council Approval	Initial Submission	Final Submission	Proposed Rule	Final Rule	Regs Effective	Notes
Golden Tilefish	2022-2024	8/11/21	10/7/21					Submitted under the Tilefish Multi-Year Specifications Framework 6
Blueline Tilefish	2022-2024	4/7/21	10/20/21					Edits received 2/10/22. No changes were proposed, rollover in effect, will likely re-submit in late April.
Surfclam and Ocean Quahog	2021-2026	8/12/20	9/2/20	2/24/21	2/17/21	5/13/21	6/14/21	
Longfin Squid	2021-2023	8/10/20	10/14/20	7/2/21	5/26/21	7/22/21	7/22/21	
Butterfish	2021-2022	8/10/20	10/14/20	7/2/21	5/26/21	7/22/21	7/22/21	
Illex Squid	2021-2022	6/17/20	10/14/20	7/2/21	5/26/21	7/22/21	7/22/21	In-season adjustment to Illex from June 2021 Council meeting. SSC will review 2022.
Atlantic Mackerel (including RH/S cap)	2022 (through July 11, 2022, likely extended through 2022)	8/11/21	N/A	N/A	N/A	1/12/22	1/7/22	Emergency action requested by the Council at August 2021 meeting. Emergency actions should lock 2022 catch to near 2021.
Chub mackerel	2020-2022	3/7/19	5/31/19	10/25/19	3/9/20	8/4/20	9/3/20	Reviewed October 2020. No changes recommended.
Bluefish	2022-2023	8/9/21	10/18/21		12/2/21	2/2/22	2/2/22	
Summer Flounder, Scup, Black Sea Bass	2022-2023	8/9/21	10/4/21	11/5/21	11/24/21	12/23/21	1/1/22	
Spiny Dogfish	2021-2022	10/6/20	12/7/20	2/3/21	3/4/21	5/1/21	5/1/21	
Spiny Dogfish	2022 trip limit adjustment	10/6/21	12/30/21		2/25/22			

Recreational Management Measures

Current Management Measures	Year(s)	Council Approval	Initial Submission	Final Submission	Proposed Rule	Final Rule	Regs Effective	Notes
Summer flounder rec measures	2022	12/14/21	2/11/22	2/24/22				Proposed rule may publish prior to April Council meeting. Rulemaking required each year to continue use of conservation equivalency
Black sea bass rec measures	2022	12/14/21	2/11/22	2/24/22				Proposed rule may publish prior to April Council meeting.
Scup rec measures	2022	12/14/21	2/11/22	2/24/22				Proposed rule may publish prior to April Council meeting.
Bluefish rec measures	2022-2023	12/13/21	1/23/20	3/19/20	5/25/20	6/29/20	6/29/20	Reviewed in 2021. No changes from prevous year's measures.

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 25, 2022

To: Council

From: Brandon Muffley, Council staff

Subject: State of the Ecosystem and EAFM Risk Assessment – Meeting Materials

On Tuesday, April 5, 2022, Dr. Sarah Gaichas (NEFSC) will present the 2022 Mid-Atlantic State of the Ecosystem report. Dr. Gaichas will also summarize the updates and changes in the 2022 EAFM risk assessment that is informed by indicators in the State of the Ecosystem report and updated analyses by Council staff. The Council will review the findings and ecosystem considerations contained in both documents and provide any feedback on the future development and utility of the information provided.

Materials listed below are provided for Council consideration of this agenda item.

Materials behind the tab:
- 2022 Mid-Atlantic State of the Ecosystem report
- Cover letter and State of the Ecosystem response memo
- 2022 Mid-Atlantic EAFM Risk Assessment update

2022 State of the Ecosystem

Mid-Atlantic

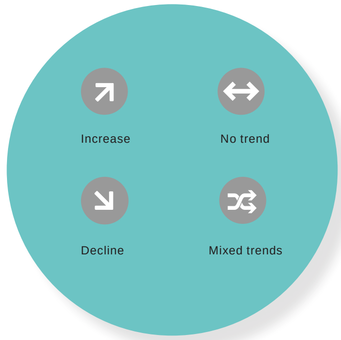
NOAA
FISHERIES

Performance Relative to Fishery Management Objectives

Trends and status of indicators related to broad ecosystem-level fishery management objectives, with implications for the Mid-Atlantic Fishery Management Council (MAFMC)

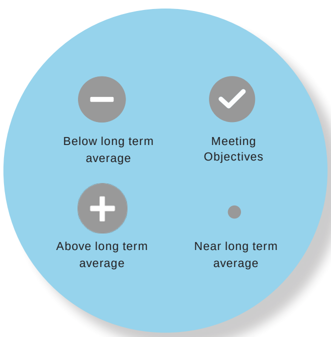
OBJECTIVE (INDICATOR)	**Seafood production** (total and MAFMC managed landings)	**Commercial profits** (indicator not updated, 2020 regional landings not yet available)	**Recreational opportunities** (effort and fleet diversity)
TREND	↘	↘	Effort ↗ Fleet diversity ↘
CURRENT STATUS	Status not updated for 2020	Status not updated for 2020	Effort + Fleet diversity −
IMPLICATIONS	Regional commercial landings data are not yet available for 2020, but coastwide landings trends for federally managed species were mixed when compared to recent years. Recreational harvest is declining due to multiple drivers. COVID-19 seems to have exacerbated existing trends in both commercial and recreational fisheries where data are available, but impacts are not uniform across fisheries. Biomass trends within the ecosystem continue to be stable. Climate indicators continue trending toward unprecedented levels, which affects stock distributions and will generate other ecosystem changes.	Regional commercial revenue data are not yet available for 2020. Coastwide, revenue was down across many federally managed species, due to a mix of both lower prices (summer flounder, scup, black sea bass, squids, monkfish) and landings (surfclam, ocean quahogs, monkfish).	Recreational effort shows a long term increasing trend and has returned to pre-2018 levels, but fleet diversity is decreasing because of a shift away from party/charter to shore-based fishing. This shift results in a decreased range of recreational fishing opportunities. Shore-based anglers will have access to different species/sizes of fish than vessel-based anglers.

Trend



OBJECTIVE (INDICATOR)	**Stability** (fishery and ecosystem diversity maintained over time)	**Social and cultural** (community fishery engagement, reliance, and environmental justice vulnerability)	**Protected species** (coastwide bycatch, population numbers, mortalities)
TREND	Fishery ↔ Ecosystem (mixed)	Status only indicator	Bycatch (mixed) Population NARW ↘
CURRENT STATUS	Fishery ● Ecosystem ●	Environmental justice status for top commercial and recreational communities	Bycatch Harbor porpoise ✓ Population NARW −
IMPLICATIONS	Fishery: Commercial fleet diversity metrics suggests stable capacity to respond to the current range of fishing opportunities. Recreational: Species catch diversity has been maintained by a different set of species over time. Ecosystem: Adult fish diversity indices are stable, but several climate and oceanography metrics are changing and should be monitored as warning signs for potential regime shift or ecosystem restructuring.	These indicators are used to identify top fishing communities and those with environmental justice concerns based on 2019 data. Highlighted communities may be vulnerable to changes in fishing patterns due to regulations and/or climate change. When any of these communities also experience environmental justice issues, they may have lower ability to successfully respond/adapt to change. All communities showing environmental justice concerns score high in the poverty index, while some also score high in personal disruption and population composition indices.	Mixed bycatch trends through 2019 are related to fishery management, shifts in population distribution combined with fishery shifts, and population increase for seals. Bycatch indices were not updated because of low 2020 observer coverage caused by COVID-19 restrictions. Population drivers for North Atlantic Right Whales (NARW) include combined fishery interactions/vessel strikes, distribution shifts, and copepod availability. Unusual mortality events continue for 3 large whale species.

Current Status

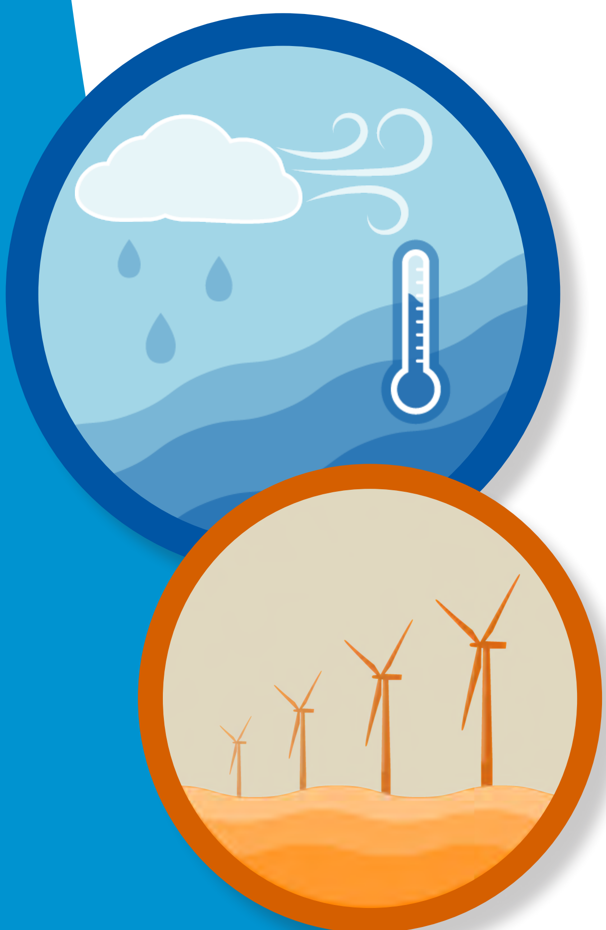


Risks to Meeting Fishery Management Objectives

Climate and Ecosystem Productivity Risks

Climate change, most notably ocean warming and changes in the Gulf Stream, continues to affect the Mid-Atlantic ecosystem:

- Frequent and intense marine heatwaves observed for the last decade continued in 2021.
- The Gulf Stream is becoming less stable, which can affect the physics, chemistry, and biology of the Northeast Shelf.
- Warm, salty, less acidic offshore water is transported onto the shelf more frequently, upwelling deepwater nutrients and reducing acidification in the outer shelf portions of the Mid-Atlantic Bight, but reducing the horizontal extent of the cold pool habitat.
- The cold pool is becoming warmer, smaller, and shorter in duration, which affects habitat for multiple federally managed species.



- Phytoplankton chlorophyll concentrations were below average throughout summer 2021 in the Mid-Atlantic Bight.
- Warming Chesapeake Bay water temperatures are having negative impacts on striped bass at all life stages. Temperature and oxygen conditions are being used to inform fishery closure decisions.
- Submerged aquatic vegetation coverage is increasing in portions of Chesapeake Bay, but declining in the lower region due to increased temperatures. These changes are impacting essential fish spawning and nursery habitats.
- Fish condition was poor for many species in 2021, and productivity is declining for multiple species.

Other Ocean Uses: Offshore Wind Risks

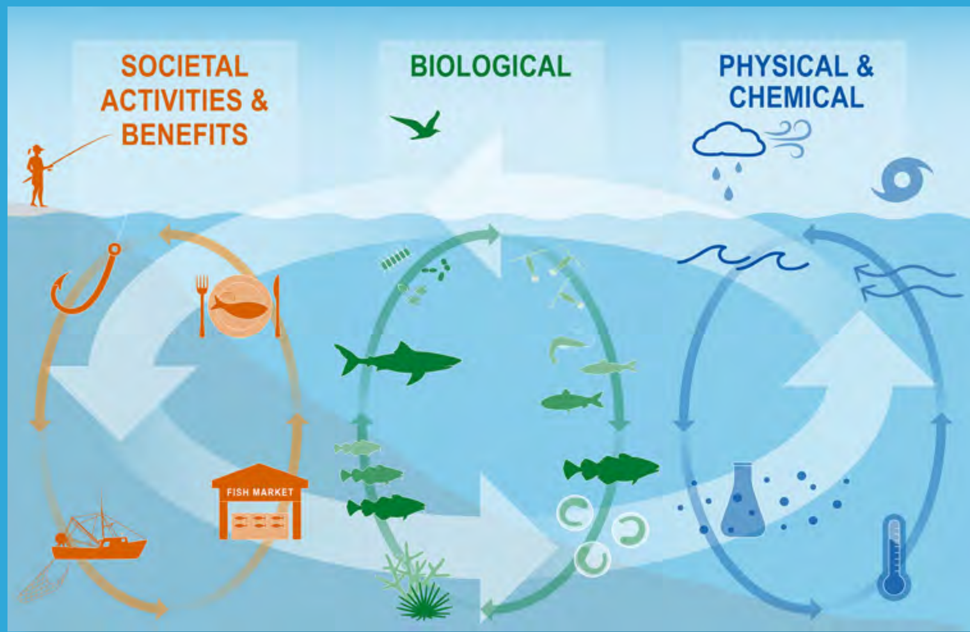
More than 20 offshore wind development projects are proposed for construction on the Northeast shelf, covering more than 1.7 million acres by 2030. An additional 6 lease areas (488,000 acres) were recently identified in the New York Bight, and more areas are anticipated off the Delmarva Peninsula. If all existing and proposed leases are developed in the Northeast:

- 1-31% of port revenue from fisheries currently comes from areas proposed for offshore wind development. Some of these port communities score medium-high to high in environmental justice concerns and gentrification vulnerability.
- Up to 20% of annual commercial landings and revenue for Mid-Atlantic species occur in lease areas and may shift to other areas.
- Development will affect species differently, negatively affecting species that prefer soft bottom habitat while potentially benefiting species that prefer hard structured habitat.
- Planned wind areas overlap with one of the only known right whale foraging habitats, and altered local oceanography could affect right whale prey availability. Development also brings increased vessel strike risk and the potential impacts of pile driving noise.
- Current plans for rapid buildout in a patchwork of areas would spread the impacts differentially throughout the region.

Characterizing Ecosystem Change

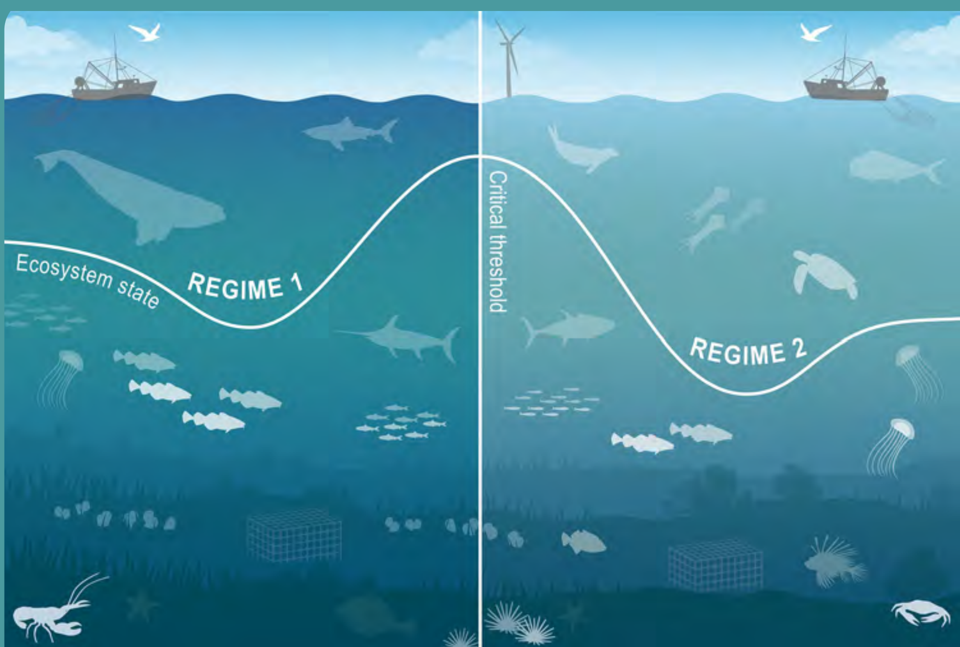
Multiple System Drivers

The Northeast shelf ecosystem is changing, which is affecting the services that the ecosystem provides. To illustrate how multiple factors are driving change in this complex ecosystem, we are using three overarching concepts: multiple system drivers, regime shifts, and ecosystem reorganization. Societal, biological, physical, and chemical factors are the **multiple system drivers** that influence marine ecosystems through a variety of different pathways.



Regime Shift

These drivers affect fishery management objectives such as seafood production and recreational opportunities, as well as other ecosystem services we derive from the ocean. Changes in the multiple drivers can lead to **regime shifts** — large, abrupt and persistent changes in the structure and function of an ecosystem. Regime shifts and changes in how multiple system drivers interact can result in **ecosystem reorganization** as species and humans respond and adapt to the new environment.



Introduction

About This Report

This report is for the Mid-Atlantic Fishery Management Council (MAFMC). The purpose of this report is to synthesize ecosystem information to allow the MAFMC to better meet fishery management objectives, and to update the MAFMC's Ecosystem Approach to Fishery Management (EAFM) risk assessment. The major messages of the report are synthesized on pages 1 and 2, and synthesis themes are illustrated on page 3. The information in this report is organized into two sections; performance measured against ecosystem-level management objectives (Table 1), and potential risks to meeting fishery management objectives (climate change and other ocean uses).

Report structure

The two main sections contain subsections for each management objective or potential risk. Within each subsection, we first review indicator trends, and the status of the most recent data year relative to a threshold (if available) or relative to the long-term average. Second, we synthesize results of other indicators and information to outline potential implications for management (i.e., connecting indicator(s) status to management and why an indicator(s) is important). For example, if there are multiple drivers related to an indicator trend, which drivers may be more or less supported by current information, and which, if any, can be affected by management action(s)? Similarly, which risk indicators warrant continued monitoring to evaluate whether regime shifts or ecosystem reorganization are likely? We emphasize that these implications are intended to represent testable hypotheses at present, rather than "answers," because the science behind these indicators and syntheses continues to develop.

A glossary of terms[1], detailed technical methods documentation[2], and indicator data[3] are available online. The details of standard figure formatting (Fig. 47a), categorization of fish and invertebrate species into feeding guilds (Table 4), and definitions of ecological production units (EPUs, including the Mid-Atlantic Bight, MAB; Fig. 47b) are provided at the end of the document.

Table 1: Ecosystem-scale fishery management objectives in the Mid-Atlantic Bight

Objective Categories	Indicators reported
Provisioning and Cultural Services	
Seafood Production	Landings; commercial total and by feeding guild; recreational harvest
Profits	Revenue decomposed to price and volume
Recreation	Angler trips; recreational fleet diversity
Stability	Diversity indices (fishery and ecosystem)
Social & Cultural	Community engagement/reliance and environmental justice status
Protected Species	Bycatch; population (adult and juvenile) numbers, mortalities
Supporting and Regulating Services	
Biomass	Biomass or abundance by feeding guild from surveys
Productivity	Condition and recruitment of managed species, primary productivity
Trophic structure	Relative biomass of feeding guilds, zooplankton
Habitat	Estuarine and offshore habitat conditions

Performance Relative to Fishery Management Objectives

In this section, we examine indicators related to broad, ecosystem-level fishery management objectives. We also provide hypotheses on the implications of these trends—*why* we are seeing them, what's driving them, and potential or observed regime shifts or changes in ecosystem structure. Identifying multiple drivers, regime shifts, and potential changes to ecosystem structure, as well as identifying the most vulnerable resources, can help managers determine whether we can do anything differently to meet objectives and how to prioritize for upcoming issues/risks.

[1] https://noaa-edab.github.io/tech-doc/glossary.html
[2] https://NOAA-EDAB.github.io/tech-doc
[3] https://github.com/NOAA-EDAB/ecodata

Special note on data availability for the 2022 report

The Catch Accounting and Monitoring System (CAMS) that will be used to provide commercial landings and discard information at the Ecological Production Unit (EPU) scale is under development. As of February 2022, our standard indicators relying on EPU scale landings data cannot be calculated for 2020 (commercial seafood production, commercial profits, ecosystem overfishing). We provide information based on coastwide commercial landings information available at this time in [1][4], and will calculate our standard indicators at EPU scales with disaggregated 2020 commercial landings data when they are available.

Seafood Production

Indicators: Landings; commercial and recreational

Total commercial landings (black) within the Mid-Atlantic are not yet available for 2020; Figure 1 includes data only through 2019. However, we do not anticipate the long-term declining trend in landings to change.

Coastwide landings at the Federal fishery management plan (FMP) level were mixed in 2020 when compared to recent years [1]. Landings of monkfish and of combined surfclam and ocean quahog declined in 2020, while landings of combined summer flounder, scup, and black sea bass increased, and landings of combined squid species increased in 2020.

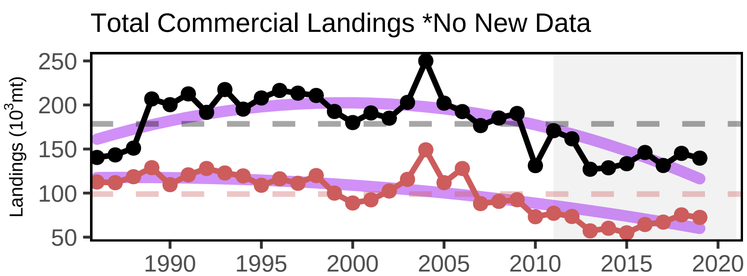


Figure 1: Total commercial seafood landings through 2019 (black) and Mid-Atlantic managed seafood landings (red).

Total recreational harvest (retained fish presumed to be eaten) is down in the MAB (Fig. 2). Although harvest has increased from a historic low in 2018, it is still below the average value for the series.

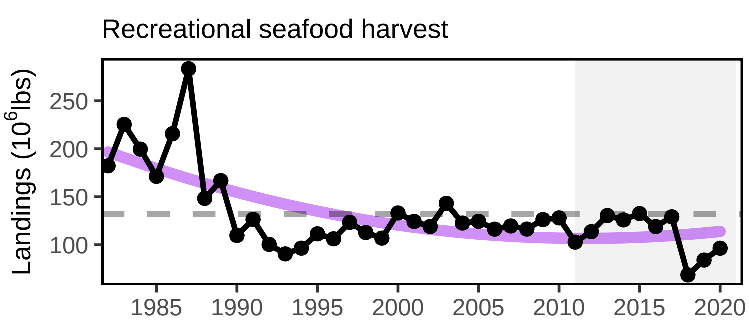


Figure 2: Total recreational seafood harvest (millions of pounds) in the Mid-Atlantic region.

Recreational shark landings show an increase in pelagic sharks over the past decade, with a sharp decrease in 2018 - 2019 persisting through 2021 (Fig 3). This is likely influenced by regulatory changes implemented in 2018 intended to rebuild shortfin mako stocks. In 2021 the International Commission for the Conservation of Atlantic Tunas

[4] https://spo.nmfs.noaa.gov/sites/default/files/TM221.pdf

(ICCAT) finalized recommendations for a two-year retention ban (ICCAT Rec.21-09), which will also affect total overall landings of pelagic sharks in coming years.

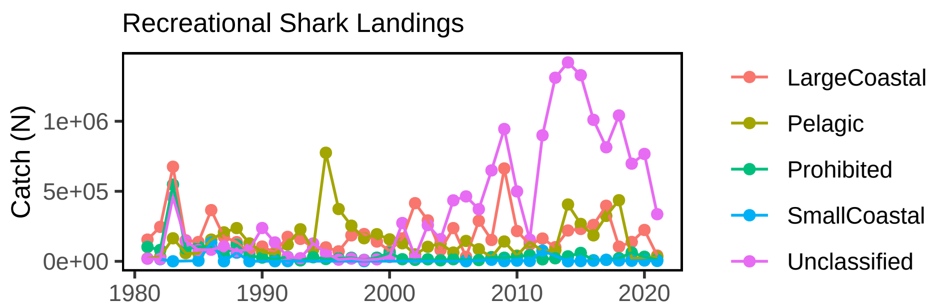


Figure 3: Recreational shark landings from Marine Recreational Information Program.

Aquaculture production is not yet included in total seafood landings, but we are working toward including it in future reports. Available aquaculture production of oysters for a subset of Mid-Atlantic states is trending upward.[5]

Implications

Declining commercial and recreational landings can be driven by many interacting factors, including combinations of ecosystem and stock production, management actions, market conditions (including COVID-19 disruptions), and environmental change. While we cannot evaluate all possible drivers at present, here we evaluate the extent to which stock status and system biomass trends may play a role.

Stock Status and Catch Limits Single species management objectives (1. maintaining biomass above minimum thresholds and 2. maintaining fishing mortality below overfishing limits) are being met for all but two MAFMC managed species, though the status of six stocks is unknown (Fig. 4).

[5] https://noaa-edab.github.io/ecodata/human_dimensions_MAB#Commercial; "Oyster Aquaculture" tab

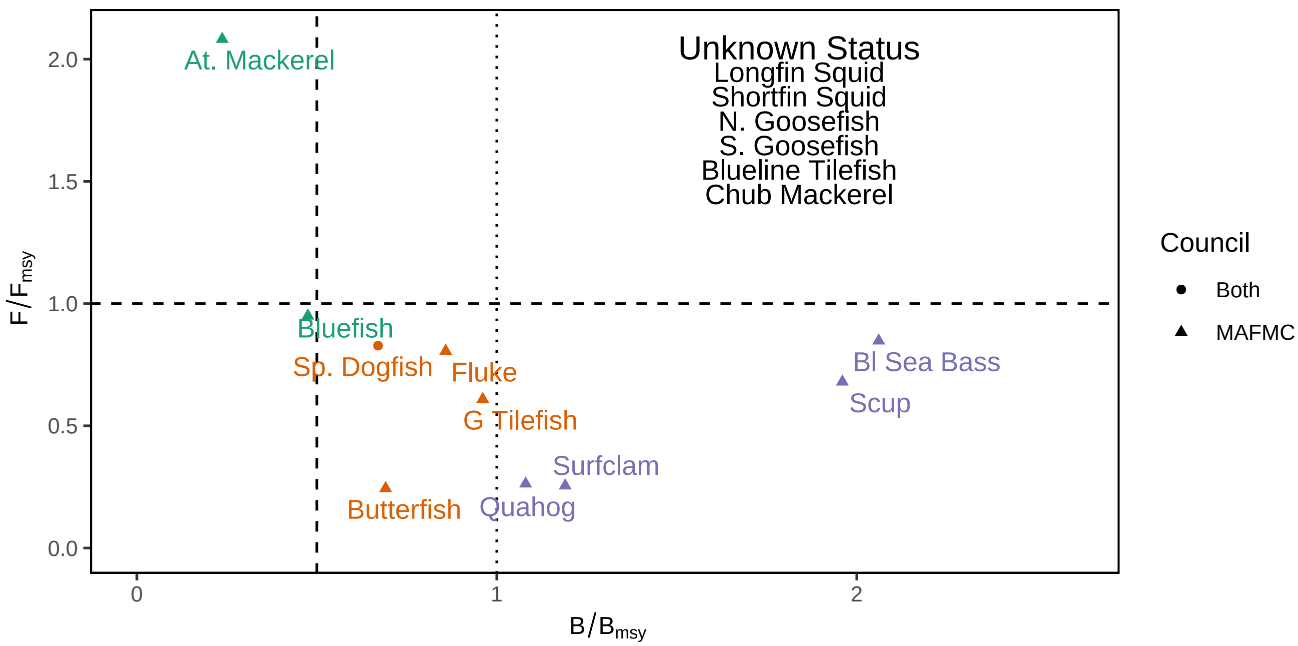


Figure 4: Summary of single species status for MAFMC and jointly federally managed stocks (Spiny dogfish and both Goosefish). The dotted verticxal line is the target bioomass reference point of Bmsy. The dashed lines are the management trehsolds of one half Bmsy (vertical) or Fmsy (horizontal). Stocks in green are below the biomass threshold (overfished), stocks in orange are above the biomass threshold but below the biomass target, and stocks in purple are above the biomass target. Only one stock, Atlantic mackerel, has fishing mortality above the limit (subject to overfishing).

Stock status affects catch limits established by the Council, which in turn may affect landings trends. Summed across all MAFMC managed species, total Acceptable Biological Catch or Annual Catch Limits (ABC or ACL) have been relatively stable 2012-2020 (Fig. 5). The recent total ABC or ACL is lower relative to 2012-2013, with much of that decrease due to declining Atlantic mackerel ABC. This is true even with the addition of blueline tilefish management in 2017 contributing an additional ABC and ACL to the total 2017-2020, due to that fishery's small relative size.

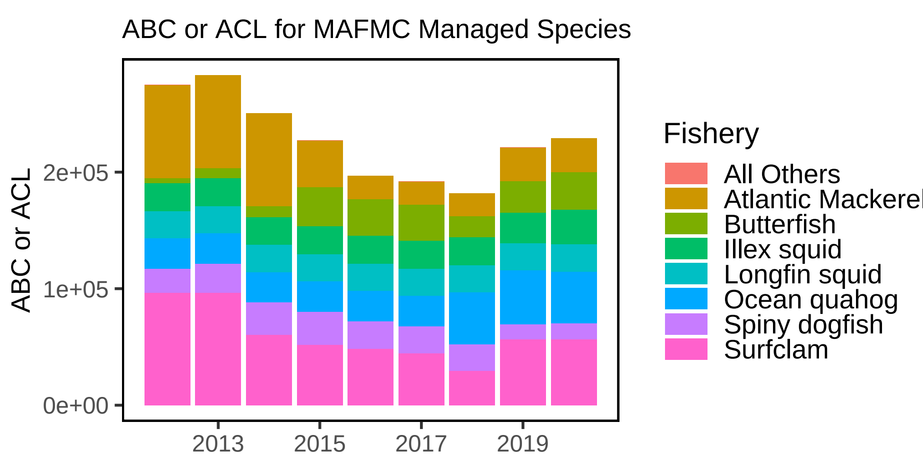


Figure 5: Sum of catch limits across all MAFMC managed fisheries.

Nevertheless, the percentage caught for each stock's ABC/ACL suggests that these catch limits are not generally constraining as most species are well below the 1/1 ratio (Fig. 6). Therefore, stock status and associated management constraints are unlikely to be driving decreased landings for the majority of species.

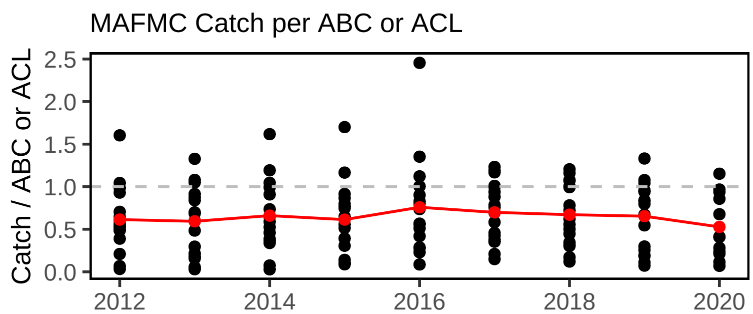


Figure 6: Catch divided by ABC/ACL for MAFMC managed fisheies. Chub mackerel removed due extremely low catch. Outliers = Recreational Black Sea Bass.

System Biomass Although aggregate biomass trends derived from scientific resource surveys are mostly stable in the MAB, spring piscivores and fall benthos show long-term increases (Fig. 7). While managed species make up varying proportions of aggregate biomass, trends in landings are not mirroring shifts in the overall trophic structure of survey-sampled fish and invertebrates. Therefore, major shifts in feeding guilds or ecosystem trophic structure are unlikely to be driving the decline in landings.

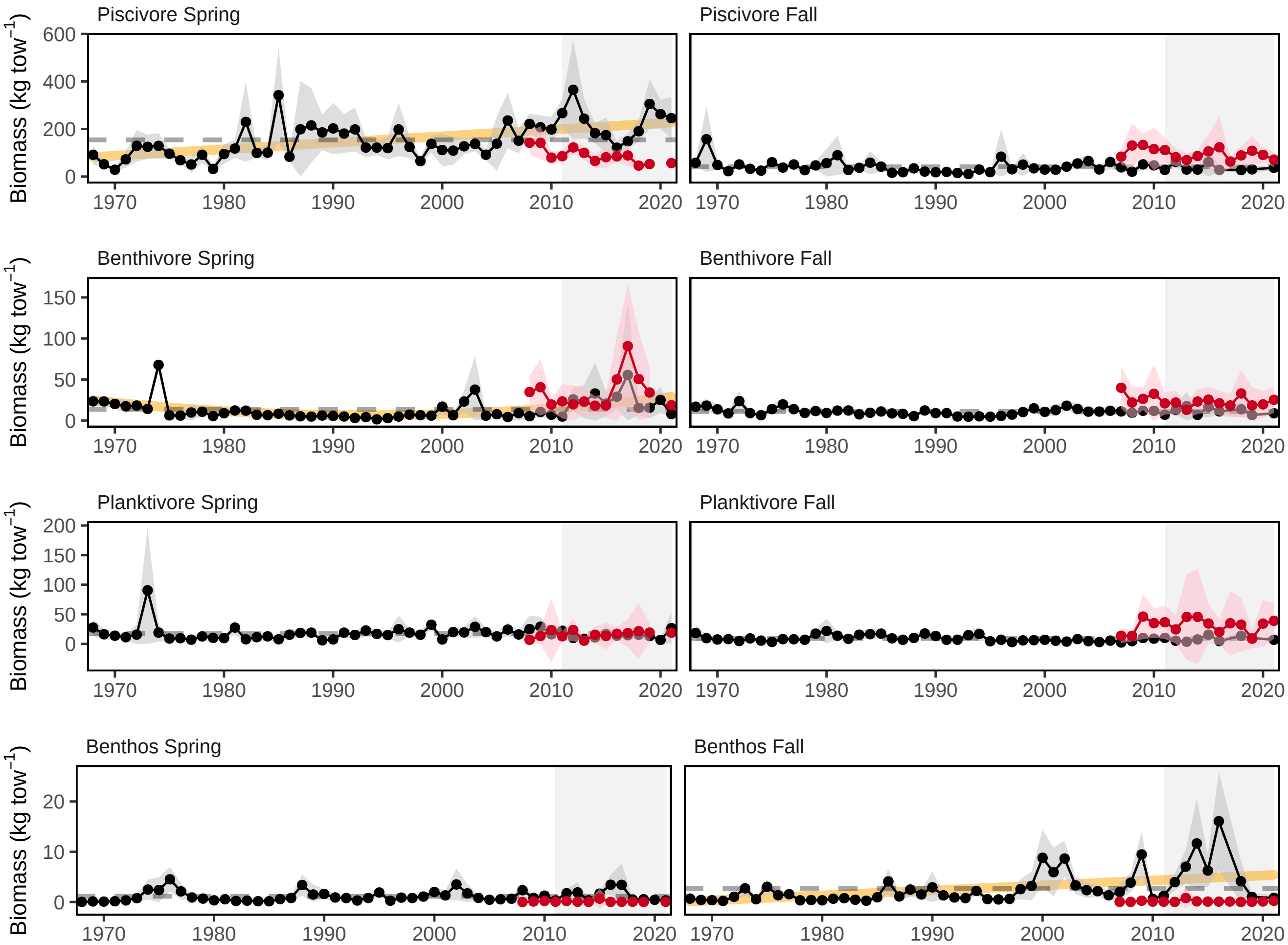


Figure 7: Spring (left) and fall (right) surveyed biomass in the Mid-Atlantic Bight. Data from the NEFSC Bottom Trawl Survey are shown in black, with the nearshore NEAMAP survey shown in red. The shaded area around each annual mean represents 2 standard deviations from the mean.

Effect on Seafood Production Stock status is mostly acceptable, and aggregate biomass trends appear stable, so the decline in commercial landings is most likely driven by market dynamics affecting the landings of surfclams and ocean quahogs, as landings have been below quotas for these species.

Climate change also seems to be shifting the distribution of surfclams and ocean quahogs, resulting in areas with overlapping distributions and increased mixed landings. Given the regulations governing mixed landings, this could become problematic in the future and is currently being evaluated by the Council.

The decline in recreational seafood landings stems from other drivers. Some of the decline, such as that for recreational shark landings, is driven by management intended to reduce fishing mortality on mako sharks. However, NOAA Fisheries' Marine Recreational Information Program survey methodology was updated in 2018, so it is unclear whether the record-low landings for species other than sharks in 2018 are driven by changes in fishing behavior or the change in the survey methodology.

Other environmental changes require monitoring as they may become important drivers of landings in the future:

- Climate is trending into uncharted territory. Globally, 2021 was the sixth warmest year on record[6] with regional marine heatwaves apparent (see Climate Risks section).

[6] https://www.climate.gov/news-features/features/2021-global-climate-summary-6th-warmest-year-record

- Stocks are shifting distribution, moving towards the northeast and into deeper waters throughout the Northeast US Large Marine Ecosystem (Fig. 8).

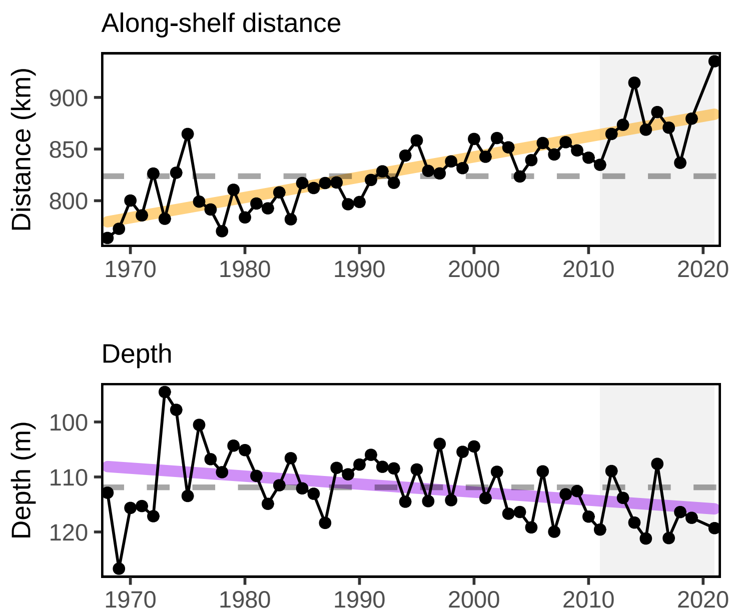


Figure 8: Aggregate species distribution metrics for species in the Northeast Large Marine Ecosystem.

- Some ecosystem composition and production changes have been observed (see Stability section).
- Some fishing communities are affected by environmental justice vulnerabilities (see Environmental Justice and Social Vulnerability section).

Commercial Profits

Indicators: revenue (a proxy for profits)

Total commercial revenues (black) within the Mid-Atlantic are not yet available for 2020; Figure 9 includes data only through 2019. However, we do not anticipate the long-term declining trend in revenue from managed species (red) to change. Coast-wide, a number of species managed by the MAFMC have seen decreases in revenue when compared to the average revenue generated between 2015 and 2019 [1]. This decline was driven by a mix of landings declines (monkfish, combined surfclam and ocean quahog) and price declines (monkfish, combined squid species, and combined summer flounder, scup, and black sea bass).

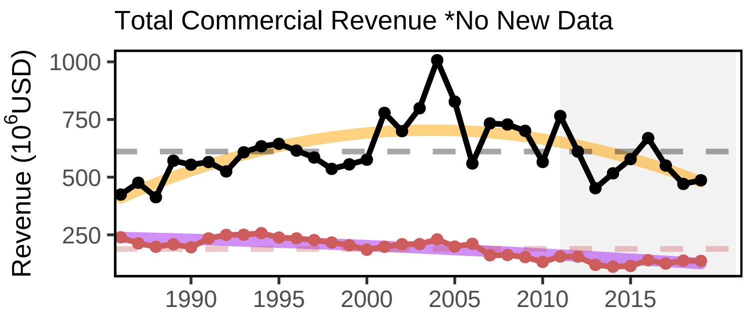


Figure 9: Revenue through 2019 for the for the Mid-Atlantic region: total (black) and from MAFMC managed species (red).

Implications

The Bennet indicator evaluating changes in landings volume and price for the Mid-Atlantic will be updated when 2020 Mid-Atlantic landings become available.

Changes in other indicators, particularly those driving landings and those related to climate change, require monitoring as they may become important drivers of revenue in the future; for example:

- Surfclams and ocean quahogs are sensitive to warming ocean temperatures and ocean acidification.
- Acidification levels in surfclam summer habitat are approaching, but not yet at, levels affecting surfclam growth (see Climate Risks section).

Recreational Opportunities

Indicators: Angler trips, fleet diversity

Recreational effort (angler trips) has increased over the long term, with 2020 effort above the long-term average (Fig. 10). However, recreational fleet diversity (i.e., effort by shoreside, private boat, and for-hire anglers) has declined over the long term (Fig. 11).

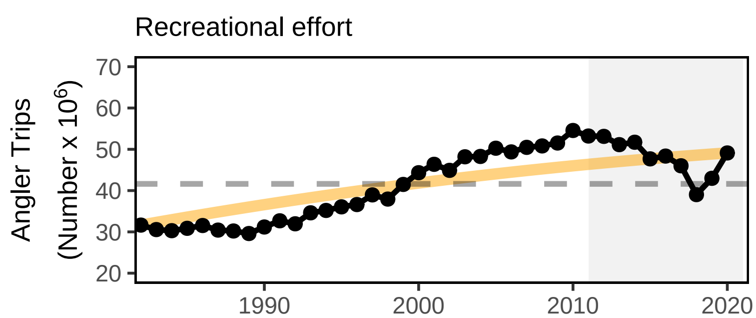


Figure 10: Recreational effort in the Mid-Atlantic.

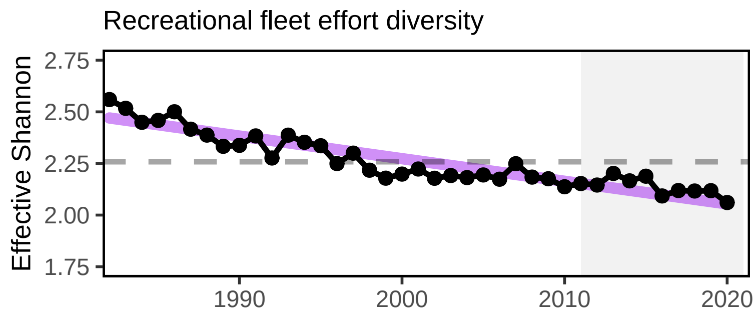


Figure 11: Recreational fleet effort diversity in the Mid-Atlantic.

Implications

Increased angler trips in 2020 relative to previous years strongly influence the long term increase in recreational effort. While the overall number of recreational opportunities in the MAB is above the long term average, the continuing decline in recreational fleet effort diversity suggests a potentially reduced range of recreational fishing options.

The downward effort diversity trend is driven by party/charter contraction (from a high of 24% of angler trips to 7% currently), and a shift toward shorebased angling. Effort in private boats remained stable between 36-37% of angler trips across the entire series.

Changes in recreational fleet diversity can be considered when managers seek options to maintain recreational opportunities. Shore anglers will have access to different species than vessel-based anglers, and when the same species is accessible both from shore and from a vessel, shore anglers typically have access to smaller individuals. Many states have developed shore-based regulations where the minimum size is lower than in other areas and sectors to maintain opportunities in the shore angling sector.

Stability

Indicators: fishery fleet and catch diversity, ecological component diversity

While there are many potential metrics of stability, we use diversity indices as a first check to evaluate overall stability in fisheries and ecosystems. In general, diversity that remains constant over time suggests a similar capacity to respond to change over time. A significant change in diversity over time does not necessarily indicate a problem or an improvement, but does indicate a need for further investigation. We examine commercial fleet and species catch diversity, and recreational species catch diversity (with fleet effort diversity discussed above), and diversity in zooplankton, and larval and adult fishes.

Fishery Diversity Diversity estimates have been developed for fleets landing managed species, and species landed by commercial vessels with Mid-Atlantic permits. A fleet is defined here as the combination of gear type (Scallop Dredge, Other Dredge, Gillnet, Hand Gear, Longline, Bottom Trawl, Midwater Trawl, Pot, Purse Seine, or Clam Dredge) and vessel length category (less than 30 ft, 30 to 50 ft, 50 to 75 ft, 75 ft and above). Commercial fishery fleet count and fleet diversity have been stable over time in the MAB, with current values near the long-term average (Fig. 12). This indicates similar commercial fleet composition and species targeting opportunities over time.

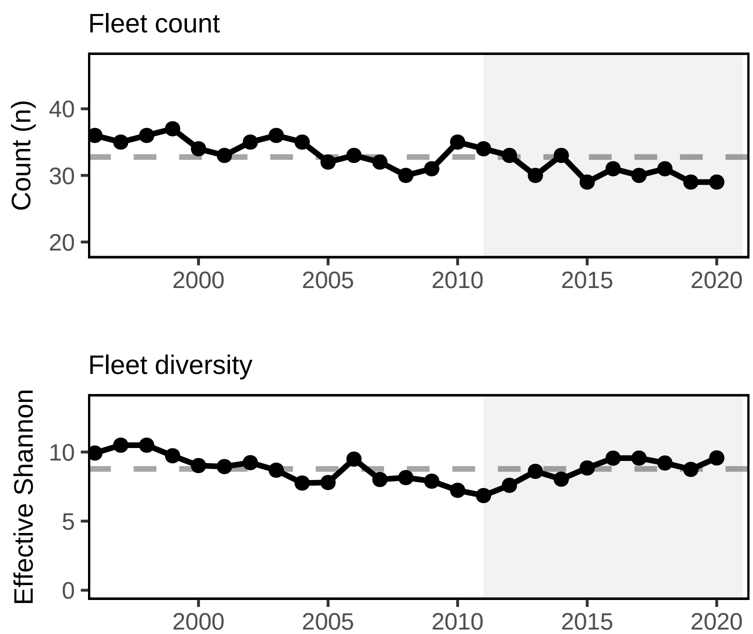


Figure 12: Commercial fleet count and diversity in the Mid-Atlantic.

Commercial fisheries are relying on fewer species relative to the mid-90s, but current species revenue diversity has been consistent since then and is currently near, but below, the long term average (Fig. 13).

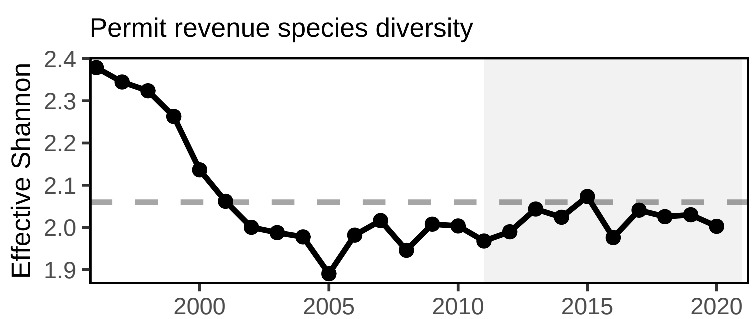


Figure 13: Species revenue diversity in the Mid-Atlantic.

As noted above, recreational fleet effort diversity is declining (Fig. 11), so this metric suggests an unstable range of recreational fishing opportunties. However, recreational species catch diversity has no long term trend so is considered stable, and has been at or above the long term average in 7 of the last 10 years (Fig. 14).

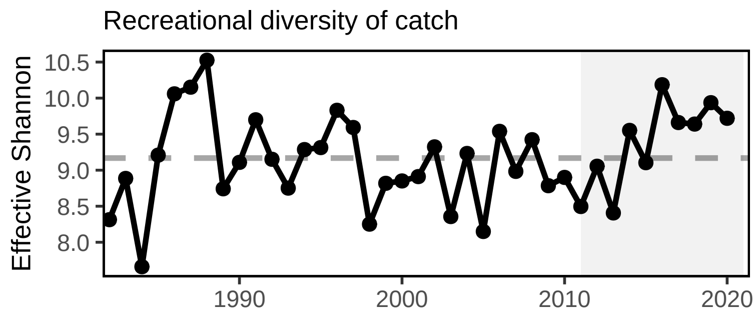


Figure 14: Diversity of recreational catch in the Mid-Atlantic.

Ecological Diversity Ecological diversity indices show mixed trends. Up to 2019, zooplankton diversity was increasing in the MAB (Fig. 15). 2020 surveys were incomplete due to COVID-19. Zooplankton and larval fish diversity indicators will be updated once 2021 survey results have been processed. Adult fish diversity is measured as the expected number of species in a standard number of individuals sampled from the NEFSC bottom trawl survey. There is no vessel correction for this metric, so indices collected aboard the research vessel Albatross IV (up to 2008) and research vessel Bigelow (2009-2021) are calculated separately. Despite this, adult fish diversity indices appear stable over time, with current values within one standard deviation from most historic estimates (Fig. 16).

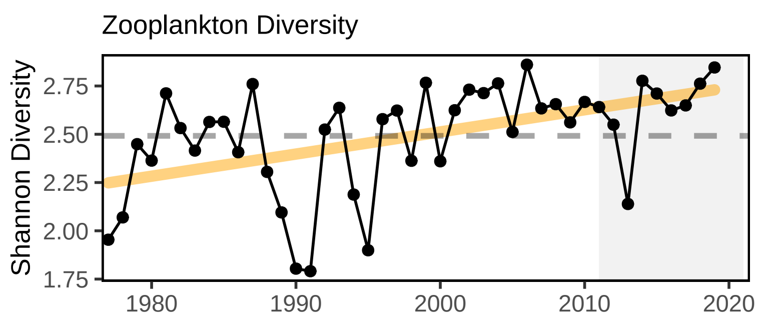


Figure 15: Zooplankton diversity in the Mid-Atlantic Bight up to 2019, based on Shannon diversity index.

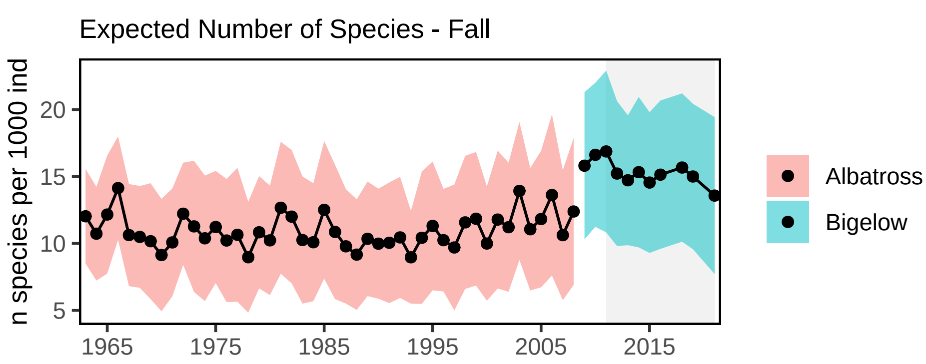


Figure 16: Adult fish diversity in the Mid-Atlantic Bight, based on expected number of species. Results from survey vessels Albatross and Bigelow are reported separately due to catchability differences.

Implications

Fleet diversity indices are used by the MAFMC to evaluate stability objectives as well as risks to fishery resilience and maintaining equity in access to fishery resources [2].

Stability in commercial fleet diversity metrics suggests stable capacity to respond to the current range of fishing opportunities.

Declining recreational fleet effort diversity, as noted above, indicates that the party/charter boat sector continues to contract, with shoreside angling becoming more important, as a percentage of recreational angler trips.

Stability in recreational species catch diversity has been maintained by a different set of species over time. A recent increase in Atlantic States Marine Fisheries Commission (ASMFC) and South Atlantic Fishery Management Council (SAFMC) managed species in recreational catch is helping to maintain diversity in the same range that MAFMC and New England Fishery Management Council (NEFMC) species supported in the 1990s.

Ecological diversity indices can provide insight into ecosystem structure. Changes in ecological diversity over time may indicate altered ecosystem structure with implications for fishery productivity and management [3].

Increasing zooplankton diversity through 2019 is driven by the declining dominance of the calanoid copepod *Centropages typicus*, with a similar composition of other zooplankton species.

Stable adult fish diversity indicates the same overall number and evenness over time, but doesn't rule out species substitutions (e.g., warm-water replacing cold-water). In addition, the change in survey vessels complicates interpretation of long term fish diversity trends.

In the MAB, existing diversity indicators suggest overall stability in the fisheries and ecosystem components examined. However, declining recreational fleet diversity suggests a potential loss in the range of recreational fishing opportunities, and increasing zooplankton diversity is due to the declining dominance of an important species, suggesting change in the zooplankton community that warrants continued monitoring to determine if managed species are affected.

Environmental Justice and Social Vulnerability

Indicators: Environmental Justice and Social Vulnerability in commercial and recreational fishing communities

Social vulnerability measures social factors that shape a community's ability to adapt to change. A subset of these can be used to assess potential environmental justice issues. Environmental Justice is defined in Executive Order 12898 as federal actions intended to address disproportionately high and adverse human health and environmental effects of federal actions on minority and low-income populations. Three of the existing NOAA Fisheries Community Social Vulnerability Indicators (CSVIs), the Poverty Index, Population Composition Index, and Personal Disruption Index, can be used for mandated Environmental Justice analysis[7].

Commercial fishery engagement measures the number of permits and dealers, and pounds and value landed in a community, while reliance expresses these numbers based on the level of fishing activity relative to the total population of a community. Recreational fishery engagement measures shore, private vessel, and for-hire fishing effort while reliance expresses these numbers based on fishing effort relative to the population of a community.

In 2021, we reported the top ten most engaged, and top ten most reliant commercial and recreational fishing communities and their associated social vulnerability. Here we apply the same selection standard for top ten fishing communities for both sectors, and focus on examining the environmental justice vulnerability in these communities.

Communities plotted in the upper right section of Fig.17 scored high for both commercial engagement and reliance, including Cape May and Barnegat Light, NJ, and Reedville, VA. Communities that ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange: Newport News, VA; Atlantic City, NJ; Hampton Bays/Shinnecock, NY; and Beaufort, Columbia and Hobucken, NC.

[7] https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities

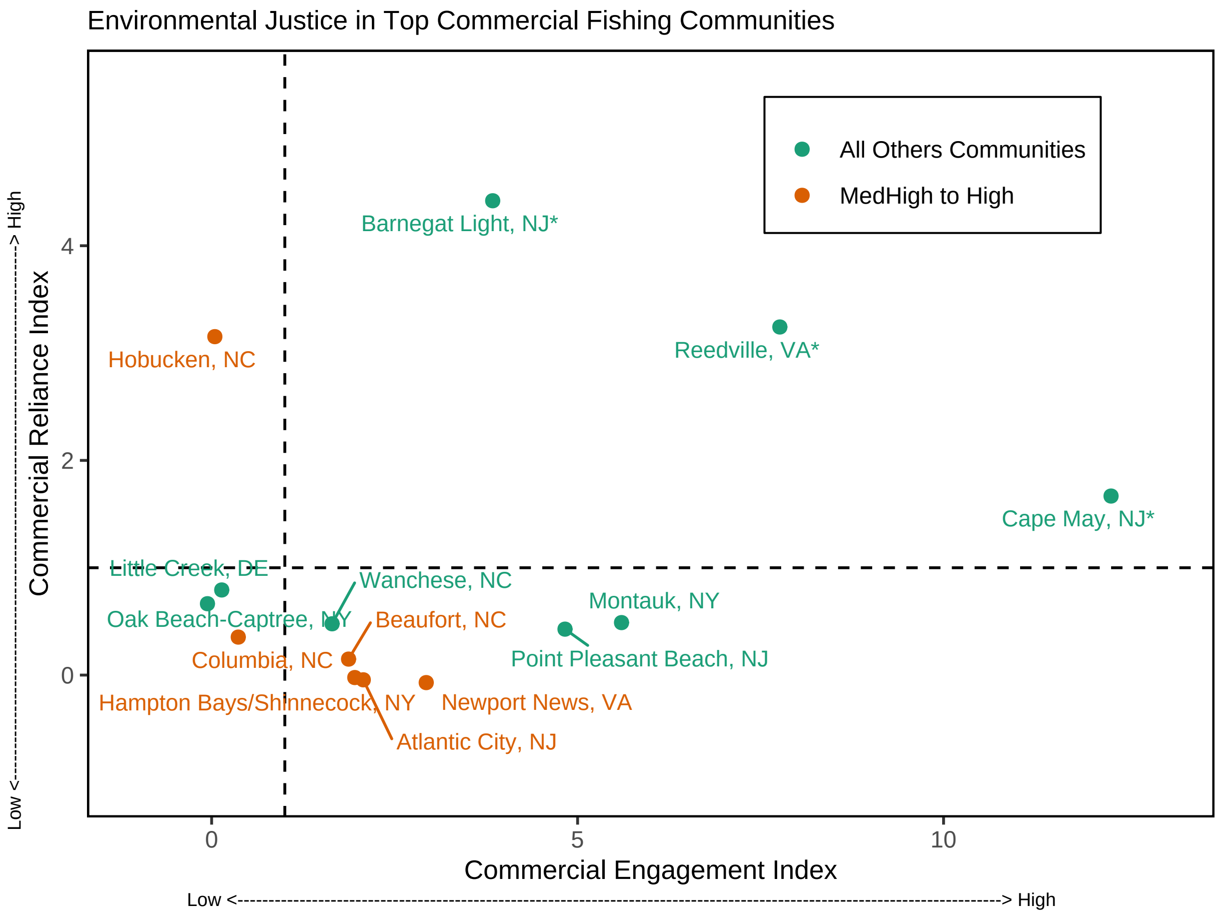


Figure 17: Commercial engagement, reliance, and environmental justice vulnerability for the top commercially engaged and reliant fishing communities in the Mid-Atlantic. Communities ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange. *Community scored high (1.00 and above) for both commercial engagement and reliance indicators.

Fig. 18 shows the detailed scores of the three environmental justice indicators for the same communities plotted in Fig.17. Communities are plotted clockwise in a descending order of commercial engagement scores from high to low, with the most highly engaged community, Cape May, NJ, listed on the top. Among the communities ranked medium-high or above for environmental justice vulnerability, Newport News, VA scored medium-high for the population composition index. Atlantic City, NJ scored high for all of the three environmental justice indicators. Hampton Bays/Shinnecock, NY scored medium-high for the population composition index. Beaufort, NC scored medium-high and very close to high for the poverty index. Columbia, NC scored high for the personal disruption index and the poverty index, and medium-high for the population composition index. Hobucken, NC scored high for the personal disruption index and the poverty index.

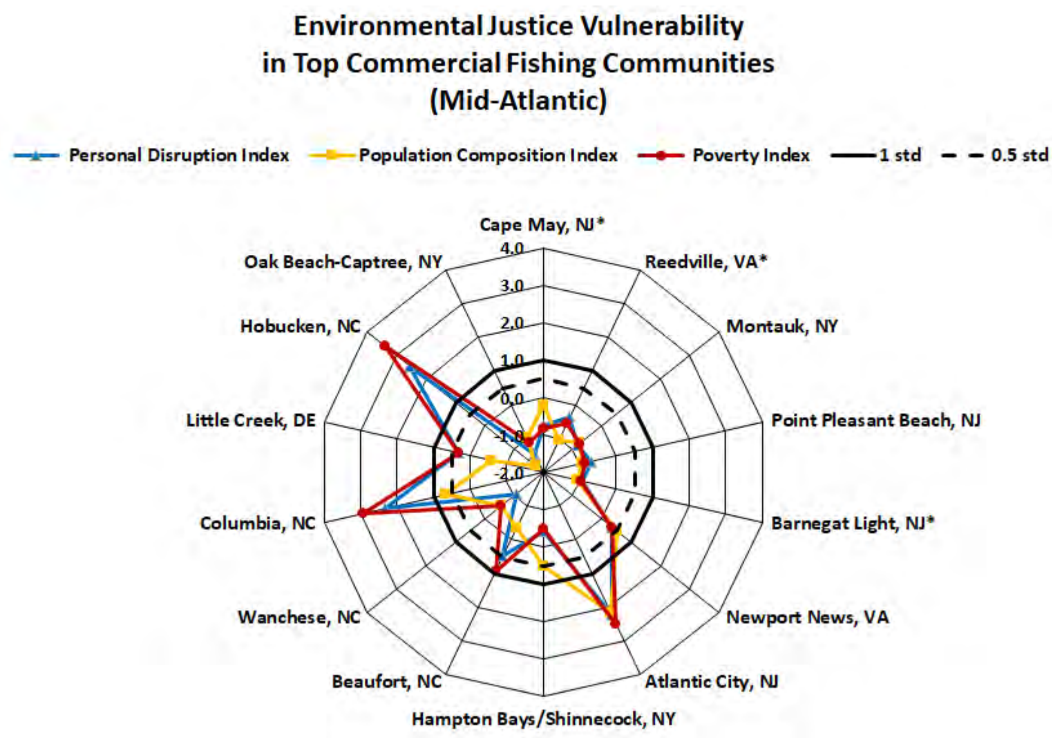


Figure 18: Environmental justice indicators (Poverty Index, population composition index, and personal disruption index) for top commercial fishing communities in Mid-Atlantic. *Community scored high (1.00 and above) for both commercial engagement and reliance indicators.

Communities plotted in the upper right section of Fig.19 scored high for both recreational engagement and reliance, including Barnegat Light, NJ and Deal Island, MD. Communities that ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange: Hatteras and Morehead City, NC.

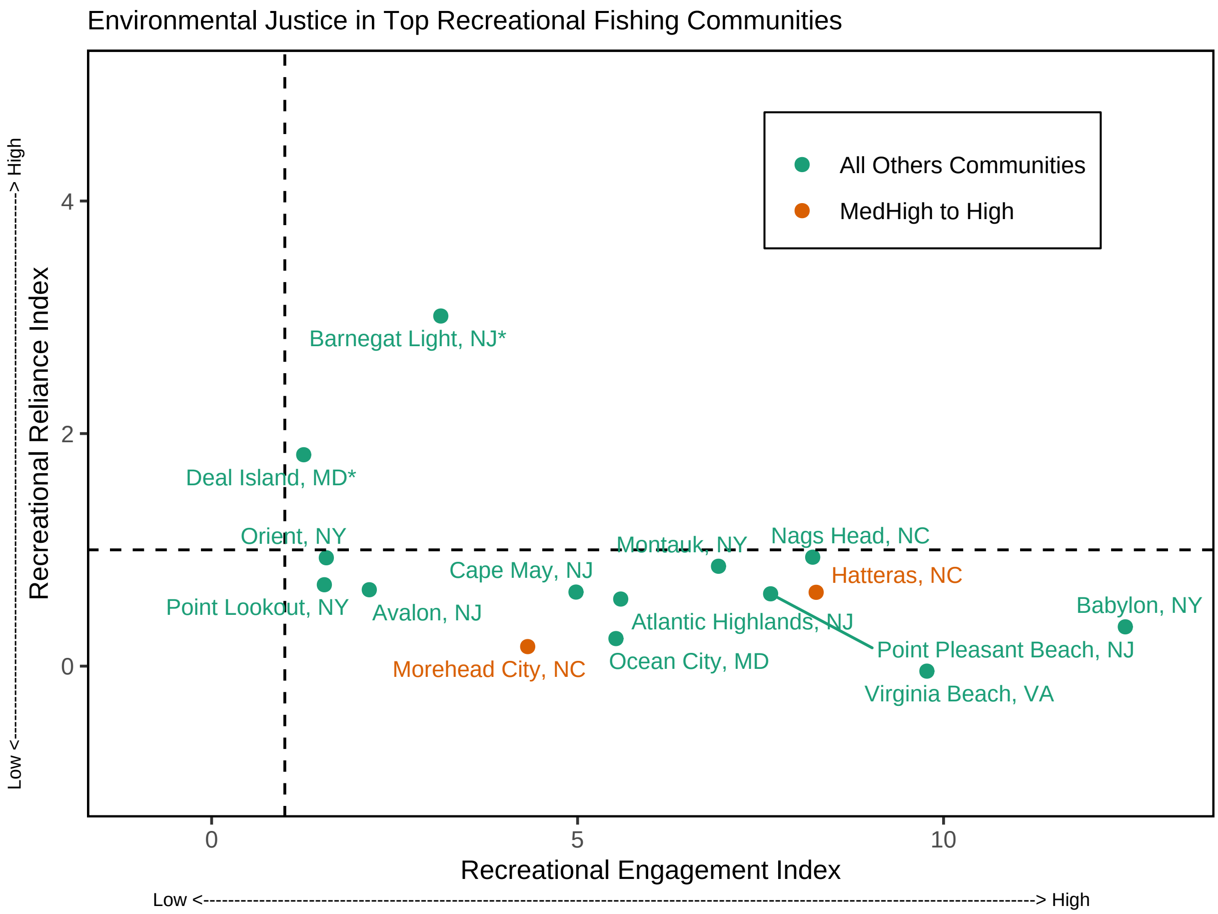


Figure 19: Recreational engagement and reliance, and environmental justice vulnerability, for the top recreationally engaged and reliant fishing communities in the Mid-Atlantic. Communities ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange. *Community scored high (1.00 and above) for both recreational engagement and reliance indicators.

Fig. 20 orders communities clockwise in a descending order of recreational engagement scores from high to low, with the most highly engaged community, Babylon, NY, listed on the top. The two communities with environmental justice concerns, Hatteras and Morehead City, NC, both scored medium-high for the poverty index.

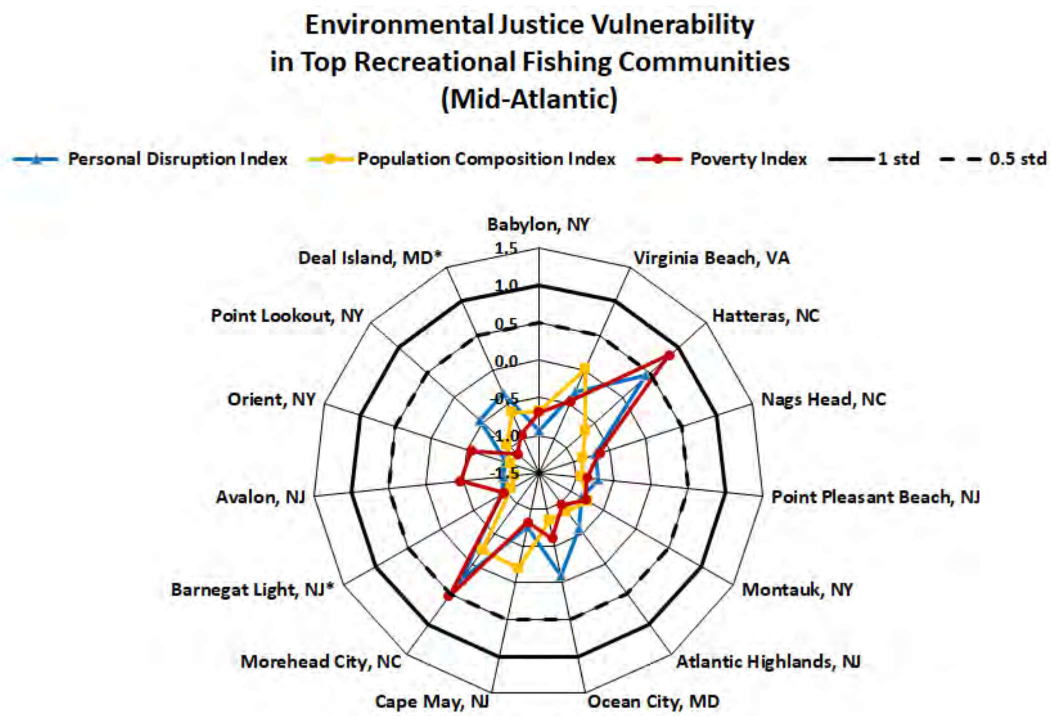


Figure 20: Environmental justice indicators (Poverty Index, population composition index, and personal disruption index) for top recreational fishing communities in Mid-Atlantic. *Community scored high (1.00 and above) for both recreational engagement and reliance indicators.

Both commercial and recreational fishing are important activities in Montauk, NY, Barnegat Light, Cape May and Point Pleasant Beach, NJ, meaning these communities may be impacted simultaneously by commercial and recreational regulatory changes. All of these communities scored lower than medium-high for all of the three environmental justice indicators, indicating that environmental justice may not be a major concern in these communities at the moment based on the indicators analyzed.

Implications

These plots provide a snapshot of the presence of environmental justice issues in the most highly engaged and most highly reliant commercial and recreational fishing communities in the Mid-Atlantic. These communities may be vulnerable to changes in fishing patterns due to regulations and/or climate change. When any of these communities are also experiencing social vulnerability including environmental justice issues, they may have lower ability to successfully respond to change.

Protected Species

Protected species include marine mammals protected under the Marine Mammal Protection Act, endangered and threatened species protected under the Endangered Species Act, and migratory birds protected under the Migratory Bird Treaty Act. In the Northeast U.S., endangered/threatened species include Atlantic salmon, Atlantic and shortnose sturgeon, all sea turtle species, and five baleen whales. Fishery management objectives for protected species generally focus on reducing threats and on habitat conservation/restoration. Here we report on the status of these actions as well as indicating the potential for future interactions driven by observed and predicted ecosystem changes in the Northeast U.S. Protected species objectives include managing bycatch to remain below potential biological removal (PBR) thresholds, recovering endangered populations, and monitoring unusual mortality events (UMEs).

Indicators: bycatch, population (adult and juvenile) numbers, mortalities

As of 2019, rolling 5 year average bycatch indices for both harbor porpoise and gray seal bycatch were below current PBR thresholds, thus meeting management objectives. However, the 2019 bycatch estimate for gray seals was the highest in the time series and above PBR for that year (see 2021 report[8]). Bycatch indices were not updated because of low 2020 observer coverage caused by COVID-19 restrictions.

The North Atlantic right whale population was on a recovery trajectory until 2010, but has since declined (Fig. 21). Reduced survival rates of adult females and diverging abundance trends between sexes have also been observed. It is estimated that there are fewer than 100 adult females remaining in the population.

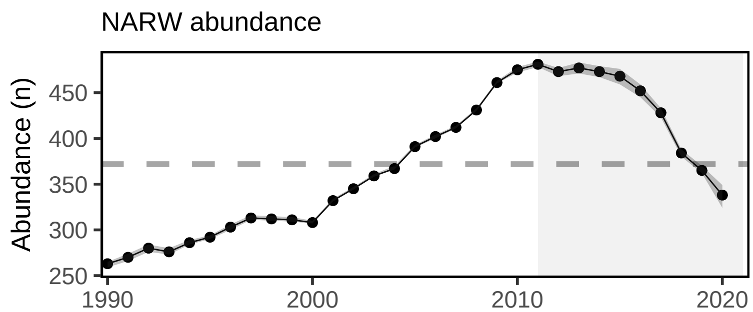


Figure 21: Estimated North Atlanic right whale abundance on the Northeast Shelf.

North Atlantic right whale calf counts have generally declined after 2009 to the point of having zero new calves observed in 2018 (Fig. 22). However, seven new calves were born in 2019, 10 were born in 2020, and preliminary 2021 observations of 18 calves have been recorded as of January 2022.

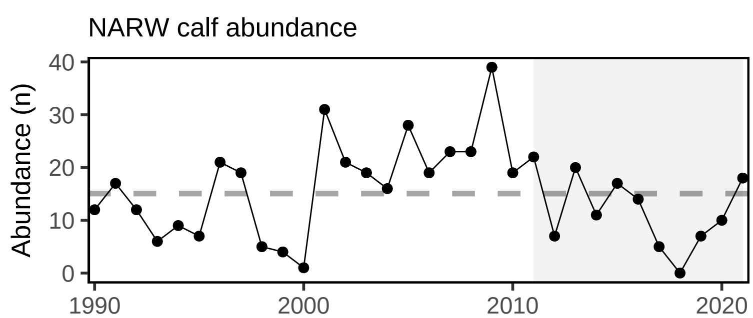


Figure 22: Number of North Atlantic right whale calf births, 1990 - 2021.

This year, the Unusual Mortality Event (UME) for North Atlantic right whales continued. Since 2017, the total UME right whale mortalities includes 34 dead stranded whales, 13 in the US and 21 in Canada. When alive but seriously injured whales (16) are taken into account, 50 individual whales are included in the UME. During 2020, two mortalities were documented, however, recent research suggests that many mortalities go unobserved and the true number of mortalities are about three times the count of the observed mortalities [4]. The primary cause of death is "human interaction" from entanglements or vessel strikes[9].

Two additional UMEs continued from previous years for humpback whales and minke whales; suspected causes include human interactions and/or infectious disease. A UME for both gray and harbor seals was declared from

[8] https://repository.library.noaa.gov/view/noaa/29525
[9] https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2022-north-atlantic-right-whale-unusual-mortality-event

2018-2020 due to a high number of mortalities thought to be caused by phocine distemper virus, but is pending closure as of January 2022[10].

Implications

Bycatch management measures have been implemented to maintain bycatch below PBR thresholds. The downward trend in harbor porpoise bycatch could also be due to a decrease in harbor porpoise abundance in US waters, reducing their overlap with fisheries, and a decrease in gillnet effort. The increasing trend in gray seal bycatch may be related to an increase in the gray seal population (U.S. pup counts).

The number of gray seals in U.S. waters has risen dramatically in the last three decades. Based on a survey conducted in 2016, the size of the gray seal population in the U.S. during the breeding season was approximately 27,000 animals, while in Canada the population was estimated to be roughly 425,000. The population in Canada is increasing at roughly 4% per year, and contributing to rates of increase in the U.S., where the number of pupping sites has increased from one in 1988 to nine in 2019. Mean rates of increase in the number of pups born at various times since 1988 at four of the more data-rich pupping sites (Muskeget, Monomoy, Seal, and Green Islands) ranged from no change on Green Island to high rates of increase on the other three islands, with a maximum increase of 26.3% (95%CI: 21.6 - 31.4%; [5], and see the 2021 New England report[11]). These high rates of increase provide further support for the hypothesis that seals from Canada are continually supplementing the breeding population in U.S. waters.

Strong evidence exists to suggest that interactions between right whales and both the fixed gear fisheries in the U.S. and Canada and vessel strikes in the U.S. are contributing substantially to the decline of the species [6]. Further, right whale distribution has changed since 2010. New research suggests that recent climate driven changes in ocean circulation have resulted in right whale distribution changes driven by increased warm water influx through the Northeast Channel, which has reduced the primary right whale prey (*Calanus finmarchicus*) in the central and eastern portions of the Gulf of Maine [6–8]. Additional potential stressors include offshore wind development, which overlaps with important habitat areas used year-round by right whales, including mother and calf migration corridors and foraging habitat [9,10]. This area is also the only known right whale winter foraging habitat. Additional information can be found in the offshore wind risks section.

The UMEs are under investigation and are likely the result of multiple drivers. For all three large whale UMEs, human interaction appears to have contributed to increased mortalities, although investigations are not complete. An investigation into the cause of the seal UME so far suggests phocine distemper virus as a potential cause.

A climate vulnerability assessment is currently underway for Atlantic and Gulf of Mexico marine mammal populations and will be reported on in future versions of this report.

Risks to meeting fishery management objectives

Climate and Ecosystem Productivity

Large scale climate related changes in the ecosystem can lead to changes in important habitats and ecological interactions, potentially resulting in regime shifts and ecosystem reorganization.

Climate Change Indicators: ocean temperature, heatwaves, currents, acidification

Ocean and estuarine temperature and salinity Ocean temperatures continue to warm at both the surface (Fig. 23) and bottom (Fig. 24) throughout the Northeast Shelf including the Mid-Atlantic. Seasonal sea surface temperatures in 2021 were above average throughout the year, with some seasons rivaling or exceeding the record warm temperatures observed in 2012.

[10] https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events
[11] https://repository.library.noaa.gov/view/noaa/29524

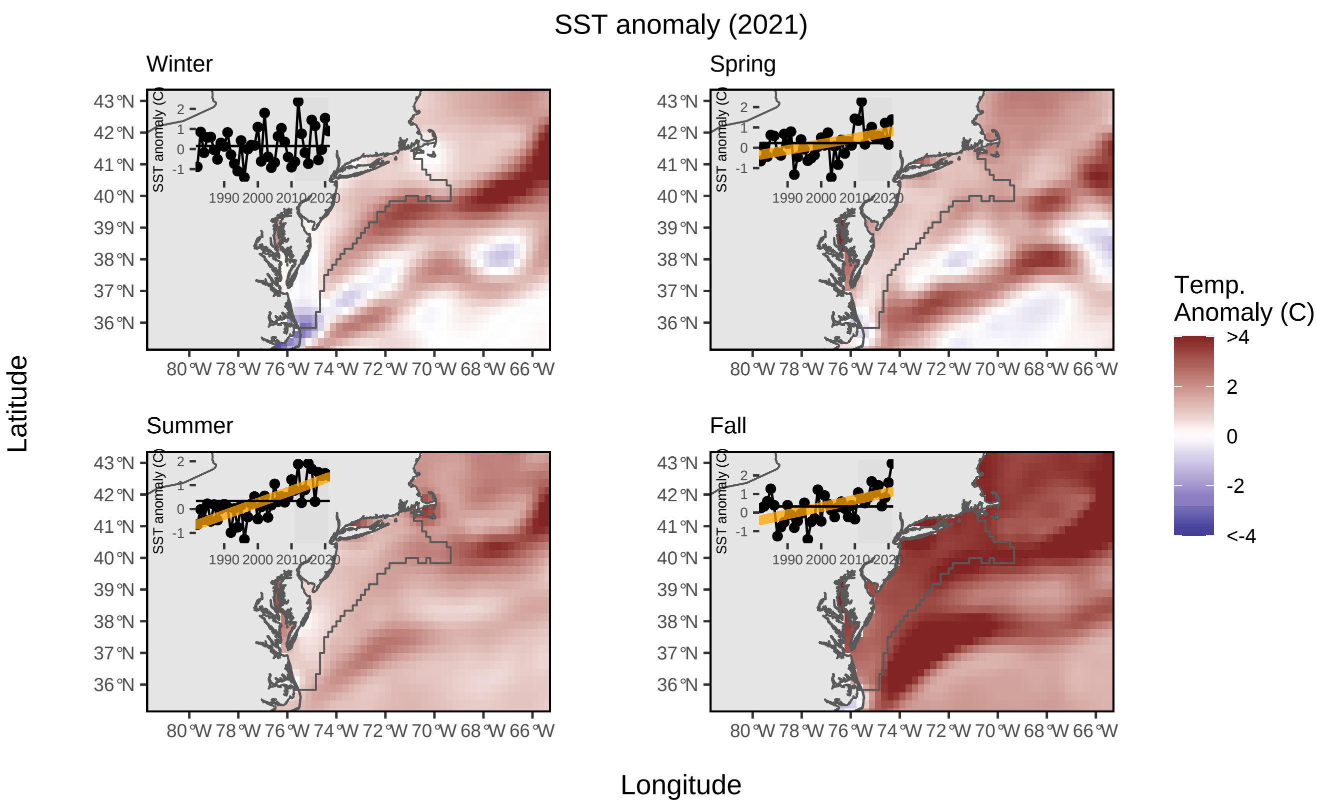


Figure 23: MAB (grey outline) seasonal sea surface temperature (SST) time series overlaid onto 2021 seasonal spatial anomalies. Seasons are defined as: Jan-Mar for winter, Apr-Jun for spring, Jul-Sep for summer, and Oct-Dec for fall.

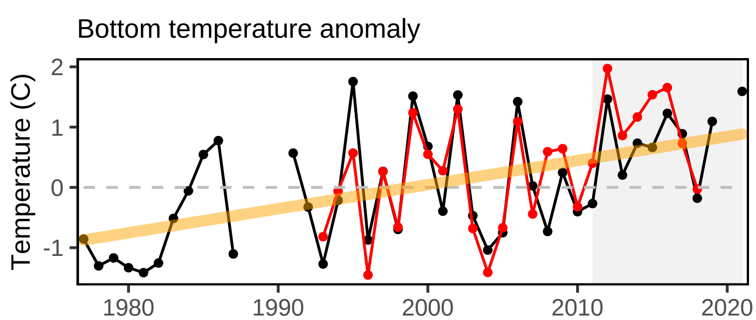


Figure 24: Annual bottom temperature in the MAB (black = in situ observations, red = observations from modeled reanalysis for comparison).

The Chesapeake Bay experienced a warmer-than-average winter and fall in 2021, and average conditions in the spring and summer, relative to the baseline period 2008-2020 (Fig. 25) as measured by satellites[12] (note that Chesapeake Bay seasonal definitions and baseline periods are different from the sea surface temperature anomalies reported in Fig.23 for the full Mid-Atlantic region). Similar 2021 seasonal temperature patterns were observed by bouys[13] (Fig. 25), which also indicated above-average salinity in the Chesapeake Bay throughout the summer, with a decrease in salinity from late July to early August (Fig. 25). Salinity fell below average in September and remained at lower levels throughout fall 2021.

[12] https://coastwatch.noaa.gov/cw/index.html
[13] https://buoybay.noaa.gov/

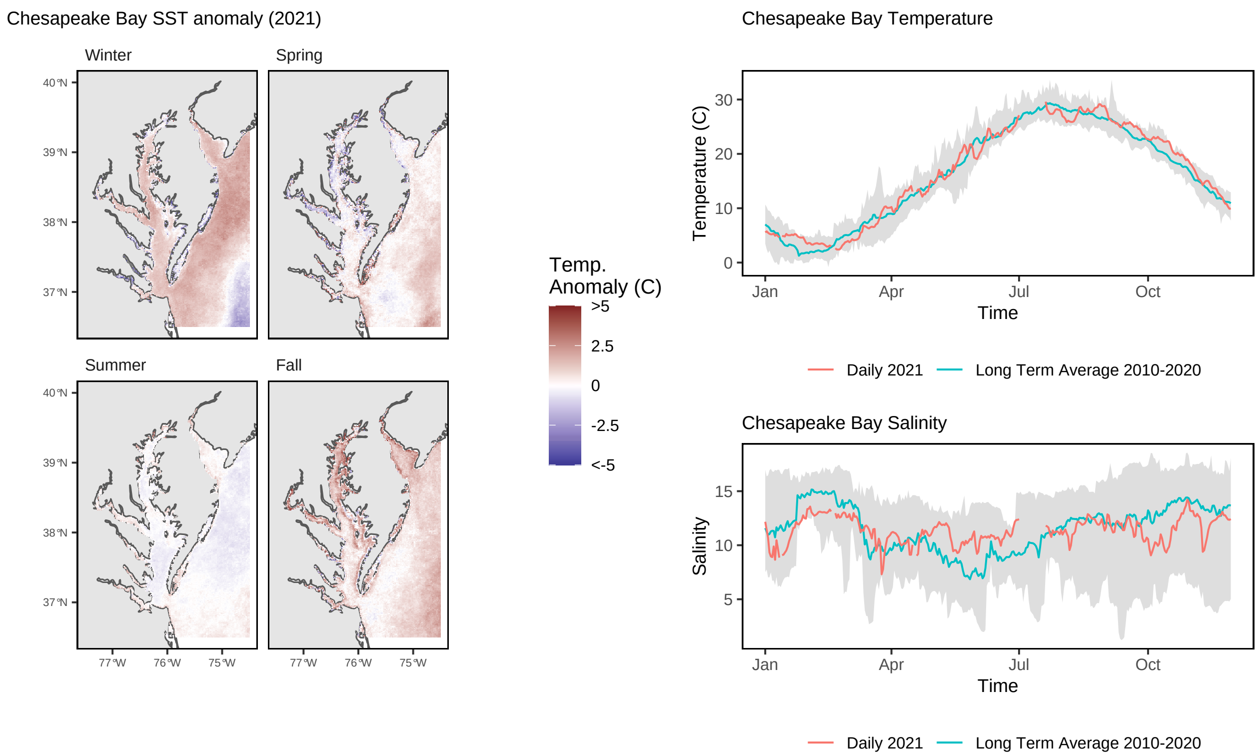


Figure 25: Left panel: 2021 sea surface temperature anomalies for the Chesapeake Bay. Data are from NOAA's multi-satellite SST products and produced by NOAA's Coastwatch Program. Seasons are defined to match the annual life cycles of many biological resources in Chesapeake Bay: Dec-Feb for winter, Mar-May for spring, Jun-Aug for summer, and Sep-Nov for fall. Right panel: NOAA Chesapeake Bay Interpretive Buoy System Gooses Reef bouy sea water temperature (top) and salinity (bottom); Red = 2021, Blue = Long term average 2010-2020.

Marine heatwaves A marine heatwave is a warming event that lasts for five or more days with sea surface temperatures warmer than 90% of previously observed (1982-2011) temperatures for that date [11]. Marine heatwaves measure not just high temperature, but how long the ecosystem is subjected to the high temperature. They are driven by both atmospheric and oceanographic factors and can have dramatic impacts on marine ecosystems. The region is experiencing more frequent marine heatwaves over the last decade, including 2021, compared to the historical period.

In 2021, the Mid-Atlantic Bight experienced seven distinct marine heatwaves with the strongest event beginning on September 13 and lasting 53 days (Fig. 26). Relative to prior years, this marine heatwave ranked 9th on record in terms of maximum intensity and 4th on record in terms of cumulative intensity.

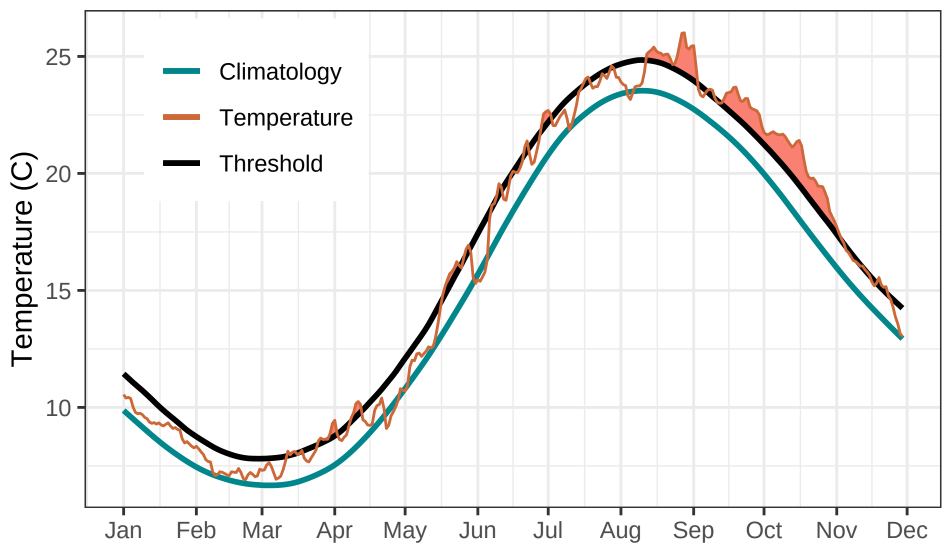


Figure 26: Marine heatwave events (red shading above black line) in the Mid-Atlantic occuring in 2021.

Ocean currents and features Variability of the Gulf Stream is one of the major drivers of changes in the oceanographic conditions of the Slope Sea and subsequently the Northeast U.S. continental shelf [12]. Changes in the Gulf Stream and Slope Sea can affect large-scale climate phenomena as well as local ecosystems and coastal communities. During the last decade, the Gulf Stream has become less stable and shifted northward [13,14] (Fig. 27). A more northern Gulf Stream position is associated with warmer ocean temperature on the northeast shelf [15], a higher proportion of Warm Slope Water in the Northeast Channel, and increased sea surface height along the U.S. east coast [16].

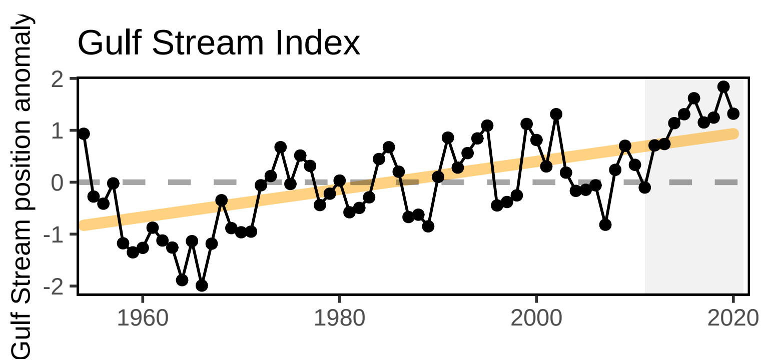


Figure 27: Index representing changes in the location of the Gulf Stream north wall. Positive values represent a more northerly Gulf Stream position.

Since 2008, the Gulf Stream has moved closer to the Grand Banks, reducing the supply of cold, fresh, and oxygen-rich Labrador Current waters to the Northwest Atlantic Shelf [17]. Nearly every year since 2010, warm slope water made up more than 75% of the annual slope water proportions entering the Gulf of Maine. In 2017 and 2019, almost no cooler Labrador Slope water entered the Gulf of Maine through the Northeast Channel (Fig. 28). The changing proportions of source water affect the temperature, salinity, and nutrient inputs to the Gulf of Maine ecosystem. In 2021, warm slope water continued to dominate (86.1%) inputs to the Gulf of Maine. The 2022 position of the north wall of the Gulf Stream is forecasted to be similar to 2021 [18], extending this pattern.

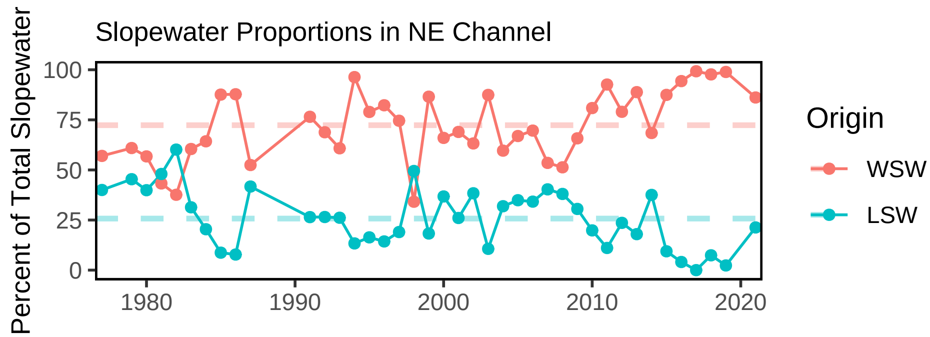
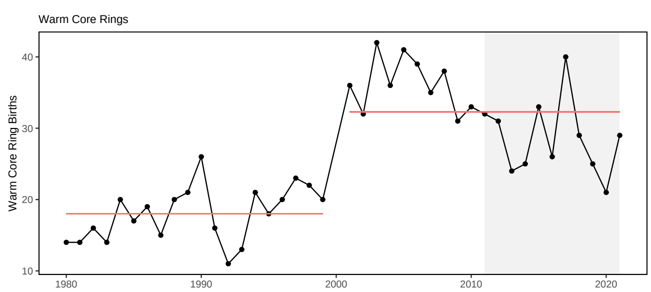


Figure 28: Proportion of Warm Slope Water (WSW) and Labrador Slope Water (LSLW) entering the Gulf of Maine through the Northeast Channel.

The increased instability of the Gulf Stream position and warming of the Slope Sea may also be connected to the regime shift increase in the number of warm core rings formed annually in the Northwest Atlantic [12,19] (Fig. 29). Timing of ring formation may also be changing. In 2021, a remarkable number of rings were observed simultaneously near the shelf break in June. When warm core ring water moves onto the continental shelf, it can alter the habitat and disrupt seasonal movements of fish [20].



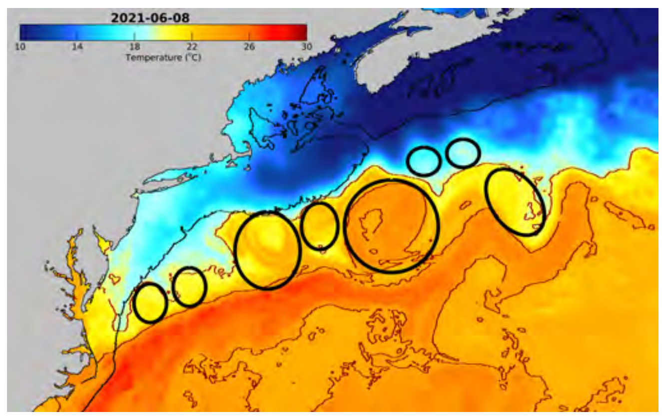


Figure 29: Warm core ring formation on the Northeast U.S. Shelf: Annual number of rings (left) and June 2021 rings (right), where the black line is the 200 m isobath (the shelf break) and the red lines are the 20 and 24 degree isotherms.

When warm core rings and eddies interact with the continental slope they can transport warm, salty water to the continental shelf [21], and this is now happening more frequently [20,22]. These interactions can be significant contributors to marine heatwaves in the Mid-Atlantic Bight [21,23] as well as the movement of shelf-break species inshore [20,24,25].

Changes in ocean temperature and circulation alter habitat features such as the seasonal cold pool, a 20–60 m thick band of cold, relatively uniform near-bottom water that persists from spring to fall over the mid and outer shelf of the MAB and southern flank of Georges Bank [26,27]. The cold pool plays an essential role in the structuring of the MAB ecosystem. It is a reservoir of nutrients that feeds phytoplankton productivity, is essential fish spawning and nursery habitat, and affects fish distribution and behavior [26,28]. The average temperature of the cold pool is getting warmer over time [29,30], the area is getting smaller [31], and the duration is getting shorter (Fig. 30).

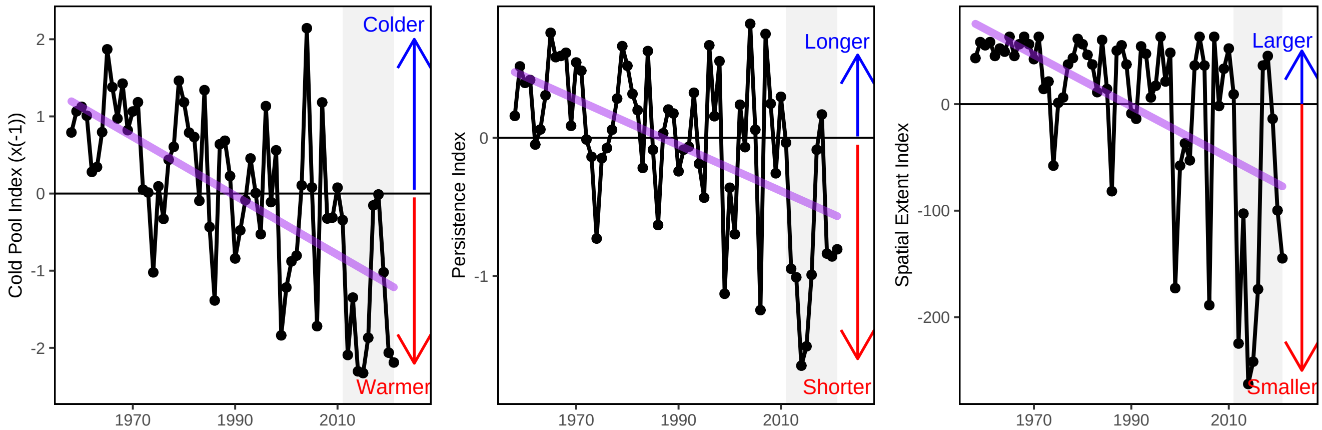


Figure 30: Seasonal cold pool indices: mean temperature within the cold pool, cold pool persistence, and spatial extent.

Ocean Acidification Ocean acidification (OA) has caused measured declines in global ocean pH. On the Northeast Shelf, summer bottom pH (2007-2021) varied spatially and temporally, ranging from 7.69-8.07 (Fig. 31, left panel). The lowest pH values were recorded in western Long Island Sound, and nearshore to mid-shelf waters off the coast of New Jersey. In summer 2021, water column pH from the glider-based profiles ranged from 7.67-8.22 (Fig. 31, right panel). The lowest pH occurred in bottom waters, reaching minimum values in shallow waters typically inhabited by Atlantic surfclams (27-56 m) in the southern flank of the Hudson Canyon (mean pH = 7.80).

This seasonal pH minimum in the Mid-Atlantic is associated with cold pool subsurface and bottom water, which is cut off from mixing with surface water by strong stratification. Fall mixing and slope water intrusions act to increase the pH in outer shelf waters [32].

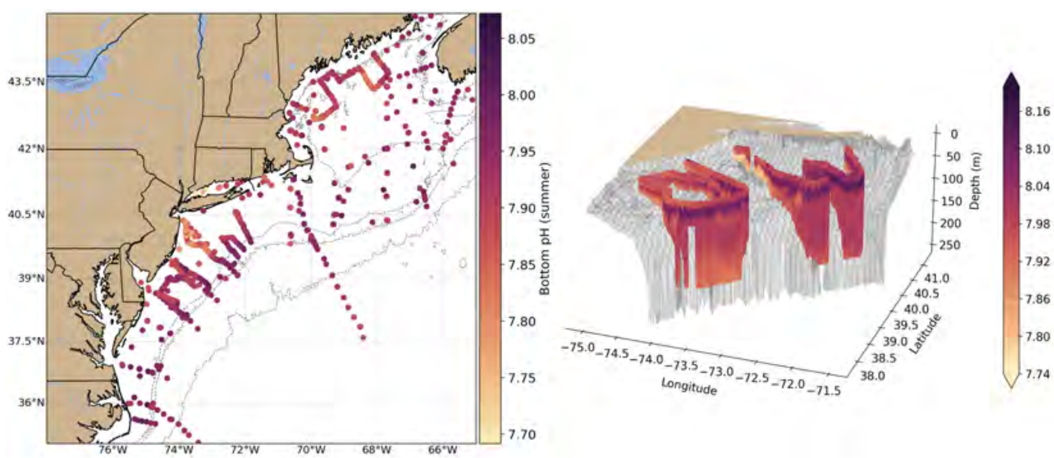


Figure 31: Left: Summer bottom pH collated from all quality-controlled vessel- and glider-based measurements from 2007-2021. Right: Glider-based pH profiles collected during summer 2021 in the Mid-Atlantic.

Ecosystem Productivity Indicators: phytoplankton, zooplankton, forage fish, fish condition

Phytoplankton Phytoplankton support the food web as the primary food source for zooplankton and filter feeders such as shellfish. Numerous environmental and oceanographic factors interact to drive the abundance, composition, spatial distribution, and productivity of phytoplankton. In 2021, MAB phytoplankton biomass (surface chlorophyll) was above average in winter, but below average during the spring and summer months. Below average phytoplankton biomass could be due to reduced nutrient flow to the surface and/or increased grazing pressure. A short fall bloom was detected in November. Primary productivity (the rate of photosynthesis) was average to below average throughout 2021 (Fig. 32).

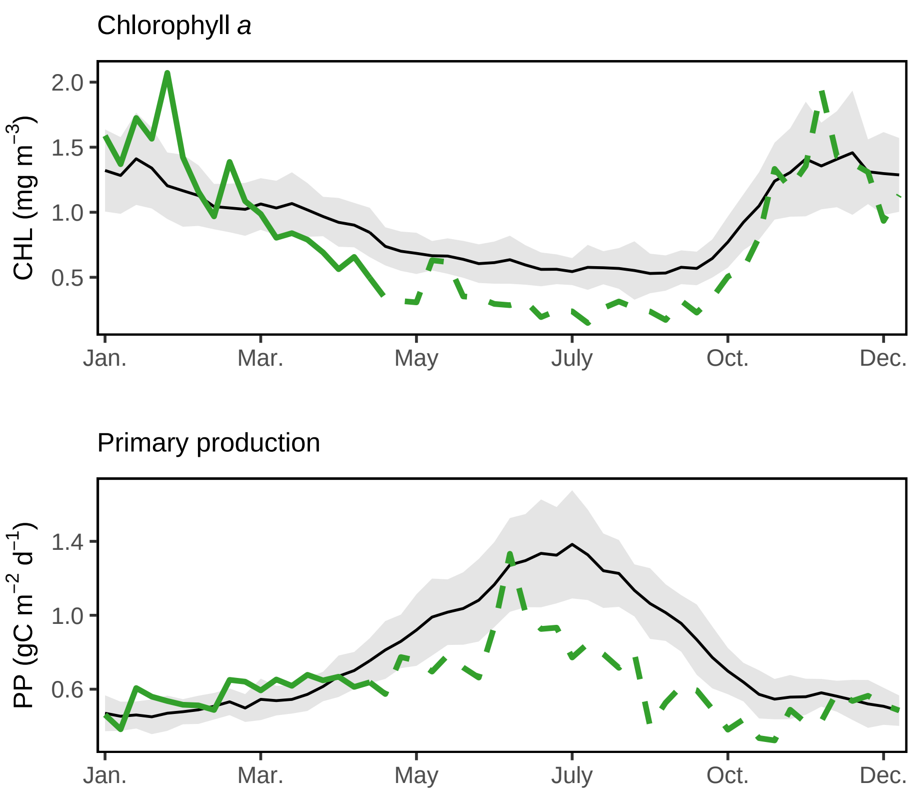


Figure 32: Weekly chlorophyll concentrations and primary productivity in the Mid-Atlantic are shown by the colored line for 2021 (dashed portion indicates preliminary data from a near real-time satellite source). The long-term mean is shown in black and shading indicates +/- 1 standard deviation.

The seasonal cycle of phytoplankton size distribution shows that the spring and fall bloom periods are dominated by larger-celled microplankton, while smaller-celled nanoplankton dominate during the warmer summer months. The proportion of the smallest phytoplankton, picoplankton (0.2-2 microns), is relatively constant throughout the year. In 2021, microplankton proportions were above average during the winter and fall bloom periods, but below average for the summer months (Fig. 33).

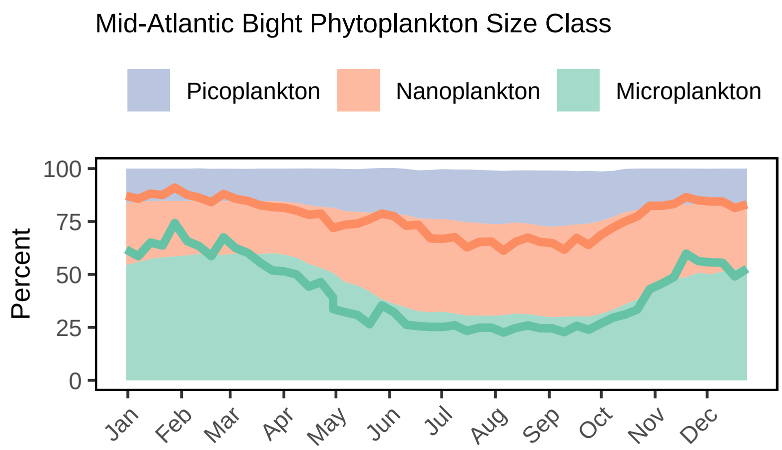


Figure 33: The annual climatology (1998-2020) percent composition of the phytoplankton size classes in the Mid-Atlantic based on satellite observations in the shaded portions. The 2021 proportions for the microplankton (>20 microns, green) and nanoplankton (2-20 microns, orange) are shown in the bold lines.

Zooplankton While zooplankton indicators could not be updated for this report due to 2020 survey disruptions and lags in sample processing, data up to 2019 showed long-term increasing trends of gelatinous zooplankton and krill on the northeast shelf (see 2021 report[14]). Preliminary 2021 observations found the total volume of plankton caught in the bongo net was significantly greater than the previous years due to increased gelatinous zooplankton, predominantly salps (*Thalia democratica*). Unusually high concentrations of salps were found throughout the Northeast shelf and in the Slope Sea during other summer 2021 scientific surveys, which may be associated with water mass intrusions at the shelf break [33,34]. Salps are filter feeders feeding on phytoplankton and other small particles and may have contributed to the below average phytoplankton biomass in summer 2021 (Fig. 32).

Forage Fish Energy Content Nutritional value (energy content) of juvenile and adult forage fish as prey is related to environmental conditions, fish growth, and reproductive cycles. Forage energy density measurements from NEFSC trawl surveys 2017-2021 are building toward a time series to evaluate trends (Fig. 34). Limited data from the spring 2020 survey, and complete spring 2021 survey measurements were consistent with previous reports: the energy density of Atlantic herring was almost half the value (5.69 +/- 0.07 kJ/g wet weight) reported in earlier studies (10.6-9.4 kJ/ g wet weight). Silver hake, longfin squid (*Loligo* in figure) and shortfin squid (*Illex* in figure) were also lower than previous estimates [35,36]. Energy density of alewife, butterfish, sand lance, and Atlantic mackerel varies seasonally, with seasonal estimates both higher and lower than estimates from previous decades.

[14] https://repository.library.noaa.gov/view/noaa/29525

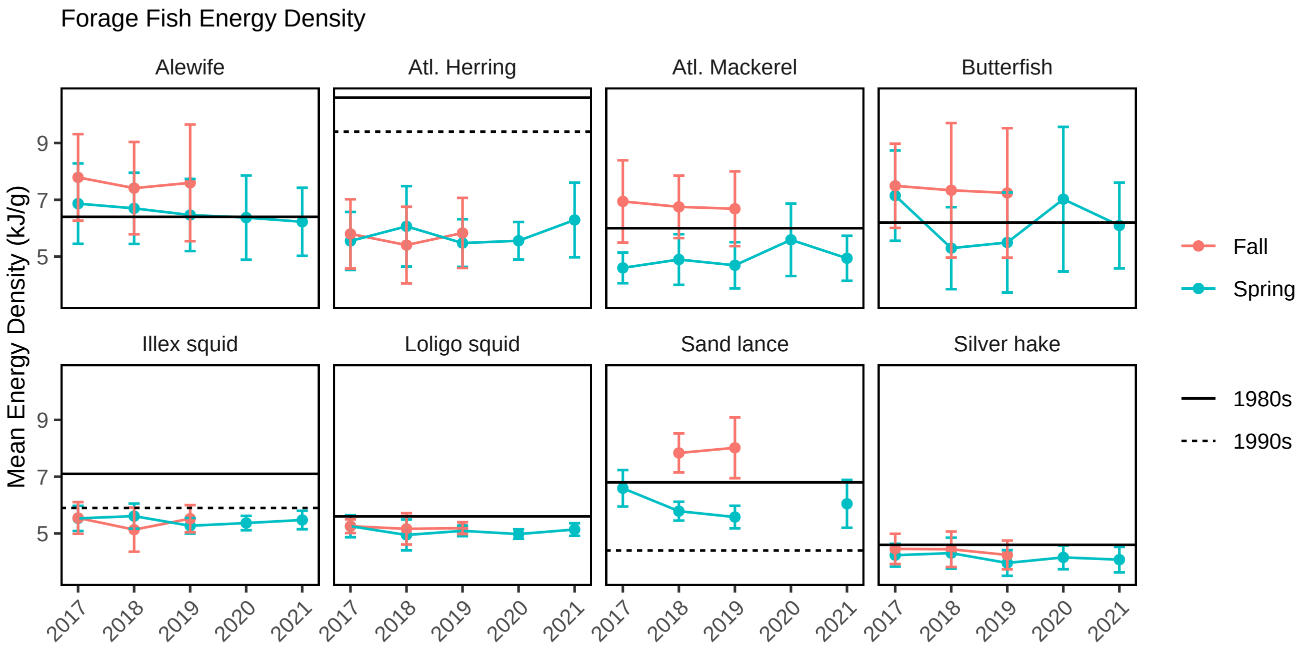


Figure 34: Forage fish energy density mean and standard deviation by season and year, compared with 1980s (solid line; Steimle and Terranove 1985) and 1990s (dashed line; Lawson et al. 1998) values.

Fish Condition The health and well being of individual fish can be related to body shape condition indices (i.e., weight at a given length) such as relative condition index, which is the ratio of observed weight to predicted weight based on length [37]. Heavier and fatter fish at a given length have higher relative condition which is expected to improve growth, reproductive output, and survival. A pattern of generally good condition was observed across many MAB species prior to 2000, followed by a period of generally poor condition from 2001-2010, with a mix of good and poor condition 2011-2019. However, most species in the MAB had below average or poor condition again in 2021 (Fig. 35). Preliminary results of synthetic analyses show that changes in temperature, zooplankton, fishing pressure, and population size influence the condition of different fish species.

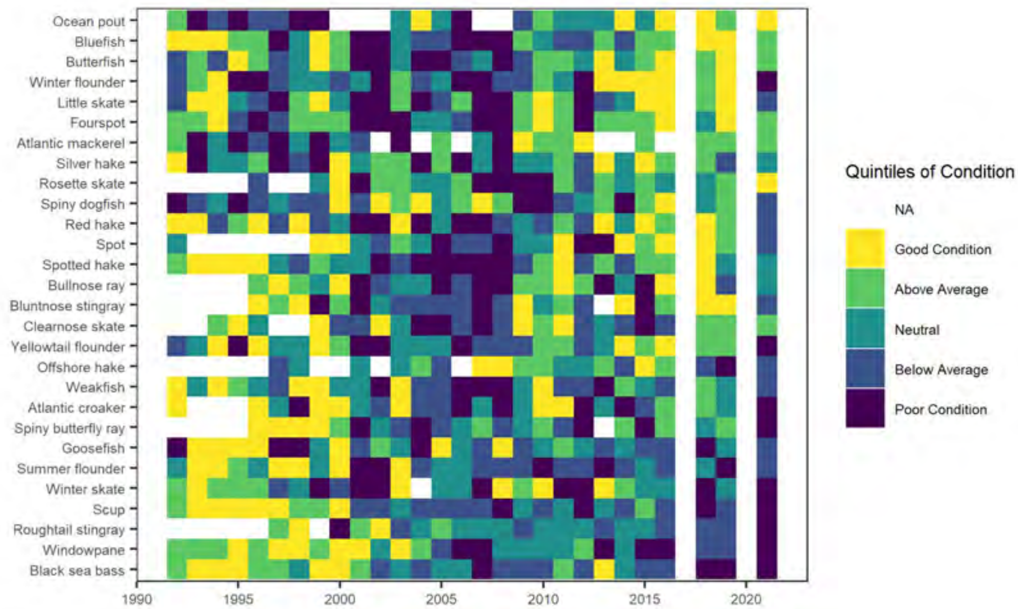


Figure 35: Condition factor for fish species in the MAB based on fall NEFSC bottom trawl survey data. MAB data are missing for 2017 due to survey delays, and no survey was conducted in 2020.

Fish Productivity We describe patterns of aggregate fish productivity in the Mid-Atlantic with the small fish per large fish anomaly indicator, derived from NEFSC bottom trawl survey data (Fig. 36). The indicator shows that productivity has been declining in this region since 2010.

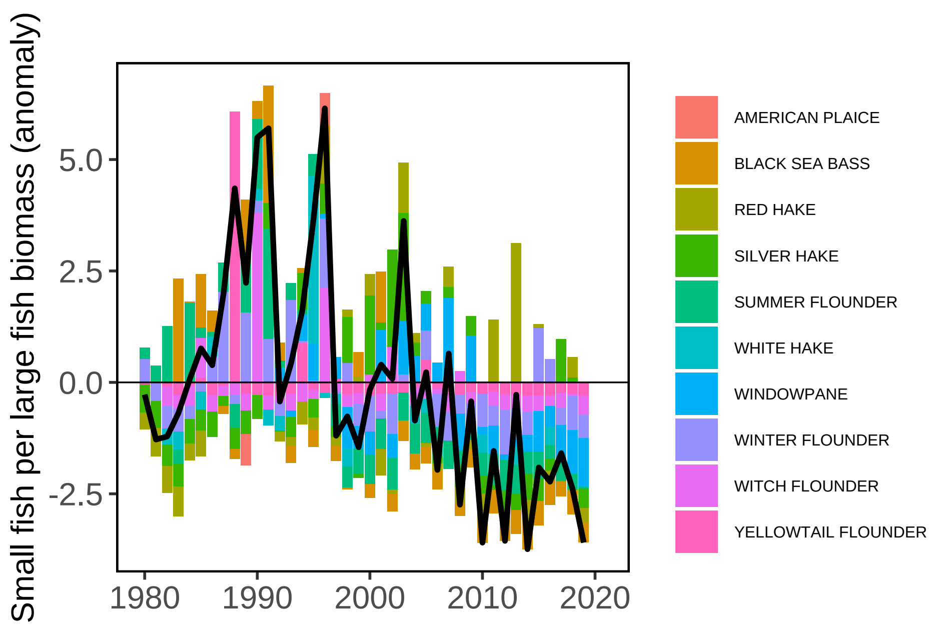


Figure 36: Small fish per large fish biomass anomaly in the Mid-Atlantic Bight. The summed anomaly across species is shown by the black line.

Ecosystem Structure Indicators: distribution shifts, diversity, predators

As noted in the Landings Implications section above, stocks are shifting distribution throughout the region. In aggregate, fish stocks are moving northeast along the shelf and into deeper waters.

Zooplankton diversity was increasing in the MAB as of 2019, while adult fish diversity indices appear stable over time, with current values within one standard deviation from most historic estimates (see Diversity Indicators section, above).

New indicators for shark populations, combined with information on gray seals (see Protected Species Implications section, above), suggests predator populations range from stable (sharks, Fig. 37) to increasing (seals) in the MAB. Stable predator populations suggest stable predation pressure on managed species, but increasing predator populations may reflect increasing predation pressure.

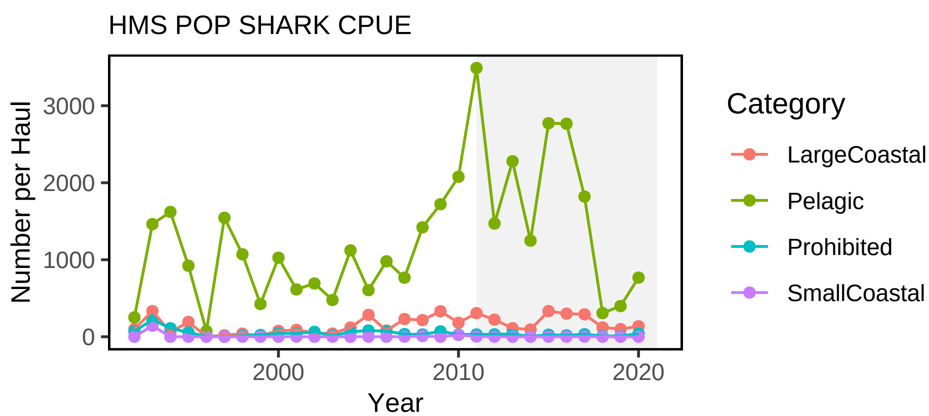


Figure 37: Estimated number of sharks per unit effort from Highly Migratory Species Pelagic Observer Program data.

Stock status is mixed for Atlantic Highly Migratory Species (HMS) stocks (including sharks, swordfish, billfish, and tunas) occurring in the Mid-Atlantic region. While there are several HMS species considered to be overfished or that have unknown stock status, the population status for some managed Atlantic sharks and tunas is at or above the biomass target (Fig. 38), suggesting the potential for robust predator populations among these managed species.

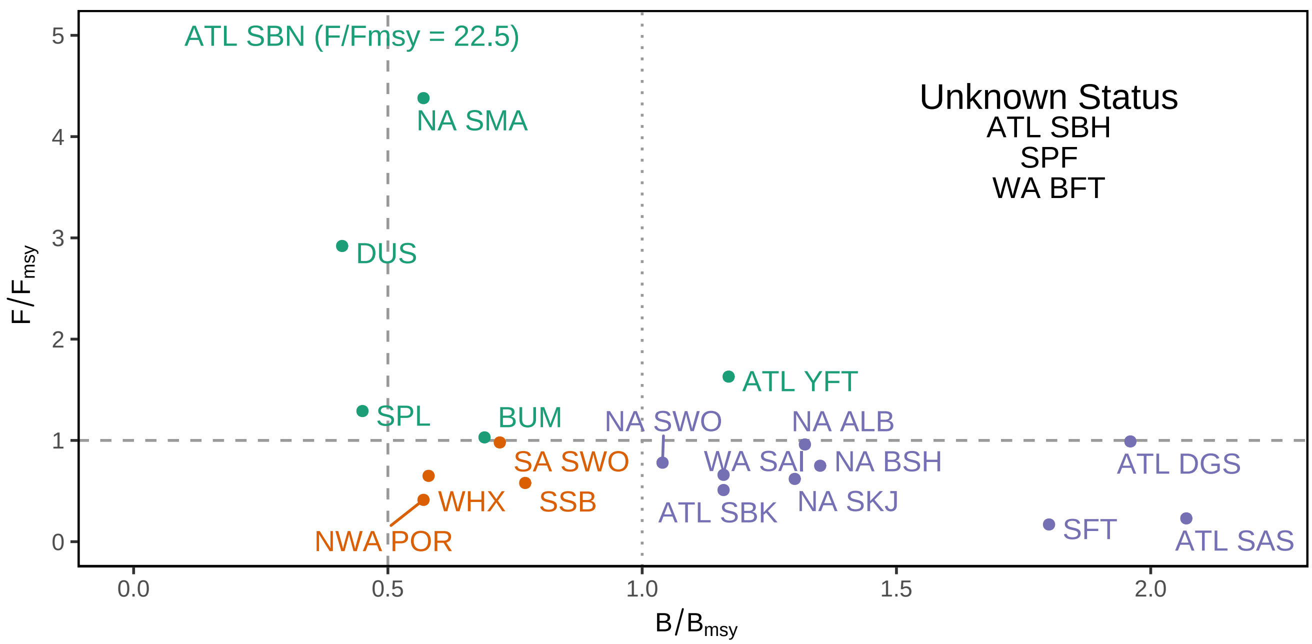


Figure 38: Summary of single species status for HMS stocks; key to species names at https://noaa-edab.github.io/tech-doc/atlantic-highly-migratory-species-stock-status.html.

As noted in the Protected Species section, gray seal populations are increasing. Harbor and gray seals occupying New England waters are generalist predators that consume more than 30 different prey species. An evaluation of hard parts found in seal stomachs showed that harbor and gray seals predominantly exploit abundant demersal fish species (i.e., red, white, and silver hake). Other relatively abundant prey species found in hard-part remains include sand lance, yellowtail flounder, four-spotted flounder, Gulf Stream flounder, haddock, herring, redfish, and squids.

A recent stable isotope study utilizing gray seal scat samples obtained from Massachusetts habitats showed individual gray seals can specialize on particular prey. It also found that gray seals vary their diet seasonally, focusing on demersal inshore species prior to the spring molt, and offshore species such as sand lance after molting. DNA studies on gray seal diet in Gulf of Maine and Massachusetts waters found spiny dogfish and Jonah crab present in gray seal scat samples. Skate and crab remains were also found in gray seal stomach remains. In contrast to direct feeding, it is uncertain if the presence of skates and crabs is due to secondary consumption or scavenging.

Habitat Risk Indicators: habitat assessments, submerged aquatic vegetation, estuarine habitat quality, fishing gear impacts

Habitat Assessments The Northeast Regional Marine Fish Habitat Assessment (NRHA) is a collaborative effort to describe and characterize estuarine, coastal, and offshore fish habitat distribution, abundance, and quality in the Northeast. This includes mapping inshore and offshore habitat types used by focal fish species, summarizing impacts of habitat climate vulnerability on these species, modeling predicted future species distributions, and developing a publicly accessible decision support tool to visualize these results. This is a three-year project led by the New England and Mid-Atlantic Fishery Management Councils in collaboration with many partners including NOAA Fisheries, and will be completed in July 2022[15].

As part of the NRHA work, climate vulnerability information from NOAA's Habitat Climate Vulnerability Assessment [38] and the Northeast Fish and Shellfish Climate Vulnerability Assessment [39][16] is synthesized for approximately 70 species in the northeast region. For example, black sea bass, scup, and summer founder have

[15] https://www.mafmc.org/nrha
[16] https://www.fisheries.noaa.gov/new-england-mid-atlantic/climate/northeast-vulnerability-assessment

been linked to several highly vulnerable nearshore habitats from salt marsh, submerged aquatic vegetation, and shallow estuarine and marine reefs. Details on highly vulnerable habitats with linkages to a variety of species, including which life stages have different levels of dependence on a particular habitat, are available in a detailed table[17].

Submerged Aquatic Vegetation Submerged aquatic vegetation (SAV) is designated as a Habitat Area of Particular Concern (HAPC) for summer flounder and is important habitat for many fish species, particularly during vulnerable juvenile stages. Increased SAV coverage (including wild celery, water stargrass, and hydrilla) in the tidal fresh areas of the Chesapeake Bay (Fig. 39) has been attributed to restoration efforts. This ecosystem engineering has improved water quality, promoting further expansions of SAV meadows. However, in the higher salinity region near the mouth of the Chesapeake Bay (Fig. 39), increased water temperatures, especially during the summer, have led to a decline in eelgrass coverage.

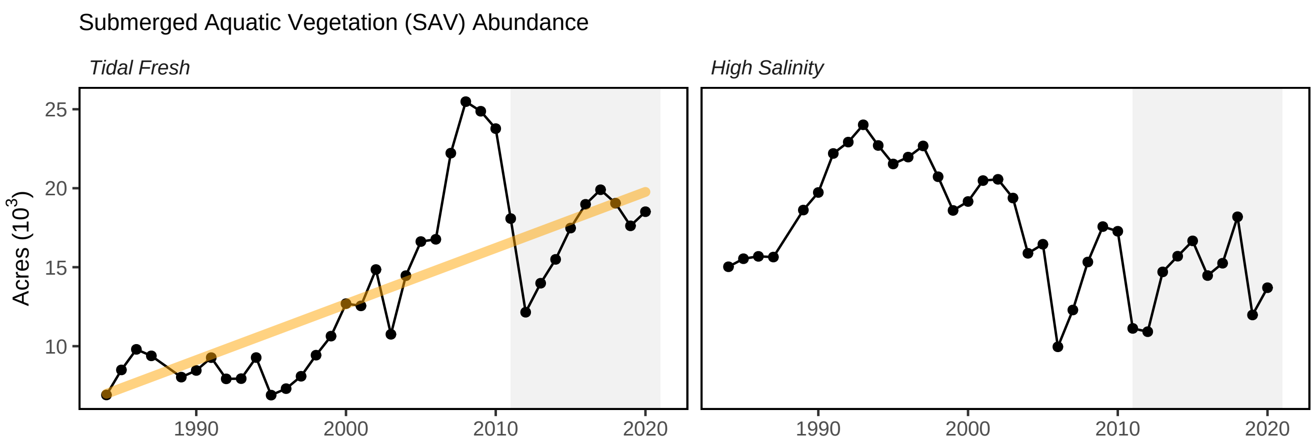


Figure 39: Submerged Aquatic Vegetation (SAV) coverage in tidal fresh and high salinity regions of the Chesapeake Bay.

Estuarine Habitat Quality (Chesapeake Bay) Many important MAFMC managed species (e.g., summer flounder, scup, black sea bass, and bluefish) use estuarine habitats as nurseries or are considered estuarine and nearshore coastal-dependent, and interact with other important estuarine-dependent species (e.g., striped bass and menhaden). An integrated measure of multiple water quality criteria shows a significantly increasing proportion of Chesapeake Bay waters meeting or exceeding EPA water quality standards over time ([40]; Fig. 40). This pattern was statistically linked to total nitrogen reduction, indicating responsiveness of water quality status to management actions implemented to reduce nutrients. Water quality trends and status may be used to inform aquaculture siting decisions in Chesapeake Bay.

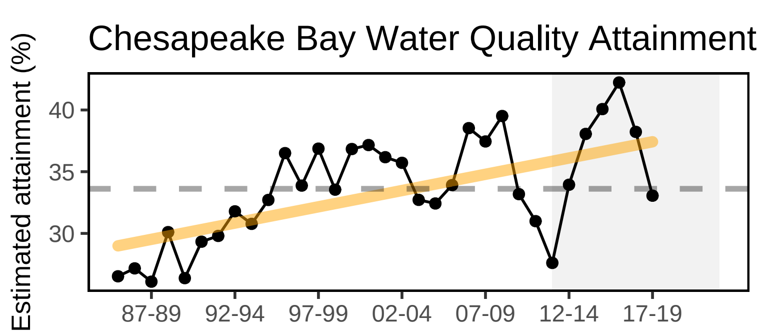


Figure 40: Water quality attainment in Chesapeake Bay following rolling three year assessment periods.

[17] https://noaa-edab.github.io/ecodata/Hab_table

Fishing Gear Impacts Estimates of the impacts of fishing gear on habitat are available through the habitat section of the Northeast Ocean Data Portal[18]. The data portal hosts selected outputs from the Northeast Fishing Effects Model which combines seafloor data (sediment type, energy regime) with fishing effort data to generate percent habitat disturbance estimates in space and time. More detailed information can be found in the Synthetic Indicator Catalog.[19]

Implications

Links between climate change and managed species Estuarine, nearshore, and offshore habitats support many life stages of state and federally managed species, and are highly vulnerable to climate change. Below we highlight how recently observed habitat changes affect several key managed species in Chesapeake Bay and in both nearshore and offshore waters of the MAB. Overall, multiple drivers interact differently for each species, producing a range of population impacts.

Striped Bass Increasing water temperatures in Chesapeake Bay have negative impacts on striped bass at all life stages, although impovements in water quality mitigate some impacts. Declining recruitment since 2000 is associated with higher winter and spring water temperatures and lower freshwater flows, which compress the reproductive season, cause production of zooplankton prey earlier in the season before striped bass larvae are feeding, and reduce concentration of zooplankton prey in larval habitat.

In 2021, average summer water temperatures combined with better dissolved oxygen conditions likely improved habitat quality for larger juvenile and adult striped bass in the summer. The expansion of submerged aquatic vegetation meadows in the tidal fresh region of the Chesapeake Bay (Fig. 39) is likely benefiting species like striped bass who use this as spawning and nursery habitat in the spring. However, similar to 2020, the warm winter in 2021 may have reduced larval survival, despite the average spring temperatures and high spring flows, which represent favorable conditions for striped bass recruitment success.

Understanding habitat conditions can enhance recreational fishery management. Maryland Department of Natural Resources is incorporating habitat conditions into striped bass catch-and-release management, including 1) a two-week summer closure directed at reducing catch-and-release mortality[20] as a substitute for harvest season reductions, and 2) the Striped Bass Fishing Advisory[21], which lets anglers know the relative level of risk of released fish dying due to high temperatures.

Blue Crabs Warmer winter temperatures may benefit Chesapeake Bay blue crabs, an important commercial and forage species. Above-average fall and winter temperatures in 2021 may have reduced overwintering mortality [41–43] and contributed to increased productivity of blue crabs going into 2022. Longer growth seasons are associated with increased production of blue crabs and oysters in Chesapeake Bay. Blue crabs are moving northward with warming temperatures and have been documented in the Gulf of Maine [44], with implications for both their management and for the inshore ecosystems.

Eastern Oyster Oyster reefs provide habitat for several managed fish species including juvenile black sea bass and summer flounder. Increased Chesapeake Bay salinity has been linked to high juvenile oyster abundance [45]. In 2021, high oyster spat set was predicted based on high summer salinity[22], and was observed in Maryland during fall 2021. Virginia oyster recruitment was at record levels 2019-2020 and was above average in 2021.

Summer Flounder and Black Sea Bass The reduced amount of Chesapeake Bay water volume with low oxygen (hypoxic volume) in June and July 2021 suggests better environmental conditions during a critical period of juvenile production for key species such as black sea bass and summer flounder. The increase in hypoxic volume in the fall, however, may have been particularly harmful as it coincided with above-average water temperatures. Additionally, eelgrass in the higher salinity areas near the mouth of the Chesapeake Bay (Fig. 39) is critical nursery habitat for summer flounder, and recent declines seen in SAV coverage could negatively impact recruitment survival.

[18] https://www.northeastoceandata.org/data-explorer/
[19] https://noaa-edab.github.io/catalog/northeast-fishing-effects-model.html
[20] https://dnr.maryland.gov/fisheries/Documents/StripedBass_regulations2022.pdf
[21] https://dnr.maryland.gov/fisheries/Pages/SB_forecast.aspx
[22] https://content.buoybay.noaa.gov/sites/default/files/NCBOSeasonalSummary2021Summer.pdf

Surfclam Ocean acidification also has different implications, depending on the species and life stage. Recent lab studies have found that surf clams exhibited metabolic depression in a pH range of 7.46-7.28 [46]. Computer models are in development to help determine the long term implications of growth on surf clam populations. Aggregated data from 2007-2021 show that summer bottom ocean pH (7.69-8.07, Fig. 31) has not yet reached the metabolic depression threshold observed for surfclams in lab studies so far.

Northern Shortfin Squid Since 2017, extraordinarily high availability of northern shortfin squid have been observed in the Mid-Atlantic, resulting in high fishery catch per unit effort (CPUE) and early fishery closures. High instances of squid catch near the shelf break are significantly related to low bottom temperatures (< 10 degrees C), high salinity (>35.6 psu), increased chlorophyll frontal activity as well as the presence and orientation of warm core rings. Warm core rings are an important contributor to squid availability, likely influencing habitat conditions across different life stages. In particular, fishing effort was concentrated on the eastern edge of warm core rings, which are associated with upwelling and enhanced productivity.

Heatwave impacts While marine heatwaves lasting over days may disturb the marine environment, long lasting events such as the warming in 2012 (Fig. 41) can have significant impacts to the ecosystem [23]. The 2012 heatwave affected the lobster fishery most notably, but other species also shifted their geographic distributions and seasonal cycles [47]. The 2012 heatwave was caused by a shift in the atmospheric Jet Stream, whereas the 2017 marine heatwave in the Mid-Atlantic was associated with a strong positive salinity anomaly and is likely related to cross-shelf flow driven by the presence of a warm core ring adjacent to the shelfbreak south of New England [23]. During the 2017 event, warm water fish typically found in the Gulf Stream were caught in shallow waters near Block Island, RI [20]. Ocean temperatures in 2021 rivaled or exceeded the record temperatures in 2012 in some seasons, but the impacts to fisheries have yet to be determined.

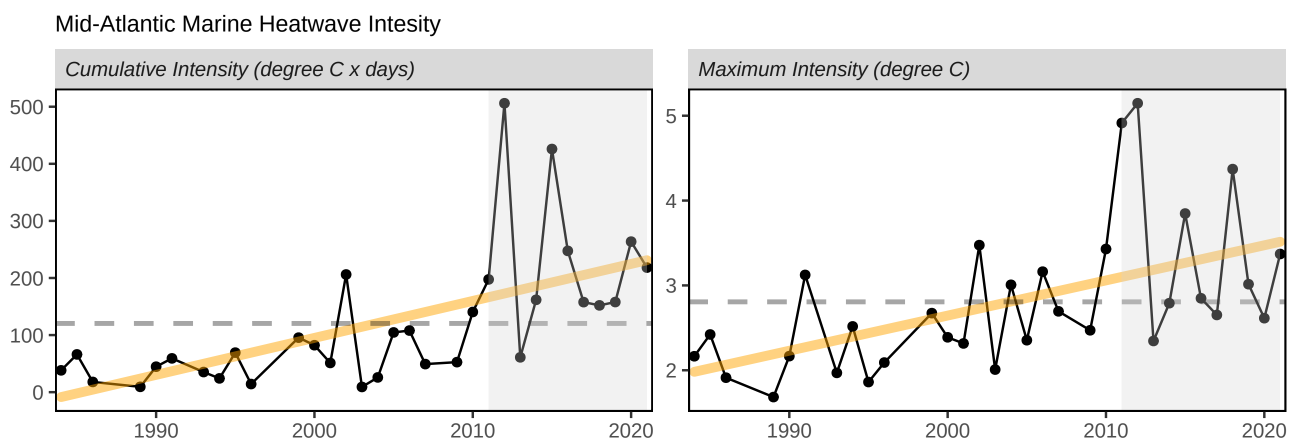


Figure 41: Marine heatwave cumulative intesity (left) and maximum intensity (right) in the Mid-Atlantic Bight.

Cold pool impacts Changes in the cold pool habitat can affect species distribution, recruitment, and migration timing for multiple federally managed species. Southern New England-Mid Atlantic yellowtail flounder recruitment and settlement are related to the strength of the cold pool [29]. The settlement of pre-recruits during the cold pool event represents a bottleneck in yellowtail life history, during which a local and temporary increase in bottom temperature negatively impacts the survival of the settlers. Including the effect of cold pool variations on yellowtail recruitment reduced retrospective patterns and improved the skill of short-term forecasts in a stock assessment model [29,30]. The cold pool also provides habitat for the ocean quahog [31,48]. Growth rates of ocean quahogs in the MAB (southern portion of their range) have increased over the last 200 years whereas little to no change has been documented in the northern portion of their range in southern New England, likely a response to a warming and shrinking cold pool [49].

Distribution shift impacts Trends for a suite of 48 commercially or ecologically important fish species along the entire Northeast Shelf continue to show movement towards the northeast and generally into deeper water (Fig. 8). We hope to expand this analysis beyond fish. Marine mammal distribution maps are available online[23]; updated maps and trends are currently being developed.

Shifting species distributions alter both species interactions and fishery interactions. In particular, shifting species distributions can alter expected management outcomes from spatial allocations and bycatch measures based on historical fish and protected species distributions.

Ecosystem productivity change impacts Climate and associated changes in the physical environment affect ecosystem productivity, with warming waters increasing the rate of photosynthesis at the base of the food web. However, increased summer production in the MAB may not translate to increased fish biomass because smaller phytoplankton dominate in this season.

While krill and large gelatinous zooplankton are increasing over time, smaller zooplankton are periodically shifting abundance between the larger, more nutritious *Calanus finmarchicus* and smaller bodied copepods with no apparent overall trend. The nutritional content of larger bodied forage fish and squid changes seasonally in response to ecosystem conditions, with apparent declines in energy density for Atlantic herring and *Illex* squid relative to the 1980s, but similar energy density for other forage species. Some of these factors are now being linked to the relative condition of managed fish.

The apparent decline in productivity across multiple managed species in the MAB, along with low fish condition for many species in 2021, also suggest changing ecosystem productivity at multiple levels. During the 1990s and early 2000s high relative abundance of smaller bodied copepods and a lower relative abundance of *Calanus finmarchicus* was associated with regime shifts to lower fish recruitment [50]. The unprecedented climate signals along with the trends toward lower productivity across multiple managed species indicate a need to continually evaluate whether management reference points remain appropriate, and to evaluate if ecosystem regime shifts have occurred or reorganization is in progress.

Other Ocean Uses: Offshore Wind

Indicators: development timeline, revenue in lease areas, coastal community vulnerability

As of February 2022, 24 offshore wind development projects are proposed for construction over the next decade in the Northeast (timelines and project data are based on Tables E-2, E-4, and E-4-2 of South Fork Wind Farm Final Environmental Impact Statement). Offshore wind areas are anticipated to cover more than 1.7 million acres by 2030 in the Greater Atlantic region (Fig. 42). Beyond 2030 values include acreage for the NY Wind Energy Areas (WEA) and Gulf of Maine Area of Interest for floating research array.

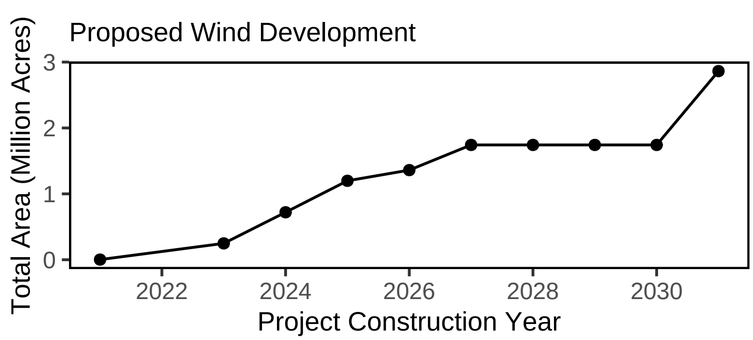
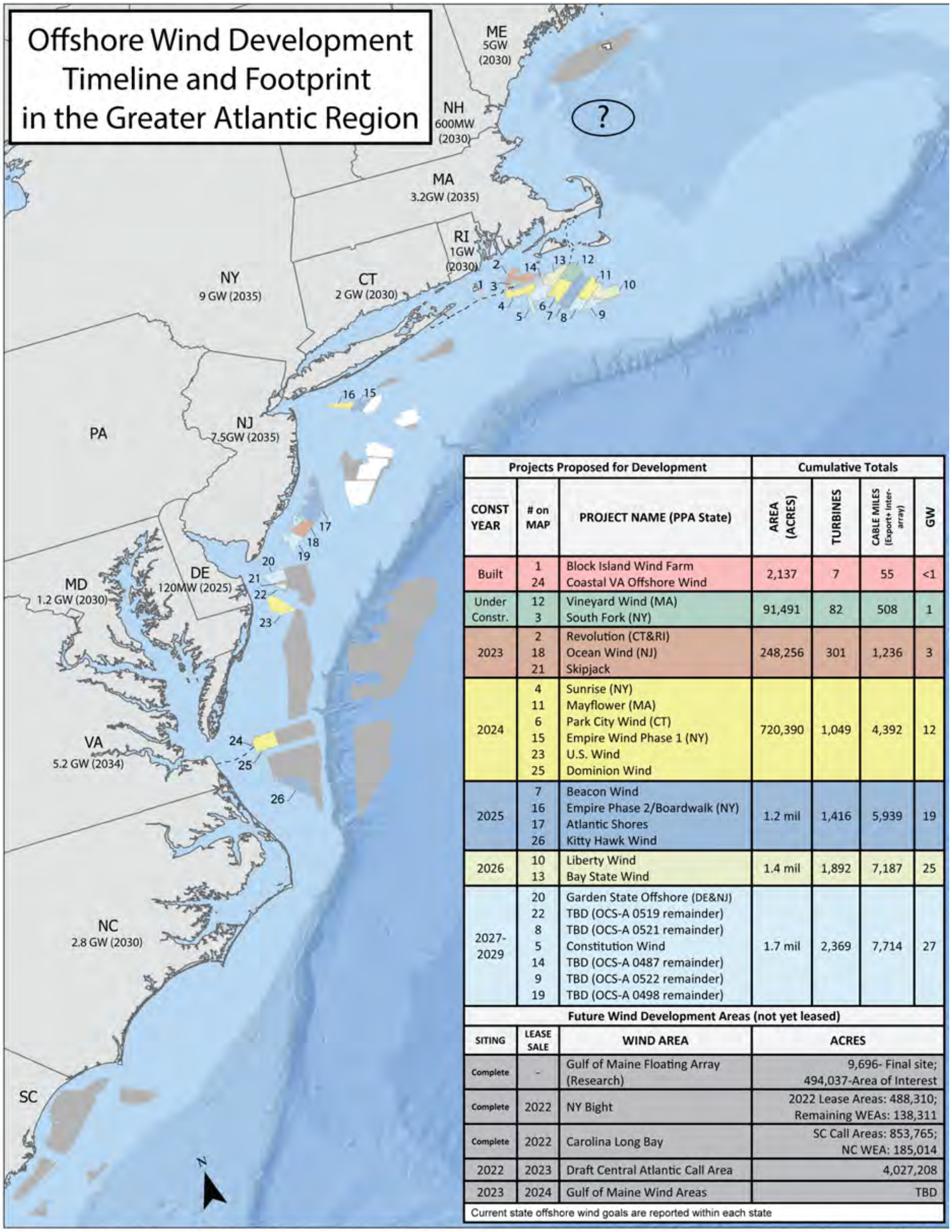


Figure 42: Proposed wind development on the northeast shelf.

[23] https://www.nefsc.noaa.gov/AMAPPSviewer/



Projects Proposed for Development			Cumulative Totals			
CONST YEAR	# on MAP	PROJECT NAME (PPA State)	AREA (ACRES)	TURBINES	CABLE MILES (Export+ Inter-array)	GW
Built	1 24	Block Island Wind Farm Coastal VA Offshore Wind	2,137	7	55	<1
Under Constr.	12 3	Vineyard Wind (MA) South Fork (NY)	91,491	82	508	1
2023	2 18 21	Revolution (CT&RI) Ocean Wind (NJ) Skipjack	248,256	301	1,236	3
2024	4 11 6 15 23 25	Sunrise (NY) Mayflower (MA) Park City Wind (CT) Empire Wind Phase 1 (NY) U.S. Wind Dominion Wind	720,390	1,049	4,392	12
2025	7 16 17 26	Beacon Wind Empire Phase 2/Boardwalk (NY) Atlantic Shores Kitty Hawk Wind	1.2 mil	1,416	5,939	19
2026	10 13	Liberty Wind Bay State Wind	1.4 mil	1,892	7,187	25
2027-2029	20 22 8 5 14 9 19	Garden State Offshore (DE&NJ) TBD (OCS-A 0519 remainder) TBD (OCS-A 0521 remainder) Constitution Wind TBD (OCS-A 0487 remainder) TBD (OCS-A 0522 remainder) TBD (OCS-A 0498 remainder)	1.7 mil	2,369	7,714	27

Future Wind Development Areas (not yet leased)			
SITING	LEASE SALE	WIND AREA	ACRES
Complete	-	Gulf of Maine Floating Array (Research)	9,696- Final site; 494,037-Area of Interest
Complete	2022	NY Bight	2022 Lease Areas: 488,310; Remaining WEAs: 138,311
Complete	2022	Carolina Long Bay	SC Call Areas: 853,765; NC WEA: 185,014
2022	2023	Draft Central Atlantic Call Area	4,027,208
2023	2024	Gulf of Maine Wind Areas	TBD

Wind area boundaries, construction data and timelines are frequently updated.This map contains the most recent published information **as of 2/2/22**
Sources: South Fork Wind Farm FEIS, BOEM GIS data, BOEM Leasing Path Forward 2021-2025

Figure 43: All Northeast Project areas by year construction ends (each project has 2 year construction period).

Just over 2,500 foundations and more than 7,000 miles of inter-array and offshore export cables are proposed to date.

The colored chart in Fig. 43 also presents the offshore wind development timeline in the Greater Atlantic region with the estimated year that foundations would be constructed (matches the color of the wind areas). These timelines and data estimates are expected to shift but represent the most recent information available as of February 2022. Based on current timelines, the areas affected would be spread out such that it is unlikely that any one particular area would experience full development at one time. Future wind development areas are also presented. Additional lease areas, totalling over 488,000 acres in the NY Bight are available for BOEM's 2022 lease sale. It's anticipated that the NY Bight leases will fulfill outstanding offshore wind energy production goals for NY and NJ. VA and NC have outstanding goals that cannot be fulfilled within the existing lease areas, and it is expected that these will be fulfilled with future development off the Delmarva Peninsula.

Based on federal vessel logbook data, average commercial fishery revenue from trips in the current offshore wind lease areas and the New York Bight leasing areas identified in the proposed sale notice represented 2-20% of the total annual revenue for the most affected fisheries in federal waters from 2008-2019 (Fig. 44).

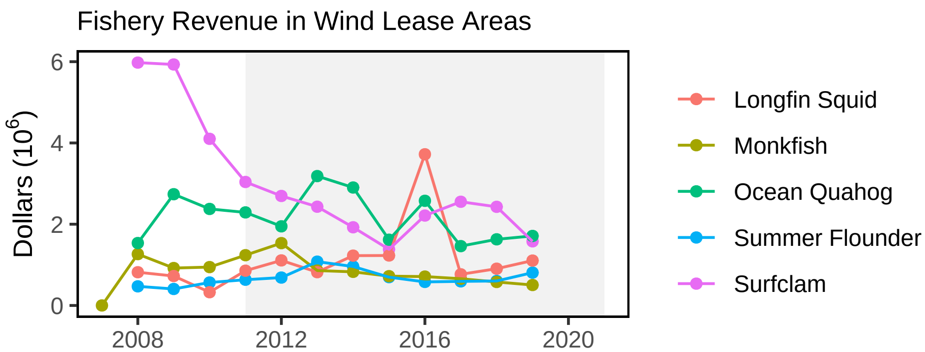


Figure 44: Wind energy revenue in the Mid-Atlantic.

The surfclam fishery could be the most affected fishery, with a maximum of 20% of annual fishery revenue occurring within potential wind lease areas during this period, followed by chub mackerel (15%), ocean quahog (13%), and Atlantic mackerel (10%). The *Illex* squid and bluefish fisheries were the least affected, at 1-2% maximum annual revenue affected, respectively. A maximum of 9% of the annual scup revenues were affected by these areas, with similar effects for the longfin squid (8%), blueline tilefish and black sea bass (7%), and monkfish and golden tilefish (6%) fisheries. The proposed New York Bight lease areas represented up to 5% of total annual fishery revenue from any MAFMC fishery during 2008-2019, with the surfclam fishery most affected. Similar patterns are observed when examining the proportion of annual fishery landings within current and proposed lease areas (see Table 2).

Table 2: Top ten species Landings and Revenue from Wind Energy Areas.

GARFO and ASMFC Managed Species	Maximum Percent Total Annual Regional Species Landings	Minimum Percent Total Annual Regional Species Landings	Maximum Percent Total Annual Regional Species Revenue	Minimum Percent Total Annual Regional Species Revenue
Atlantic surfclam	21 %	6 %	20 %	6 %
American eel	13 %	2 %	18 %	0 %
Atlantic menhaden	17 %	3 %	17 %	3 %
Atlantic chub mackerel	15 %	0 %	16 %	0 %
Yellowtail flounder	14 %	0 %	15 %	0 %
Offshore hake	14 %	0 %	14 %	0 %
Ocean quahog	14 %	5 %	13 %	5 %
Atlantic sea scallops	12 %	1 %	10 %	1 %
Skate wings	10 %	5 %	10 %	5 %
Atlantic mackerel	9 %	0 %	10 %	0 %

Proposed wind development areas interact with the region's federal scientific surveys. Scientific surveys are impacted by offshore wind in four ways: 1. Exclusion of NOAA Fisheries' sampling platforms from the wind development area due to operational and safety limitations; 2.Impacts on the random-stratified statistical design that is the basis for scientific assessments, advice, and analyses; 3.Alteration of benthic and pelagic habitats, and airspace in and around the wind energy development, requiring new designs and methods to sample new habitats; and, 4.Reduced sampling productivity through navigation impacts of wind energy infrastructure on aerial and vessel survey operations. Increase vessel transit between stations may decrease data collections that are already limited by annual days-at-sea day allocations. The total survey area overlap ranges from 1-14% for all Greater Atlantic federal surveys. Individual survey strata have significant interaction with wind, including the sea scallop survey (up to 96% of individual strata) and the bottom trawl survey (BTS, up to 60% strata overlap). Additionally, up to 50% of the southern New England North Atlantic right whale survey's area overlaps with proposed project areas. A region-wide survey mitigation program is underway (Table 3)

Table 3: Survey mitigation planning.

Survey	1.Evaluate designs & Impacts	2.Design New Methods	3.Calibrate New/Existing Surveys	4.Bridge Solutions	5.Conduct New Surveys	6.Comms & Data
Fall BTS	Started	Inital	No	No	No	Initial
Spring BTS	Started	Initial	No	No	No	Initial
EcoMon	No	No	No	No	No	No
Scallop	Started	Initial	No	No	No	No
Shellfish(Clams)	No	No	No	No	No	No
Right Whale (Air)	Inital	Initial	Initial	No	No	No
Marine Mammal/Turtle (Ship/Air)	No	No	No	No	No	No
Altantic Shark (Bottom Long-Line	No	No	No	No	No	No
GOM Bottom Long-Line	No	No	No	No	No	No
GOM Shrimp Survey	No	No	No	No	No	No
Atlantic Shark COASTPAN	No	No	No	No	No	No

Equity and environmental justice (EJ) are priority concerns with offshore wind development and fisheries impacts in the Northeast. Fig. 45 links historic port revenue (2008-2019) from within all wind lease areas as a proportion of the port's total revenue based on vessel trip reports as described in the revenue and landings of species in the wind indicator above. The range (minimum and maximum) of total percent revenue from within wind energy areas is presented in the graph and ports are sorted from greatest to least revenue from within wind areas.

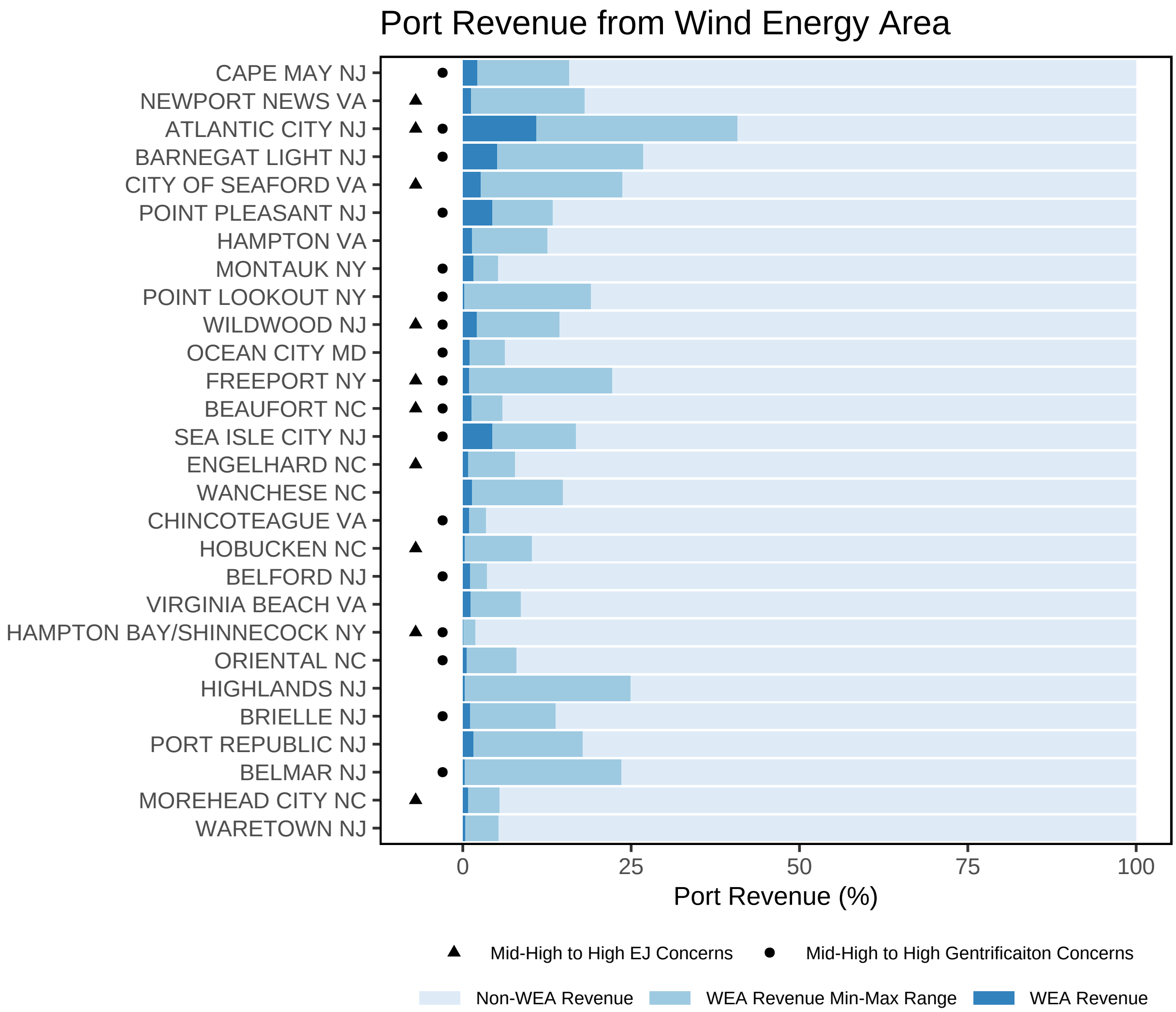


Figure 45: Percent of port revenue from Wind Energy Areas (WEA) in descending order from most to least port revenue from WEA. EJ = Environmental Justice.

For example, Atlantic City, NJ had a minimum of 11% and maximum of 30% overlap of wind energy revenue to the total port revenue between 2008-2019. Those communities that score Med-High or higher in at least one of the vulnerability indicators that address environmental justice concerns (i.e., Poverty, Population Composition, Personal Disruption; see indicator definitions) are noted with a triangle. Gentrification pressure is also highlighted here, with those communities that score Med-High or higher in one or more gentrification pressure indicators (i.e., Housing Disruption, Retiree Migration, Urban Sprawl) represented with a circle (Fig. 45). BOEM reports that cumulative offshore wind development (if all proposed projects are developed) could have moderate impacts on low-income members of environmental justice communities who work in the commercial fishing and for-hire fishing industry due to disruptions to fish populations, restrictions on navigation and increased vessel traffic, as well as existing vulnerabilities of low-income workers to economic impacts [51].

Top fishing communities high in environmental justice concerns (i.e., Atlantic City, NJ, Newport News, VA, Hobucken and Beaufort, NC) should be considered in decision making to reduce the social and economic impacts and aid in the resilience and adaptive capacity of underserved communities. It also highlights communities where we need to provide further resources to reach underserved and underrepresented groups and create opportunities for and directly involve these groups in the decision-making process.

Implications

Current plans for rapid buildout of offshore wind in a patchwork of areas spreads the impacts differentially throughout the region (Fig. 43).

Up to 20% of total average revenue for major Mid-Atlantic commercial species in lease areas could be forgone or reduced and associated effort displaced if all sites are developed. Displaced fishing effort can alter historic fishing area, timing, and method patterns, which can in turn change habitat, species (managed and protected), and fleet interactions. Several factors, including fishery regulations, fishery availability, and user conflicts affect where, when, and how fishing effort may be displaced.

Planned development overlaps right whale mother and calf migration corridors and a significant foraging habitat that is used throughout the year [9] (Fig 46). Turbine presence and extraction of energy from the system could alter local oceanography [52] and may affect right whale prey availability. Proposed wind development areas also bring increased vessel strike risk from construction and operation vessels. In addition, there are a number of potential impacts to whales from pile driving and operational noise such as displacement, increased levels of communication masking, and elevated stress hormones.

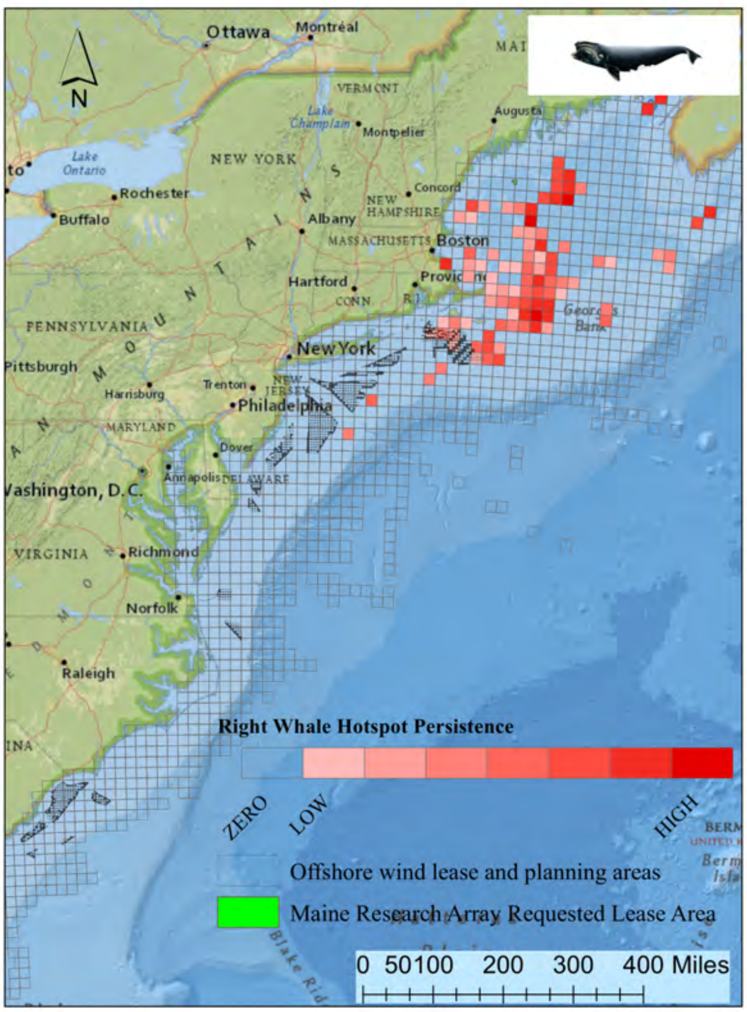


Figure 46: Northern Right Whale persistent hotspots and Wind Energy Areas.

Scientific data collection surveys for ocean and ecosystem conditions, fish, and protected species will be altered, potentially increasing uncertainty for management decision making.

The increase of offshore wind development can have both positive (e.g., employment opportunities) and negative (e.g., space-use conflicts) effects. Continued increase in coastal development and gentrification pressure has resulted in loss of fishing infrastructure space within ports. Understanding these existing pressures can allow for avoiding and mitigating negative impacts to our shore support industry and communities dependent on fishing. Some of the communities with the highest revenue overlap with offshore wind that are also vulnerable to gentrification pressure are Point Pleasant and Atlantic City, NJ, Ocean City, MD, and Beaufort, NC.

Contributors

Editors (NOAA NMFS Northeast Fisheries Science Center, NEFSC): Sarah Gaichas, Kimberly Bastille, Geret DePiper, Kimberly Hyde, Scott Large, Sean Lucey, Chris Orphanides, Laurel Smith

Contributors (NEFSC unless otherwise noted): Kimberly Bastille, Aaron Beaver (Anchor QEA), Andy Beet, Ruth Boettcher (Virginia Department of Game and Inland Fisheries), Mandy Bromilow and CJ Pellerin (NOAA Chesapeake Bay Office), Joseph Caracappa, Doug Christel (GARFO), Patricia Clay, Lisa Colburn, Jennifer Cudney and Tobey Curtis (NMFS Atlantic HMS Management Division), Geret DePiper, Dan Dorfman (NOAA-NOS-NCCOS), Hubert du Pontavice, Emily Farr and Grace Roskar (NMFS Office of Habitat Conservation), Michael Fogarty, Paula Fratantoni, Kevin Friedland, Marjy Friedrichs (VIMS), Sarah Gaichas, Ben Galuardi (GAFRO), Avijit Gangopadhyay (School for Marine Science and Technology, University of Massachusetts Dartmouth), James Gartland (Virginia Institute of Marine Science), Glen Gawarkiewicz (Woods Hole Oceanographic Institution), Sean Hardison, Kimberly Hyde, John Kosik, Steve Kress and Don Lyons (National Audubon Society's Seabird Restoration Program), Young-Oh Kwon and Zhuomin Chen (Woods Hole Oceanographic Institution), Andrew Lipsky, Sean Lucey, Chris Melrose, Shannon Meseck, Ryan Morse, Brandon Muffley (MAFMC), Kimberly Murray, Chris Orphanides, Richard Pace, Tom Parham (Maryland DNR), Charles Perretti, Grace Saba and Emily Slesinger (Rutgers University), Vincent Saba, Sarah Salois, Chris Schillaci (GARFO), Dave Secor (CBL), Angela Silva, Adrienne Silver (UMass/SMAST), Laurel Smith, Talya ten Brink (GARFO), Bruce Vogt (NOAA Chesapeake Bay Office), Ron Vogel (University of Maryland Cooperative Institute for Satellite Earth System Studies and NOAA/NESDIS Center for Satellite Applications and Research), John Walden, Harvey Walsh, Changhua Weng, Mark Wuenschel

Document Orientation

The figure format is illustrated in Fig 47a. Trend lines are shown when slope is significantly different from 0 at the $p < 0.05$ level. An orange line signifies an overall positive trend, and purple signifies a negative trend. To minimize bias introduced by small sample size, no trend is fit for < 30 year time series. Dashed lines represent mean values of time series unless the indicator is an anomaly, in which case the dashed line is equal to 0. Shaded regions indicate the past ten years. If there are no new data for 2021, the shaded region will still cover this time period. The spatial scale of indicators is either coastwide, Mid-Atlantic states (New York, New Jersey, Delaware, Maryland, Virginia, North Carolina), or at the Mid-Atlantic Bight (MAB) Ecosystem Production Unit (EPU, Fig. 47b) level.

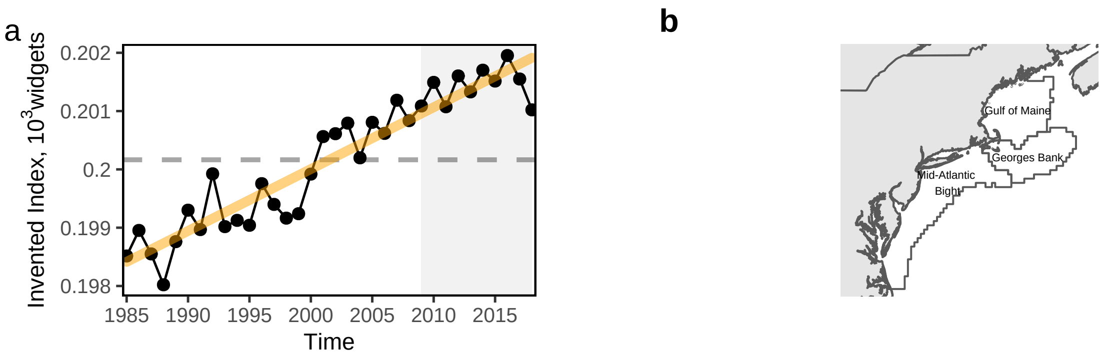


Figure 47: Document orientation. a. Key to figures. b.The Northeast Large Marine Ecosystem.

Fish and invertebrates are aggregated into similar feeding categories (Table 4) to evaluate ecosystem level trends in predators and prey.

Table 4: Feeding guilds and management bodies.

Guild	MAFMC	Joint	NEFMC	State or Other
Apex Predator	NA	NA	NA	bluefin tuna, shark uncl, swordfish, yellowfin tuna
Piscivore	bluefish, longfin squid, northern shortfin squid, summer flounder	goosefish, spiny dogfish	acadian redfish, atlantic cod, atlantic halibut, clearnose skate, little skate, offshore hake, pollock, red hake, silver hake, smooth skate, thorny skate, white hake, winter skate	fourspot flounder, john dory, sea raven, striped bass, weakfish, windowpane
Planktivore	atlantic mackerel, butterfish	NA	atlantic herring	alewife, american shad, blackbelly rosefish, blueback herring, cusk, longhorn sculpin, lumpfish, menhaden, northern sand lance, northern searobin, sculpin uncl
Benthivore	black sea bass, scup, tilefish	NA	american plaice, barndoor skate, crab,red deepsea, haddock, ocean pout, rosette skate, winter flounder, witch flounder, yellowtail flounder	american lobster, atlantic wolffish, blue crab, cancer crab uncl, chain dogfish, cunner, jonah crab, lady crab, smooth dogfish, spider crab uncl, squid cuttlefish and octopod uncl, striped searobin, tautog
Benthos	atlantic surfclam, ocean quahog	NA	sea scallop	blue mussel, channeled whelk, sea cucumber, sea urchin and sand dollar uncl, sea urchins, snails(conchs)

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

23 March, 2022

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901
Scientific and Statistical Committee

To the Council,

In this memo we list comments and requests received on the 2019, 2020, and 2021 State of the Ecosystem (SOE) reports, and how we responded to those requests. We include comments from both Councils because adjustments to the report were made in response to both. We welcome feedback on whether this memo is useful and how to improve it for future SOE reporting.

The attached document includes a table where we summarize all comments and requests with sources. The Status and Progress columns briefly summarize how we responded, with a more detailed response in the numbered Memo Section. In each detailed response, we refer to SOE sections where changes are found or describe information that was not sufficiently developed to include in the 2022 SOE in an effort to solicit feedback on how best to develop indicators for future reports.

We welcome comments on the entire SOE report as well as information included in this memo, and look forward to feedback from the SSC and Council.

Sincerely,

Sarah Gaichas, PhD
Research Fishery Biologist
Ecosystem Dynamics and
Assessment Branch
Northeast Fisheries Science Center

encl: State of the Ecosystem 2022: Request Tracking Memo

cc: Jon Hare

State of the Ecosystem 2022: Request Tracking Memo

March 8, 2022

Introduction

In the table below we summarize all comments and requests with sources. The Progress column briefly summarizes how we responded, with a more detailed response in the numbered Memo Section.

Request	Year	Source	Status	Progress	Memo Section
Add "This report is for [audience]"	2021	MAFMC SSC	In SOE	Introduction section	1
State management objectives first in report	2021	NEFMC	In SOE	Introduction section + Table	2
Ocean acidification (OA) in NEFMC SOE	2021	NEFMC SSC	In SOE	Climate risks section	3
Habitat impact of fishing based on gear.	2021	NEFMC	In SOE	Habitat risks section	4
Revisit right whale language	2021	NEFMC	In SOE	Protected species section	5
Sum of TAC/ Landings relative to TAC	2021	MAFMC SSC	In SOE-MAFMC	Seafood production section	6
Estuarine Water Quality	2020	NEFMC	In SOE-MAFMC, In progress-NEFMC	Climate and Habitat Risks sections MAFMC; Intern collated New England NERRS data	7
More direct opportunities for feedback	2021	MAFMC SSC	In progress	MAFMC SSC ecosystem subgroup	8
Further definition of regime shift	2021	MAFMC SSC	In progress	Regime shift analyses for specific indicators define "abrupt" and "persistent" quantitatively	9
Expand collaboration with Canadian counterparts	2021	MAFMC SSC	In progress	Currently drafting a NMFS-DFO climate/fisheries collaboration framework.	10
Fall turnover date index	2021	MAFMC SSC	In progress	See Current Conditions report	11
Links between species availability inshore/offshore (estuarine conditions) and trends in recreational fishing effort?	2021	MAFMC	In progress	Bluefish prey index inshore/offshore partially addresses	12
Apex predator index (pinnipeds)	2021	NEFMC	In progress	Protected species branch developing time series	13
Forage availability index (Herring/Sandlance)	2021	NEFMC	In progress	Bluefish prey index partially addresses	14
Fishery gear modifications accounted for in shark CPUE?	2021	MAFMC	In progress	Updated methods in tech-doc	15
Trend analysis	2021	NEFMC SSC	In progress	Evaluating empirical thresholds	16
Regime shifts in Social-Economic indicators	2021	NEFMC SSC	In progress	National working group and regional study	17
Linking Condition	2020	MAFMC	In progress	Not ready for 2022	18
Cumulative weather index	2020	MAFMC	In progress	Data gathered for prototype	19
VAST and uncertainty	2020	Both Councils	In progress	Not ready for 2022	20
Seal index	2020	MAFMC	In progress	Not ready for 2022	21

(continued)

Request	Year	Source	Status	Progress	Memo Section
Breakpoints	2020	NEFMC	In progress	Evaluating empirical thresholds	22
Management complexity	2019	MAFMC	In progress	Student work needs further analysis, no further work this year	23
Shellfish growth/distribution linked to climate (system productivity)	2019	MAFMC	In progress	Project with A. Hollander	24
Avg weight of diet components by feeding group	2019	Internal	In progress	Part of fish condition project	25
Mean stomach weight across feeding guilds	2019	MAFMC	In progress	Intern evaluated trends in guild diets	26
Inflection points for indicators	2019	Both Councils	In progress	Evaluating empirical thresholds	27
Recreational bycatch mortality as an indicator of regulatory waste	2021	MAFMC SSC	Not started	Lacking resources this year	28
Sturgeon Bycatch	2021	MAFMC SSC	Not started	Lacking resources this year	29
Decomposition of diversity drivers highlighting social components	2021	MAFMC SSC	Not started	Lacking resources this year	30
Changing per capita seafood consumption as driver of revenue?	2021	MAFMC	Not started	Lacking resources this year	31
Nutrient input, Benthic Flux and POC(particulate organic carbon) to inform benthic productivity by something other than surface indidcators	2021	MAFMC SSC	Not started	Lacking resources this year	32
Relate OA to nutrient input; are there "dead zones" (hypoxia)?	2021	MAFMC	Not started	Lacking resources this year	33
Indicators of chemical pollution in offshore waters	2021	MAFMC	Not started	Lacking resources this year	34
How does phyto size comp affect EOF indicator, if at all?	2021	MAFMC	Not started	May pursue with MAFMC SSC eco WG	35
Indicator of scallop pred pops poorly sampled by bottom trawls	2021	NEFMC	Not started	Lacking resources this year	36
Compare EOF (Link) thresholds to empirical thresholds (Large, Tam)	2021	MAFMC SSC	Not started	May pursue with MAFMC SSC eco WG	37
Time series analysis (Zooplankton/Forage fish) to tie into regime shifts	2021	MAFMC SSC	Not started	Lacking resources this year	38
Optimum yield for ecosystem	2021	NEFMC	Not started	May pursue with MAFMC SSC eco WG	39
Re-evaluate EPUs	2020	NEFMC	Not started	Lacking resources this year	40
Incorporate social sciences survey from council	2020	NEFMC	Not started	Lacking resources this year	41
Biomass of spp not included in BTS	2020	MAFMC	Not started	Lacking resources this year	42

(continued)

Request	Year	Source	Status	Progress	Memo Section
Reduce indicator dimensionality with multivariate statistics	2020	NEFMC	Not started	Lacking resources this year	43
Estuarine condition relative to power plants and temp	2019	MAFMC	Not started	Lacking resources this year	44
Young of Year index from multiple surveys	2019	MAFMC	Not started	Lacking resources this year	45

Responses to comments

1 Add "This report is for [audience]"

The first sentence of each report now states the audience.

2 State management objectives first in report

The graphical summary on page 1 (MAFMC) and 1-2 (NEFMC) summarizes management objectives (columns in each table) and indicator performance relative to those objectives. Table 1 in the main body of each report (reproduced below) lists management objectives and indicators linked to those objectives.

Table 2: Ecosystem-scale fishery management objectives in the Mid-Atlantic Bight

Objective Categories	Indicators reported
Provisioning and Cultural Services	
Seafood Production	Landings; commercial total and by feeding guild; recreational harvest
Profits	Revenue decomposed to price and volume
Recreation	Angler trips; recreational fleet diversity
Stability	Diversity indices (fishery and ecosystem)
Social & Cultural	Community engagement/reliance and environmental justice status
Protected Species	Bycatch; population (adult and juvenile) numbers, mortalities
Supporting and Regulating Services	
Biomass	Biomass or abundance by feeding guild from surveys
Productivity	Condition and recruitment of managed species, primary productivity
Trophic structure	Relative biomass of feeding guilds, zooplankton
Habitat	Estuarine and offshore habitat conditions

3 Ocean acidification (OA) in NEFMC SOE

Ocean acidification information was included in the MAFMC report in 2021, and was expanded to the Gulf of Maine and added to the NEFMC report in 2022. In both reports, OA information is presented in the Climate Risks section. Additional information is available in the Indicator catalog: https://noaa-edab.github.io/catalog/ocean-acidification-and-shellfish.html

4 Habitat impact of fishing based on gear

Both SOEs were revised this year to include a section on Habitat Risks. Both reports include a Fishing Gear Impacts subsection within the Habitat Risks section that links to detailed information on the outputs of the Northeast Fishing Effects Model. Detailed model results are available at the Northeast Ocean Data Portal (https://www.northeastoceandata.org/data-explorer/) under the Habitat/Fishing Effects - Seabed Habitat Disturbance and Fishing Effects - Intrinsic Seabed Habitat Vulnerablity.

More details are available on the Indicator catalog page https://noaa-edab.github.io/catalog/northeast-fishing-effects-model.html

5 Revisit right whale language

The NEFMC requested a review and update of language in the Protected Species section on right whales. Language was edited in 2021, and a revised 2021 report was submitted to both Councils in April 2021. The report of record for each region (MAFMC, NEFMC) contains the revised text and notes the revision history as a footnote. Revised language was carried through to the 2022 reports.

6 Sum of TAC/ Landings relative to TAC

The MAFMC SSC requested information on landings relative to allowable catches. This information was provided by Council staff for 2012-2020 for all MAFMC fisheries and presented in 2022 MAFMC report as one of the multiple potential drivers of Seafood Production.

7 Estuarine Water Quality

The 2022 MAFMC report was updated with additional Chesapeake Bay water quality indicators, as well as a new indicator on submerged aquatic vegetation.

The NEFMC requested more information on estuarine habitats. In 2021, PEP intern Rhegan Thomason (U. Texas) developed a reproducible data workflow using open data science tools and principles that will be used to provide estuarine habitat information into annual SOE reports. She used data from the National Estuarine Research Reserve System (NERRS) to explore water quality and climate indicators at four sites in the New England region. NERRS conducts research and monitors the ecosystems to "track short-term variability and long-term changes due to natural and anthropogenic disturbances." We acquired and compiled data from the NERRS Centralized Data Management Office to create a partially automated workflow that analyzes and visualizes available data. We developed open access code to generate time series and climatologies for temperature, dissolved oxygen, salinity, and chlorophyll. The project used RStudio with GitHub integration to version control data and code as well as enhance collaboration and transparency (https://github.com/rheganthomason/NERRSdata). This workflow was designed to be reproducible and available for future use anywhere the data is applicable.

An Indicator catalog chapter details further results: https://noaa-edab.github.io/catalog/NERRs.html. We welcome feedback to develop this information for future SOE reports.

8 More direct opportunities for feedback

The MAFMC SSC requested more opportunities for SOE report development and feedback to improve use in mangement. An SSC ecosystem working group was established in 2021 to coordinate SSC needs with ecosystem indicator investigations. NEFSC secured funding to support SSC-requested analyses that will evaluate aspects of SOE indicators along with management uses. Results of this work will be reported as they become available, but porposed analyses may address several other points raised by both SSCs and Councils, including evaluations of ecosystem overfishing indicators (points 35, 37), indicator thresholds (points 16, 22, 27), and system level optimum yields (point 39).

9 Further definition of regime shift

Regime shifts are currently described in the SOE graphical summary as "large, abrupt and persistent changes in the structure and function of an ecosystem." This plain-language general definition is used by many sources on regime shifts (e.g., https://www.regimeshifts.org/what-is-a-regime-shift) as well as in the scientific literature (e.g., [1]).

Further technical definitions of "abrupt" "and"persistent" for a particular indicator or set of indicators may vary, and can be based on the outcomes of multiple analyses. In many analyses, "abrupt" represents a single-year shift between different levels of a time series indicator, and "persistent" means the indicator stays in the new state for mutliple years after the shift rather than returning to the previous state.

For example, [1] identified regime shifts where "results of the chronological clustering, PCA, and change point analysis were complementary." In other words, groups of similar years were detected by multiple methods and compared to determine persistence within a regime, and changepoint analysis detects whether abrupt change has occurred between those groups of years with similar conditions.

Thge regime shift in warm core rings presented in the SOE also used multiple methods incorporated into a "sequential regime shift detection algorithm" ([2]; https://noaa-edab.github.io/tech-doc/warm-core-rings.html). The algorithm looks for "abrupt change" and "persistence" by comparing time series means prior to and after the inclusion of each new observation, evaluating the amount of change within the current time period, and determining whether the current year represents a change point.

Technical definitions of "abrupt" and "persistent" for regime shift analyses presented in the SOE can be found either in the SOE Technical Documentation (https://noaa-edab.github.io/tech-doc/), in literature cited within the SOE, or both.

10 Expand collaboration with Canadian counterparts

NEFSC are currently drafting a NMFS-DFO climate/fisheries collaboration framework. We can expand some of our environmental indicators to include NW Atlantic indicators, and welcome feedback on priority indicators for this expansion.

11 Fall turnover date index

An index of fall turnover timing is presented in the NEFSC Current Conditions report each year: https://www.fisheries.noaa.gov/new-england-mid-atlantic/climate/current-conditions-northeast-us-shelf-ecosystem-spring-2021-update#fall-thermal-transition-day

As noted in the Current Conditions summary, "the fall thermal transition continues to shift to progressively later on the year, raising concern over the timing of production cycles in the food web."

We can include these indicators or summarize results from Current Conditions and other sources in the SOE, in particular as they are prioritized by the Councils.

12 Links between species availability inshore/offshore (estuarine conditions) and trends in recreational fishing effort?

Work is in progress to evaluate bluefish availability inshore vs offshore along with trends in recreational fishing catch per unit effort for the 2022 Bluefish Research Track Assessment. The index in development relates bluefish availablilty to prey, rather than estuarine conditions. It remains to be seen if prey availability is related to recreational CPUE, but results can be summarized in an upcoming SOE if this seems relevant.

13 Apex predator index (pinnipeds)

Understanding the dynamics of apex predators, including pinnipeds and sharks, is the aim of the restructured SOE section on Ecosystem Structure Indicators. This section is a work-in progress, which will add information as it becomes available. The NEFSC Protected Species Branch is working towards time series for many apex predators (see also point 21, Seal Index), and the HMS shark CPUE time series is another component. We hope to have a more integrated apex predator index in future SOE reports.

14 Forage availability index (Herring/Sandlance)

As noted under point 12, work is in progress to evaluate bluefish availability inshore vs. offshore along with trends in recreational fishing effort for the 2022 Bluefish Research Track Assessment. While there are not plans to distinguish different forage fish species for this work, the aggregate forage fish index may be presented in the SOE reports in coming years.

Additional research on sandlance co-occurrence on Stellwagen Bank with seabird and marine mammal predators has been added to the Indicator catalog (https://noaa-edab.github.io/catalog/sandlance.html) for potential expansion in the future.

15 Fishery gear modifications accounted for in shark CPUE

Methods for the HMS Pelagic Observer Program (POP) shark CPUE indicator have been posted to the SOE Technical Documentation website (https://noaa-edab.github.io/tech-doc/). The Pelagic Observer Program does collect information on hooks (https://www.fisheries.noaa.gov/inport/item/30713), but at this time it is unclear how or whether information on circle hooks is specifically incorporated into the CPUE index. We are updating the methods with more detail for the next report.

16 Trend analysis

Points 16, 22 and 27 are related, and exploratory analysis evaluating trends, empirical breakpoints, and thresholds for individual indicators are in progress. Initial comparisons of current SOE trends are available online at https://connect.fisheries.noaa.gov/content/24ac5977-ec9f-4c32-ab8d-045cdbc526e6/

17 Regime shifts in Social-Economic indicators

The National Integrated Ecosystem Assessment Human Dimensions Working Group is working on regime shifts in social indicators. The WG, led by Geret DePiper, has a special issue call open for Marine Policy: https://www.journals.elsevier.com/marine-policy/call-for-papers/special-issue-call-for-papers-assessing-social-change-and-ranking-outcomes-in-support-of-ecosystem-based-management-regime-shifts-nonlinearities-and-ecosystem-status. There will be one paper for the Northeast (Walden and DePiper, presented at the SOE synthesis meeting) and a cross regional manuscript. This information can be incorporated into a future SOE as it becomes available.

18 Linking Condition

Both Councils were interested in more quantitative analysis linking environmental indicators, managed fish indicators, and fishery indicators to facilitate use of this information in management. Considerable progress has been made on linking environmental indicators to fish condition for multiple species, with an overview of preliminary Generalized Additive Modeling (GAM) results described in the SOE. The NE SSC commented that overall (total) biomass could be included in the analysis of fish condition; this has been included in the analysis, as well as local abundance and local biomass (Fig. 1).

Species	Fproxy	Total Biomass	Local Abundance	Local Biomass	Bottom Temp	Total Copepods	Copepod Small/Large	Spring Temp	Winter Temp	Stomach Fullness
Smooth dogfish									NA	
Spiny dogfish								NA		
Winter skate						NA		NA		
Little skate								NA		
Thorny skate								NA		
Atlantic herring								NA		NA
Silver hake								NA		
Atlantic cod						NA			NA	NA
Haddock								NA		
Pollock									NA	
White hake								NA		
Red hake						NA		NA		
Spotted hake	NA	NA						NA		
American plaice									NA	
Summer flounder						NA			NA	
Fourspot	NA	NA				NA			NA	
Yellowtail flounder								NA		NA
Winter flounder								NA		
Witch flounder						NA		NA		
Windowpane						NA			NA	NA
Atlantic mackerel									NA	NA
Butterfish						NA		NA		
Bluefish						NA			NA	
Black sea bass									NA	
Weakfish	NA	NA				NA			NA	
Acadian redfish						NA			NA	
Sea raven	NA	NA				NA			NA	
Ocean pout								NA		
Goosefish	NA	NA							NA	

Figure 1: Preliminary results: GAM fish condition deviance explained by environmental variables, with darker cells indicating more important variables for that species.

Correlations between the potential drivers of condition are also being explored. Indices that are correlated (R>0.3, dark cells in Fig. 2) will not be used together in future full GAM analyses.

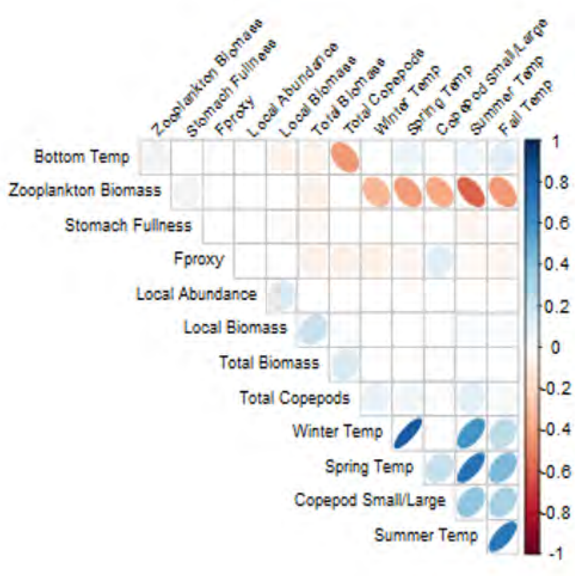

Figure 2: Preliminary results: correlations between potential environmental drivers of fish condition.

The MA SSC commented that indices of growth (weight at age) used in stock assessments could also be included in the analysis, and that methods such as Gaussian network modeling may be appropriate. The fish condition working group explored GAM analyses to link environmental indices to weights at age for managed fish species, but there were diagnostic issues that were not present in the condition analyses. The fish condition working group is continuing to make improvements to the GAM analyses, exploring options for indices of growth to integrate this information into future analyses. Similarly, modeling approaches in addition to GAMs are under investigation. Another component of the project evaluating potential links between fish condition and market prices is also ongoing.

19 Cumulative weather index

The MAFMC requested that we include information on weather that might affect recreational or commercial fishing effort. We are partnering with the National Weather Service (NWS) to provide this type of information. A preliminary index was developed based on Small craft/Gale warnings from the NWS Boston forecast office for the area off Cape Cod (Table 3).

Table 3: Gales = winds >=34 knots (usually associated with a coastal storm); Storm = winds >=48 knots

Year	Gale.Warnings	Storm.Warnings
2008	61	8
2009	49	11
2010	47	6
2011	48	5
2012	30	8
2013	43	6
2014	36	7
2015	80	3
2016	55	8
2017	52	15
2018	60	14
2019	57	8

Funding has been obtained to have 1 or 2 interns working on creating this index. The plan is for it to be available for the 2023 SOE.

We seek feedback from the Council on the utility of this information to further develop an indicator for future SOE reports. Is monthly data more useful than annual as above? Would seasonal aggregates be useful? Is there a certain wind speed where vessels alter effort? We look forward to further integration of NWS information for our region.

20 VAST and uncertainty

Both Councils were interested in model-based estimates of aggregate fish biomass and uncertainty based on preliminary results presented in 2020. We experimented with a model-based estimate of uncertainty for survey biomass which accounts for both spatial and temporal sources (VAST; [3]). Work on model-based estimates is currently in review and may be presented in an upcoming report.

21 Seal index

The MA SSC requested indices of abundance for seals rather than the narrative supplied in 2020. Analysis and review is in progress to update abundance and possibly assess trends in US waters for harbor and gray seals; however, these estimates were not available for the 2022 SOE. New information on increasing numbers of gray seal pups born at US pupping sites has been added to the narrative for both SOE reports [4].

A detailed stock assessment for Canadian Northwest Atlantic gray seals was published in 2017 and is available online. As noted in the SOE, the Candian population is likely supplementing the US population, and seals range widely, so distinguishing trends within US waters or individual EPUs is complex. However, a gray seal survey was in progress in 2021, and updated information will be included as it is available.

As noted by the MA SSC, seals are important predators in the ecosystem, so we have included additional updates on seal diet studies in progress, and have moved the discussion of seals as predators into a more general discussion of predator trends in the SOE along with information added for sharks.

22 Breakpoints

Points 16, 22 and 27 are related, and exploratory analysis evaluating trends, empirical breakpoints, and thresholds for individual indicators are in progress.

While this could not be addressed for individual indicators in 2022, our regime shifts synthesis theme will be explored further in upcoming years. We welcome suggestions for which individual indicators or groups of indicators should be prioritized for regime shift analysis in upcoming years.

23 Management complexity

The MAFMC asked for indicators of management complexity for use in the EAFM risk assessment. An NEFSC summer student started work on this in 2018, but we have lacked capacity to finish the project since then. If resources allow we will continue the project, and guidance for further indicator developmet is welcome.

24 Shellfish growth/distribution linked to climate (system productivity)

The MAFMC requested that we investigate how shellfish growth and distribution information could be linked to climate indicators and possibly ecosystem productivity. We are working with Dr. Roger Mann who has obtained NSF INTERN funding for his student Alexis Hollander to spend up to 6 months at NEFSC working on shellfish growth, and to facilitate integration of SOE climate indicators with this work. While in-person work has not been possible to date, bottom temperature and other ecosystem indicators are currently being incorporated into Ms Hollander's work.

25 Avg weight of diet components by feeding group

In 2021, IN FISH intern Ava De Leon (U. Miami) investigated diet data collected aboard the NEFSC bottom trawl survey 1973-2019 across all predators combined. Trend analyses were performed on four prey categories, including benthic invertebrates, fish, pelagic invertebrates, and other in the regions of Georges Bank, Mid-Atlantic Bight and the Gulf of Maine during the Fall and Spring seasons.

Each category can be described in general:

BENINV includes prey that are clearly identifiable as benthic (bottom dwelling) invertebrates by either name or general taxoomic category. Similarly, PELINV includes prey clearly identifiable as pelagic (water column dwelling) invertebrates, including some shrimp species that spend much time in the water column.

FISH includes all fish, whether identified as individual species or as a taxonmic category, or "unidentified fish." The FISH category also includes the commercially fished squid species, *Illex* and *Doryteuthis* (formerly *Loligo*).

OTHER includes everything that could not be placed into one of the above categories; for example, "unidentified invertebrates," taxonomic categories that could be either benthic or pelagic, digested animal remains, plant material, etc.

In the Mid-Atlantic Bight in the Fall there were notable trends of increasing fish, and decreasing benthic invertebrates and pelagic invertebrates in predator diets. Other regions and seasons did not show significant diet trends.

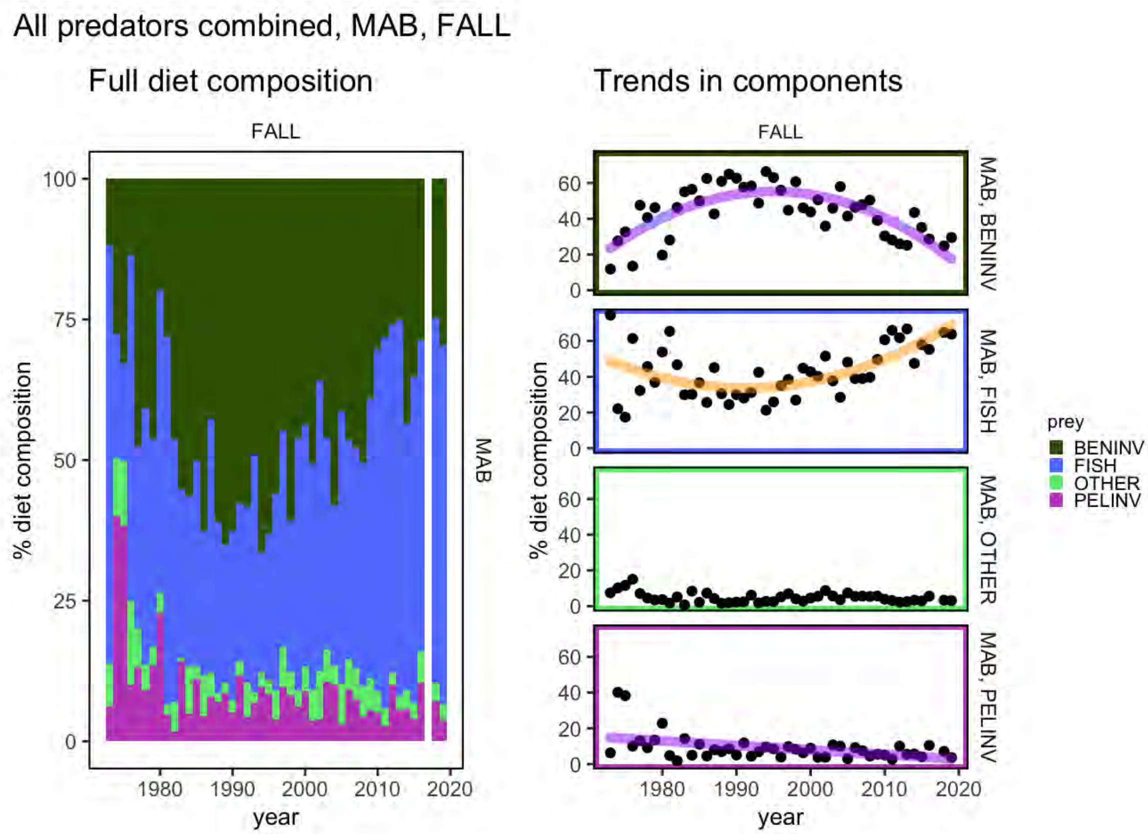

Figure 3: Diet composition for all predators combined collected on Fall NEFSC surveys in the Mid-Atlantic. See text for prey group definitions. Significant trends are shown using the standard State of the Ecosystem format: orange lines indicate a significant increasing trend and purple lines indicate a significant decreasing trend

There was no significant trend in predator size over time for the Mid-Atlantic. The number of stomachs sampled from all predators combined has increased over time for both seasons and all regions. There isn't one dominantly sampled predator over time, so it would be difficult to say that any single predator was driving the aggregate trends. The proportion of piscivores sampled was dominant for much of the 1980s and 1990s, and the proportion benthivores sampled has been higher and more consistent in all areas and seasons since about 2000.

Details of the work are summarized at https://sgaichas.github.io/learnR-dietdata/ExplainTrends.html, and an Indicator catalog chapter is in progress here https://noaa-edab.github.io/catalog/diet-composition-analysis.html.

This information is also being examined as part of the fish condition links project described above. We welcome feedback on further directions for this work.

26 Mean stomach weight across feeding guilds

This information is being examined as part of the fish condition links project, and is related to the initial work described on trends in diet components by feeding group (25) above. However, we had insufficient resources to develop an independent indicator for the SOE in 2021.

27 Inflection points for indicators

Both Councils have requested more information on ecosystem thresholds and inflection points. In 2021, we calculated two ecosystem overfishing indicators with proposed thresholds [5] for each ecological production unit (EPU) on the northeast US shelf.

Points 16, 22 and 27 are related, and exploratory analysis evaluating trends, empirical breakpoints, and thresholds for individual indicators are in progress. While this could not be addressed for individual indicators in 2022, we did include new Ecosystem Overfishing (EOF) indicators with proposed thresholds. Simulation testing the EOF indicators is one of the potential analyses identified by the MAFMC SSC Ecosystem working group, so work on this may proceed over the coming year.

We welcome suggestions for which additional indicators or groups of indicators should be prioritized for inflection point/threshold analysis in upcoming years.

28 Recreational bycatch mortality as an indicator of regulatory waste

We had insufficient resources to address this in 2021.

29 Sturgeon Bycatch

We had insufficient resources to address this in 2021.

30 Decomposition of diversity drivers highlighting social components

We had insufficient resources to address this in 2021.

31 Changing per capita seafood consumption as driver of revenue

We had insufficient resources to address this in 2021.

32 Nutrient input, Benthic Flux and POC (particulate organic carbon) to inform benthic productivity by something other than surface indidcators

While there is investigation into these issues related to ongoing end-to-end ecosystem model development at NEFSC, we had insufficient resources to address this as a standalone ecosystem indicator in 2021.

33 Relate OA to nutrient input; are there "dead zones" (hypoxia)?

Ocean acidification (OA) information was updated and expanded for the Mid-Atlantic report, and included for the first time in the New England report in 2022 (see point 3 above).

Comprehensive data on nutrient input onto the Northeast US shelf is lacking. However, as noted above, nutrient dynamics are under investigation within ongoing end-to-end ecosystem model development at NEFSC. We had insufficient resources to address this as a standalone ecosystem indicator or integrate it with OA indicators in 2021.

34 Indicators of chemical pollution in offshore waters

We had insufficient resources to address this in 2021.

35 How does phyto size comp affect ecosystem overfishing (EOF) indicators, if at all?

Ecosystem overfishing indicators could not be updated this year due to delayed landings data, as noted in the SOE. However, more detailed information on phytoplankton size composition was presented in the Ecosystem Productivity Indicators section. We anticipate addressing this question in future years as we further develop the EOF indicators. Simulation testing the EOF indicators is one of the potential analyses identified by the MAFMC SSC Ecosystem working group, so work on this may proceed over the coming year.

36 Indicator of scallop pred pops poorly sampled by bottom trawls

We had insufficient resources to address this in 2021.

37 Compare EOF (Link) thresholds to empirical thresholds (Large, Tam)

Ecosystem overfishing indicators could not be updated this year due to delayed landings data, as noted in the SOE. As noted above under points 16, 22 and 27, exploratory analysis evaluating trends, empirical breakpoints, and thresholds for individual indicators are in progress. Simulation testing the EOF indicators is one of the potential analyses identified by the MAFMC SSC Ecosystem working group, so work on this may proceed over the coming year.

38 Time series analysis (Zooplankton/Forage fish) to tie into regime shifts

Zooplankton and forage fish time series presented in the 2021 report could not be updated this year due to survey interruptions and sample processing delays. We hope to initiate this work in the coming years.

39 Optimum yield for ecosystem

This is related to the EOF indicators first presented in 2021. Ecosystem overfishing indicators could not be updated this year due to delayed landings data, as noted in the SOE. Simulation testing the EOF indicators and evaluating ecoystem reference points such as optimum yield is among the potential analyses identified by the MAFMC SSC Ecosystem working group, so work on this may proceed over the coming year.

40 Re-evaluate EPUs

Initial planning for re-evaluating Northeast US Shelf ecological production units has started, but we had insufficient resources to begin the project in 2021.

41 Incorporate social sciences survey from council

The NE SSC was interested in reviewing information on the perception and use of social science information from an NEFMC survey. We had insufficient resources to address this in 2021. We welcome input from the New England Council and staff on how best to incorporate this information in future reports.

42 Biomass of spp not included in BTS

We continued to include information on sharks this year, and data streams for many other species not captured by bottom trawl surveys (BTS) are under investigation. However, we had insufficient resources to address this fully in 2021.

43 Reduce indicator dimensionality with multivariate statistics

The NE SSC suggested statistical analysis to reduce the number of indicators and remove redundant indicators in the report. Some work has been initiated on this in past years, but we had insufficient resources to complete this in 2021.

44 Estuarine condition relative to power plants and temp

We had insufficient resources to address this in 2021.

45 Young of Year index from multiple surveys

The MA SSC was interested in a young of year index from multiple surveys. The SOE includes a fish productivity index (direct links MAB, GB and GOM), which calculates the number of small fish per biomass of large fish of the same species from NEFSC surveys. This index is based only on the NEFSC bottom trawl survey. We recognize that this is not strictly a young of year index, and it is from a single survey.

We had insufficient resources to address this further in 2021.

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Introduction

The Council approved an EAFM Guidance Document in 2016 which outlined a path forward to more fully incorporate ecosystem considerations into marine fisheries management[1], and revised the document in February 2019[2]. The Council's stated goal for EAFM is "to manage for ecologically sustainable utilization of living marine resources while maintaining ecosystem productivity, structure, and function." Ecologically sustainable utilization is further defined as "utilization that accommodates the needs of present and future generations, while maintaining the integrity, health, and diversity of the marine ecosystem." Of particular interest to the Council was the development of tools to incorporate the effects of species, fleet, habitat and climate interactions into its management and science programs. To accomplish this, the Council agreed to adopt a structured framework to first prioritize ecosystem interactions, second to specify key questions regarding high priority interactions and third tailor appropriate analyses to address them [1]. Because there are so many possible ecosystem interactions to consider, a risk assessment was adopted as the first step to identify a subset of high priority interactions [2]. The risk elements included in the Council's initial assessment spanned biological, ecological, social and economic issues (Table 1) and risk criteria for the assessment were based on a range of indicators and expert knowledge (Table 2).

This document updates the Mid-Atlantic Council's initial EAFM risk assessment [3] with indicators from the 2022 State of the Ecosystem report and with new analyses by Council Staff for the Management elements. The risk assessment was designed to help the Council decide where to focus limited resources to address ecosystem considerations by first clarifying priorities. Overall, the purpose of the EAFM risk assessment is to provide the Council with a proactive strategic planning tool for the sustainable management of marine resources under its jurisdiction, while taking interactions within the ecosystem into account.

Many risk rankings are unchanged based on the updated indicators for 2022 and the Council's risk criteria. Below, we highlight only the elements where updated information has changed the perception of risk. In addition, we present new indicators based on Council feedback on the original risk analysis that the Council may wish to include in future updates to the EAFM risk assessment. As part of the Council's 2022 Implementation Plan, the Council will initiate a comprehensive review of the risk assessment where new/different risk elements and analyses that could inform the risk criteria can be considered. This review will likely begin later in 2022 (the fall) and continue in 2023 and will likely include working with the Council's Ecosystem and Ocean Planning Committee and Advisory Panel.

[1] http://www.mafmc.org/s/EAFM_Guidance-Doc_2017-02-07.pdf
[2] http://www.mafmc.org/s/EAFM-Doc-Revised-2019-02-08.pdf

Table 1: Risk Elements, Definitions, and Indicators Used

Element	Definition	Indicator
Ecological		
Assessment performance	Risk of not achieving OY due to analytical limitations	Current assessment method/data quality
F status	Risk of not achieving OY due to overfishing	Current F relative to reference F from assessment
B status	Risk of not achieving OY due to depleted stock	Current B relative to reference B from assessment
Food web (MAFMC Predator)	Risk of not achieving OY due to MAFMC managed species interactions	Diet composition, management measures
Food web (MAFMC Prey)	Risk of not achieving OY due to MAFMC managed species interactions	Diet composition, management measures
Food web (Protected Species Prey)	Risk of not achieving protected species objectives due to species interactions	Diet composition, management measures
Ecosystem productivity	Risk of not achieving OY due to changing system productivity	Four indicators, see text
Climate	Risk of not achieving OY due to climate vulnerability	Northeast Climate Vulnerability Assessment
Distribution shifts	Risk of not achieving OY due to climate-driven distribution shifts	Northeast Climate Vulnerability Assessment + 2 indicators
Estuarine habitat	Risk of not achieving OY due to threats to estuarine/nursery habitat	Enumerated threats + estuarine dependence
Offshore habitat	Risk of not achieving OY due to changing offshore habitat	Integrated habitat model index
Economic		
Commercial Revenue	Risk of not maximizing fishery value	Revenue in aggregate
Recreational Angler Days/Trips	Risk of not maximizing fishery value	Numbers of anglers and trips in aggregate
Commercial Fishery Resilience (Revenue Diversity)	Risk of reduced fishery business resilience	Species diversity of revenue
Commercial Fishery Resilience (Shoreside Support)	Risk of reduced fishery business resilience due to shoreside support infrastructure	Number of shoreside support businesses
Social		
Fleet Resilience	Risk of reduced fishery resilience	Number of fleets, fleet diversity
Social-Cultural	Risk of reduced community resilience	Community vulnerability, fishery engagement and reliance
Food Production		
Commercial	Risk of not optimizing seafood production	Seafood landings in aggregate
Recreational	Risk of not maintaining personal food production	Recreational landings in aggregate
Management		
Control	Risk of not achieving OY due to inadequate control	Catch compared to allocation
Interactions	Risk of not achieving OY due to interactions with species managed by other entities	Number and type of interactions with protected or non-MAFMC managed species, co-management
Other ocean uses	Risk of not achieving OY due to other human uses	Fishery overlap with energy/mining areas
Regulatory complexity	Risk of not achieving compliance due to complexity	Number of regulations by species
Discards	Risk of not minimizing bycatch to extent practicable	Standardized Bycatch Reporting
Allocation	Risk of not achieving OY due to spatial mismatch of stocks and management	Distribution shifts + number of interests

Table 2: Risk Ranking Criteria used for each Risk Element

Element	Low	Low-Moderate	Moderate-High	High
Assessment performance	Assessment model(s) passed peer review, high data quality	Assessment passed peer review but some key data and/or reference points may be lacking	*This category not used*	Assessment failed peer review or no assessment, data-limited tools applied
F status	F < Fmsy	Unknown, but weight of evidence indicates low overfishing risk	Unknown status	F > Fmsy
B status	B > Bmsy	Bmsy > B > 0.5 Bmsy, or unknown, but weight of evidence indicates low risk	Unknown status	B < 0.5 Bmsy
Food web (MAFMC Predator)	Few interactions as predators of other MAFMC managed species, or predator of other managed species in aggregate but below 50% of diet	*This category not used*	*This category not used*	Managed species highly dependent on other MAFMC managed species as prey
Food web (MAFMC Prey)	Few interactions as prey of other MAFMC managed species, or prey of other managed species but below 50% of diet	Important prey with management consideration of interaction	*This category not used*	Managed species is sole prey and/or subject to high mortality due to other MAFMC managed species
Food web (Protected Species Prey)	Few interactions with any protected species	Important prey of 1-2 protected species, or important prey of 3 or more protected species with management consideration of interaction	Important prey of 3 or more protected species	Managed species is sole prey for a protected species
Ecosystem productivity	No trends in ecosystem productivity	Trend in ecosystem productivity (1-2 measures, increase or decrease)	Trend in ecosystem productivity (3+ measures, increase or decrease)	Decreasing trend in ecosystem productivity, all measures
Climate	Low climate vulnerability ranking	Moderate climate vulnerability ranking	High climate vulnerability ranking	Very high climate vulnerability ranking
Distribution shifts	Low potential for distribution shifts	Moderate potential for distribution shifts	High potential for distribution shifts	Very high potential for distribution shifts
Estuarine habitat	Not dependent on nearshore coastal or estuarine habitat	Estuarine dependent, estuarine condition stable	Estuarine dependent, estuarine condition fair	Estuarine dependent, estuarine condition poor
Offshore habitat	No change in offshore habitat quality or quantity	Increasing variability in habitat quality or quantity	Significant long term decrease in habitat quality or quantity	Significant recent decrease in habitat quality or quantity
Commercial Revenue	No trend and low variability in revenue	Increasing or high variability in revenue	Significant long term revenue decrease	Significant recent decrease in revenue
Recreational Angler Days/Trips	No trends in angler days/trips	Increasing or high variability in angler days/trips	Significant long term decreases in angler days/trips	Significant recent decreases in angler days/trips
Commercial Fishery Resilience (Revenue Diversity)	No trend in diversity measure	Increasing or high variability in diversity measure	Significant long term downward trend in diversity measure	Significant recent downward trend in diversity measure

Table 2: Risk Ranking Criteria used for each Risk Element *(continued)*

Element	Low	Low-Moderate	Moderate-High	High
Commercial Fishery Resilience (Shoreside Support)	No trend in shoreside support businesses	Increasing or high variability in shoreside support businesses	Significant recent decrease in one measure of shoreside support businesses	Significant recent decrease in multiple measures of shoreside support businesses
Fleet Resilience	No trend in diversity measure	Increasing or high variability in diversity measure	Significant long term downward trend in diversity measure	Significant recent downward trend in diversity measure
Social-Cultural	Few (<10%) vulnerable fishery dependent communities	10-25% of fishery dependent communities with >3 high vulnerability ratings	25-50% of fishery dependent communities with >3 high vulnerability ratings	Majority (>50%) of fishery dependent communities with >3 high vulnerability ratings
Commercial	No trend or increase in seafood landings	Increasing or high variability in seafood landings	Significant long term decrease in seafood landings	Significant recent decrease in seafood landings
Recreational	No trend or increase in recreational landings	Increasing or high variability in recreational landings	Significant long term decrease in recreational landings	Significant recent decrease in recreational landings
Control	No history of overages	Small overages, but infrequent	Routine overages, but small to moderate	Routine significant overages
Interactions	No interactions with non-MAFMC managed species	Interactions with non-MAFMC managed species but infrequent, Category II fishery under MMPA; or AMs not likely triggered	AMs in non-MAFMC managed species may be triggered; or Category I fishery under MMPA (but takes less than PBR)	AMs in non-MAFMC managed species triggered; or Category I fishery under MMPA and takes above PBR
Other ocean uses	No overlap; no impact on habitat	Low-moderate overlap; minor habitat impacts but transient	Moderate-high overlap; minor habitat impacts but persistent	High overlap; other uses could seriously disrupt fishery prosecution; major permanent habitat impacts
Regulatory complexity	Simple/few regulations; rarely if ever change	Low-moderate complexity; occasional changes	Moderate-high complexity; occasional changes	High complexity; frequently changed
Discards	No significant discards	Low or episodic discard	Regular discard but managed	High discard, difficult to manage
Allocation	No recent or ongoing Council discussion about allocation	*This category not used*	*This category not used*	Recent or ongoing Council discussion about allocation

Changes from 2021: Ecological risk elements

Species added: 1

Chub mackerel was formally added to the Mackerel, Squid, Butterfish (MSB) Fishery Management Plan (FMP) in December 2020. We ranked as many risk elements as possible for chub mackerel given data availability (Table 5).

Chub mackerel risk rankings and justifications

Chub mackerel **Assessment performance** ranks high risk because there is no stock assessment, nor data to conduct one in this region. **F status** and **B status** are unknown, but the weight of evidence indicates low risk of high fishing mortality or low biomass for this species in the Mid-Atlantic, and therefore rank low-moderate risk. Chub mackerel are not predators of MAFMC managed species, and we could not find evidence that chub mackerel are significant prey of MAFMC managed species[3] or protected species on the Northeast US shelf [4], so they ranked low risk for all three **Food web** elements. Chub mackerel were not included in the Northeast US climate vulnerability assessment [5], so we leave the **Climate** and **Distribution shifts** elements unranked until further study is completed. Chub mackerel do not depend on **Estuarine habitat**, so rank low risk for this element.

Decreased Risk: 0

No indicators for existing ecological elements have changed enough to warrant decreased risk rankings according to the Council risk critiera.

Increased Risk: 0

No indicators for existing ecological elements have changed enough to warrant increased risk rankings according to the Council risk critiera.

Update on Estuarine Habitat Quality (Chesapeake Bay)

Many important MAFMC managed species (e.g., summer flounder, scup, black sea bass, and bluefish) use estuarine habitats as nurseries or are considered estuarine and nearshore coastal-dependent, and interact with other important estuarine-dependent species (e.g., striped bass and menhaden). An integrated measure of multiple water quality criteria shows a significantly increasing proportion of Chesapeake Bay waters meeting or exceeding EPA water quality standards over time ([6]; Fig. 1). This pattern was statistically linked to total nitrogen reduction, indicating responsiveness of water quality status to management actions implemented to reduce nutrients. Water quality trends and status may be used to inform aquaculture siting decisions in Chesapeake Bay.

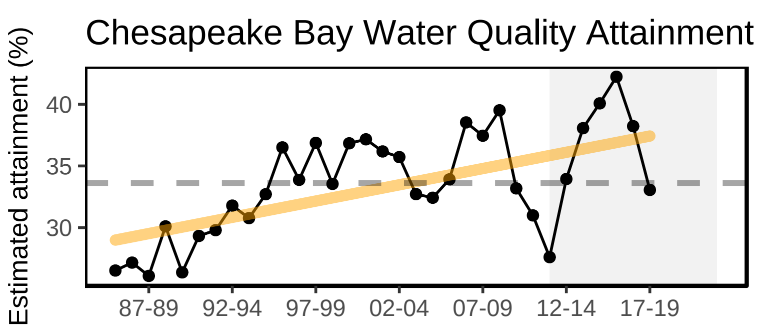


Figure 1: Water quality attainment in Chesapeake Bay following rolling three year assessment periods.

In 2019, we also reported on improving water quality in Chesapeake Bay, and suggested that the Council could reconsider high risk ratings for estuarine-dependent species if this trend continues.

[3] https://fwdp.shinyapps.io/tm2020/

However, as reported in the 2020-2022 SOEs, the Chesapeake Bay experienced below average salinity in 2019, caused by the highest precipitation levels ever recorded for the watershed throughout 2018 and 2019. In 2020, Chesapeake Bay experienced a warmer than average winter, followed by a cooler than average spring, with potential impacts to striped bass and blue crabs as noted in the 2021 SOE. The Chesapeake Bay experienced a warmer-than-average winter and fall in 2021, and average conditions in the spring and summer. Trends in tidal freshwater submerged aquatic vegetation (SAV) have improved over time, while SAV in high salinity habitats declined.

These annual updates in Chesapeake Bay temperature, salinity, dissolved oxygen, and SAV may partially account for the recent drop in the overall water quality indicator. This suggests that high risk for estuarine-dependent species is still warranted. However, direct links between estuarine habitat conditions and population attributes for managed species (as reported in the SOE for Chesapeake Bay striped bass and blue crabs, as well as summer flounder and black sea bass) could be incorporated into future risk assessments as the science continues to develop.

Update on Climate risks

Current risks to species productivity (and therefore to achieving OY) due to projected climate change in the Northeast US were derived from a comprehensive assessment [5]. This assessment evaluated exposure of each species to multiple climate threats, including ocean and air temperature, ocean acidification, ocean salinity, ocean currents, precipitation, and sea level rise. The assessment also evaluated the sensitivity (*not extinction risk*) of each species based on habitat and prey specificity, sensitivity to temperature and ocean acidification, multiple life history factors, and number of non-climate stressors. Mid-Atlantic species were all either highly (77%) or very highly (23%) exposed to climate risk in this region, with a range of sensitivity (low-62%, moderate-15%, high-15%, and very high-8%) to expected climate change in the Northeast US. The combination of exposure and sensitivity results in the overall vulnerability ranking for each species (see the **Climate** column of Table 5).

In 2021, the SOE was restuctured with an entire section focused on Climate risks to meeting fishery management objectives. New information has been added to the SOE that could be used to update species-specific Climate risk rankings in the future. The 2022 SOE includes multiple climate indicators including surface and bottom water temperature, marine heat waves, Gulf Stream position and warm core rings, cold pool area and persistence, and ocean acidification measurements. Combined with species sensitivity information from lab work, these indicators could be used to further clarify climate risks to managed species, as presented for surfclams and ocean acidification in the 2021-2022 SOEs.

Indicators can also be used to identify beneficial conditions for managed species. For example, since 2017, extraordinarily high availability of northern shortfin squid have been observed in the Mid-Atlantic, resulting in high fishery catch per unit effort (CPUE) and early fishery closures. High instances of squid catch near the shelf break are significantly related to low bottom temperatures (< 10 degrees C), high salinity (>35.6 psu), increased chlorophyll frontal activity as well as the presence and orientation of warm core rings. Warm core rings are an important contributor to squid availability, likely influencing habitat conditions across different life stages. In particular, fishing effort was concentrated on the eastern edge of warm core rings, which are associated with upwelling and enhanced productivity.

Potential new indicators

Habitat Climate Vulnerability combined with Species Climate Vulnerability

A Habitat Climate Vulnerability Assessment (HCVA) for habitat types in the Northeast US Large Marine Ecosystem was published in January 2021 [7]. To better understand which species depend on vulnerable habitats, the Atlantic Coastal Fish Habitat Partnership (ACFHP) habitat-species matrix [8] was used in conjunction with the results of the HCVA and the Northeast Fish and Shellfish Climate Vulnerability Assessment (FCVA) completed in 2016 [5]. The ACFHP matrix identified the importance of coastal benthic habitats to each life stage of select fish species, which helps elucidate species that may be highly dependent on highly vulnerable habitats that were identified in the HCVA.

Several MAFMC managed species, including black sea bass, scup, and summer flounder, are dependent on several highly vulnerable nearshore habitats from salt marsh through shallow estuarine and marine reefs. Details on highly vulnerable habitats with linkages to a variety of species, including which life stages have different levels of dependence on a particular habitat, are available in a detailed table.[4]

Species highlighted here are those that are highly dependent on highly vulnerable habitats. A ranking matrix was created using the habitat vulnerability rankings compared to the habitat importance rankings to determine the criteria, and for the purposes of this submission, "high dependence on a highly vulnerable habitat" encompasses moderate use of very highly vulnerable habitats, high use of highly or very highly vulnerable habitats, or very high use of moderately, highly, or very highly vulnerable habitats.

Preliminary species narratives have been developed by Grace Roskar and Emily Farr (NMFS Office of Habitat Conservation), using information from the HCVA. The HCVA team is currently working with MAFMC and NEFMC on synthesizing habitat assessment information and developing narratives for ~75 species. We include two here so that the Council may provide feedback to improve their utility for management in general and for potentail future inclusion in the EAFM risk assessment.

Black Sea Bass *Summary:* Black sea bass were determined to have, overall, a high vulnerability to climate change, due to very high climate exposure related to high surface and air temperature in both inshore and offshore waters, and moderate climate sensitivity of early life history stage requirements. However, climate change is predicted to have a positive effect on black sea bass, due to warmer temperatures increasing spawning and therefore recruitment, and a potential expansion in distribution of the species shifting farther north [5].

The habitats important to black sea bass, such as submerged aquatic vegetation and shellfish reefs, are high and highly vulnerable to projected climate change, respectively. In particular, both habitats are sensitive to higher sea surface temperature and non-climate stressors. Additionally, intertidal habitats such as shellfish reefs are also vulnerable to projected changes in air temperatures, sea level rise, and pH. Although the climate vulnerability of subtidal rocky habitat was assessed as low, intertidal rocky bottom was assessed as high because of higher sea level, air temperature, and pH. Steimle et al. [9] include use of salt marsh edge and channel habitats for young-of-year black sea bass, and estuarine emergent wetlands were determined to have very high climate vulnerability. Habitat condition and habitat fragmentation were also of concern for shellfish reefs and submerged aquatic vegetation. The species itself is also vulnerable to temperature changes, as mentioned above. The overlapping high importance of intertidal and subtidal shellfish reefs to black sea bass and the very high to high climate vulnerability of these habitats, respectively, show a potential critical nexus of climate vulnerability.

Mid-Atlantic *Summary:* Shellfish reef habitats are highly important for both juveniles/young-of-the-year and adults. These life stages utilize both marine and estuarine shellfish reefs, in both intertidal and subtidal zones, which are very highly vulnerable and highly vulnerable, respectively. Other important habitats for black sea bass include submerged aquatic vegetation, which is highly vulnerable, and subtidal sand and rocky bottom habitats, which have low vulnerability. More information is needed on use of intertidal benthic habitats by black sea bass. Juvenile occurrence on sandy intertidal flats or beaches is rare, according to [10], but additional information on the use and importance of intertidal rocky bottom or intertidal benthic habitat use by adults is lacking. According to [10], black sea bass eggs have been collected in the water column over the continental shelf, as have larvae. As water column habitats were not included in ACFHP's assessment of habitat importance, finer-scale information on the importance of specific pelagic habitats is needed for the species.

Habitat importance by life stage:

- Juveniles/Young-of-the-year:
  - Marine and estuarine intertidal shellfish reefs, which are very highly vulnerable to climate change, are of high importance.

  - Marine and estuarine submerged aquatic vegetation and subtidal shellfish reefs, which are highly vulnerable to climate change, are of high importance.

[4] https://noaa-edab.github.io/ecodata/Hab_table

    - Marine intertidal rocky bottom habitats, which are highly vulnerable to climate change, are of high importance.

    - Marine (<200 m) and estuarine subtidal rocky bottom habitats, which have a low vulnerability to climate change, are also of high importance.
- Adults:
    - Marine and estuarine intertidal shellfish reefs, which are very highly vulnerable to climate change, are of high importance.

    - Marine and estuarine subtidal shellfish reefs, which are highly vulnerable to climate change, are of high importance.

    - Marine intertidal rocky bottom habitats, which are highly vulnerable to climate change, are of high importance.

    - Marine and estuarine submerged aquatic vegetation, which are highly vulnerable to climate change, are of moderate importance.

    - Marine (<200 m) and estuarine subtidal rocky bottom habitats, which have a low vulnerability to climate change, are also of high importance.

    - Marine (<200 m) and estuarine subtidal sand habitats, including sandy-shelly areas, which have a low vulnerability to climate change, are also of moderate importance.

New England *Summary:* All habitats in New England for black sea bass were ranked as moderately important, likely indicating that the species uses a diverse range of habitats rather than high dependence on a specific habitat type. Shellfish reef habitats are moderately important for both juveniles/young-of-the-year and adults. These life stages utilize both marine and estuarine shellfish reefs, in both intertidal and subtidal zones, which are very highly vulnerable and highly vulnerable, respectively. Juveniles/young-of-the-year are also moderately dependent on native salt marsh habitats, which are highly vulnerable to climate change. Other moderately important habitats for black sea bass include submerged aquatic vegetation, which is highly vulnerable, and subtidal sand and rocky bottom habitats, which have low vulnerability. More information is needed on use of intertidal benthic habitats by black sea bass. Juvenile occurrence on sandy intertidal flats or beaches is rare, according to [10], but additional information on the use and importance of intertidal rocky bottom or intertidal benthic habitat use by adults is lacking.

Habitat importance by life stage:

- Juveniles/Young-of-the-year:
    - Marine and estuarine submerged aquatic vegetation and subtidal shellfish reefs, which are all highly vulnerable to climate change, are of moderate importance.

    - Marine and estuarine intertidal shellfish reefs, which are very highly vulnerable to climate change, are of moderate importance.

    - Native salt marshes, which are very highly vulnerable to climate change, are of moderate importance. Marine (<200 m) and estuarine subtidal rocky bottom habitats, which have a low vulnerability to climate change, are of moderate importance.
- Adults:
    - Marine and estuarine submerged aquatic vegetation and subtidal shellfish reefs, which are all highly vulnerable to climate change, are of moderate importance.

    - Marine and estuarine intertidal shellfish reefs, which are very highly vulnerable to climate change, are of moderate importance.

    - Marine (<200 m) and estuarine subtidal rocky bottom habitats, which have a low vulnerability to climate change, are of moderate importance.

– Structured sand habitats in marine (<200 m) and estuarine subtidal areas, which have a low vulnerability to climate change, and marine intertidal areas, which are highly vulnerable, are of moderate importance.

Summer Flounder *Summary:* Summer flounder were ranked moderately vulnerable to climate change due to very high exposure to both ocean surface and air temperature, but low sensitivity to all examined attributes. Broad dispersal of eggs and larvae and seasonal north-south migrations by adults lend the species a high potential for distribution shifts. However, climate change is expected to have a neutral effect on the species, although there is high uncertainty surrounding this. The dispersal of eggs and larvae and the broad use of both estuarine and marine habitats could result in climate change having a positive effect, but uncertainty remains [5].

The habitats important to summer flounder, such as intertidal benthic habitats, submerged aquatic vegetation, and native salt marsh habitats, are vulnerable to projected changes in temperature as well as sea level rise. Subtidal benthic habitats are vulnerable to changes in sea surface temperature. The species itself is also vulnerable to such factors, as they are exposed to changes in conditions in both inshore and offshore habitats. The overlapping high importance of native salt marsh and submerged aquatic vegetation habitats to the species and the very high and high climate vulnerability of these habitats, respectively, show a potential critical nexus of climate vulnerability.

Mid-Atlantic *Summary:* Marine and estuarine sand and mud habitats are highly important to juvenile and adult summer flounder, and these habitats range in their vulnerability to climate change. For example, marine intertidal sand is highly vulnerable, whereas subtidal mud and sand habitats have low vulnerability. In addition to these fine bottom benthic habitats, native salt marshes are highly important to juveniles and moderately important to adults, yet these habitats are very highly vulnerable to climate change. Eggs and larvae utilize pelagic continental shelf habitats; however, water column habitats were not included in ACFHP's assessment of habitat importance. Finer-scale information on the importance of specific pelagic habitats is needed for the species.

<u>Habitat importance by life stage:</u>

- Juveniles/Young-of-the-year:
  - Marine and estuarine intertidal shellfish reefs, which are very highly vulnerable to climate change, are of moderate importance.
  - Marine and estuarine subtidal shellfish reefs, which are highly vulnerable to climate change, are of moderate importance.
  - Marine and estuarine submerged aquatic vegetation, which are highly vulnerable habitats, are of high importance.
  - Native salt marsh habitats, which are very highly vulnerable to climate change, are of high importance.
  - Marine and estuarine subtidal and intertidal sand and mud bottom habitats are of high importance. These habitats range in climate vulnerability, from high vulnerability of marine intertidal sand to low vulnerability of marine subtidal sand and mud (<200 m) and estuarine subtidal sand.
- Adults:
  - Marine and estuarine submerged aquatic vegetation, which are highly vulnerable habitats, are of moderate importance.
  - Native salt marsh habitats, which are very highly vulnerable to climate change, are of moderate importance.
  - Marine and estuarine subtidal and intertidal sand and mud bottom habitats are of high importance. These habitats range in climate vulnerability, from high vulnerability of marine intertidal sand to low vulnerability of marine subtidal sand and mud (<200 m) and estuarine subtidal sand.
- Spawning Adults:

- Marine subtidal (<200 m) sand habitats, which have a low vulnerability to climate change, are of high importance.

We seek Council feedback on how best to include information on habitat climate vulnerability for managed species in future EAFM risk assessments.

Changes from 2021: Economic, Social, and Food production risk elements

Elements not updated: 2

Commercial landings data at the spatial scale relevant to the MAFMC risk assessment are not yet available for 2020. As a result, we were unable to update the **Commercial Revenue** and **Commercial Food production** risk elements for this report. These remain at risk levels assessed in 2021 based on data through the end of 2019. Given trends in the broader region in commercial landings and revenue for 2020 [11], we do not expect the risk rankings for these elements to change when Mid-Atlantic scale data becomes available.

Decreased Risk: 1

Recreational value has changed from high risk to low-moderate risk based on 2022 indicator updates. Recreational value was ranked high risk in the 2018 risk assessment due to a significant decrease in angler trips over the most recent 10 years of the time series. In 2019, the risk assessment noted that in the updated MRIP angler trip time series, "declines are less pronounced than measured previously. A reduction from the highest risk ranking to a lower risk category may be warranted."

Updated information has eliminated the recent trend, and contributed to a long term increase in recreational effort (angler trips), with 2020 effort above the long-term average (Fig. 2).

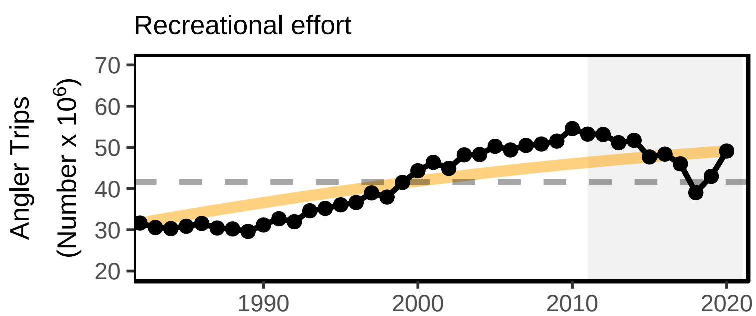


Figure 2: Recreational effort in the Mid-Atlantic.

The long term increase in recreational angler trips results in an updated low-moderate risk ranking according to Council criteria.

Increased Risk: 0

No indicators for existing economic, social, and food production elements have changed enough to warrant increased risk rankings according to the Council risk critiera.

Potential new indicators

Recreational Fleet Diversity

Recreational diversity indices could be considered as additional risk element(s) to complement the existing Commercial fishery resilience (revenue diversity) element. While recreational value measured as angler trips has gone from high risk to low-moderate risk based on updated data, recreational fleet diversity (i.e., effort by shoreside, private boat, and for-hire anglers) has declined over the long term (Fig. 3).

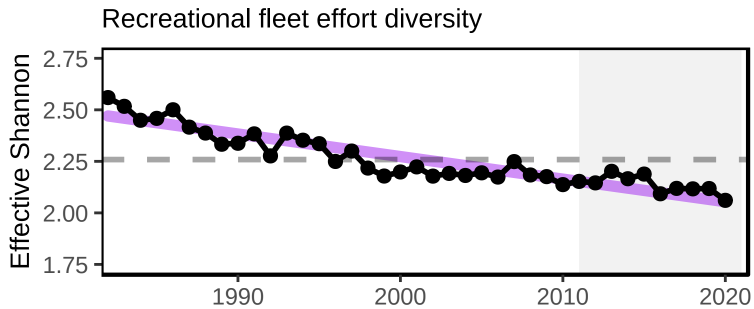


Figure 3: Recreational fleet effort diversity in the Mid-Atlantic.

Increased angler trips in 2020 relative to previous years strongly influence the long term increase in recreational effort. While the overall number of recreational opportunities in the MAB is above the long term average, the continuing decline in recreational fleet effort diversity suggests a potentially reduced range of recreational fishing options.

The downward effort diversity trend is driven by party/charter contraction (from a high of 24% of angler trips to 7% currently), and a shift toward shorebased angling. Effort in private boats remained stable between 36-37% of angler trips across the entire series.

Changes in recreational fleet diversity can be considered when managers seek options to maintain recreational opportunities. Shore anglers will have access to different species than vessel-based anglers, and when the same species is accessible both from shore and from a vessel, shore anglers typically have access to smaller individuals. Many states have developed shore-based regulations where the minimum size is lower than in other areas and sectors to maintain opportunities in the shore angling sector.

Environmental justice vulnerability in commercial and recreational fishing communities

Social vulnerability measures social factors that shape a community's ability to adapt to change. A subset of these can be used to assess potential environmental justice issues. Environmental Justice is defined in Executive Order 12898 as federal actions intended to address disproportionately high and adverse human health and environmental effects of federal actions on minority and low-income populations. Three of the existing NOAA Fisheries Community Social Vulnerability Indicators (CSVIs), the Poverty Index, Population Composition Index, and Personal Disruption Index, can be used for mandated Environmental Justice analysis[5].

Commercial fishery engagement measures the number of permits and dealers, and pounds and value landed in a community, while reliance expresses these numbers based on the level of fishing activity relative to the total population of a community. Recreational fishery engagement measures shore, private vessel, and for-hire fishing effort while reliance expresses these numbers based on fishing effort relative to the population of a community.

In 2021, we reported the top ten most engaged, and top ten most reliant commercial and recreational fishing communities and their associated social vulnerability. Here we apply the same selection standard for top ten fishing communities for both sectors, and focus on examining the environmental justice vulnerability in these communities.

Communities plotted in the upper right section of Fig.4 scored high for both commercial engagement and reliance, including Cape May and Barnegat Light, NJ, and Reedville, VA. Communities that ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange: Newport News, VA; Atlantic City, NJ; Hampton Bays/Shinnecock, NY; and Beaufort, Columbia and Hobucken, NC.

[5] https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities

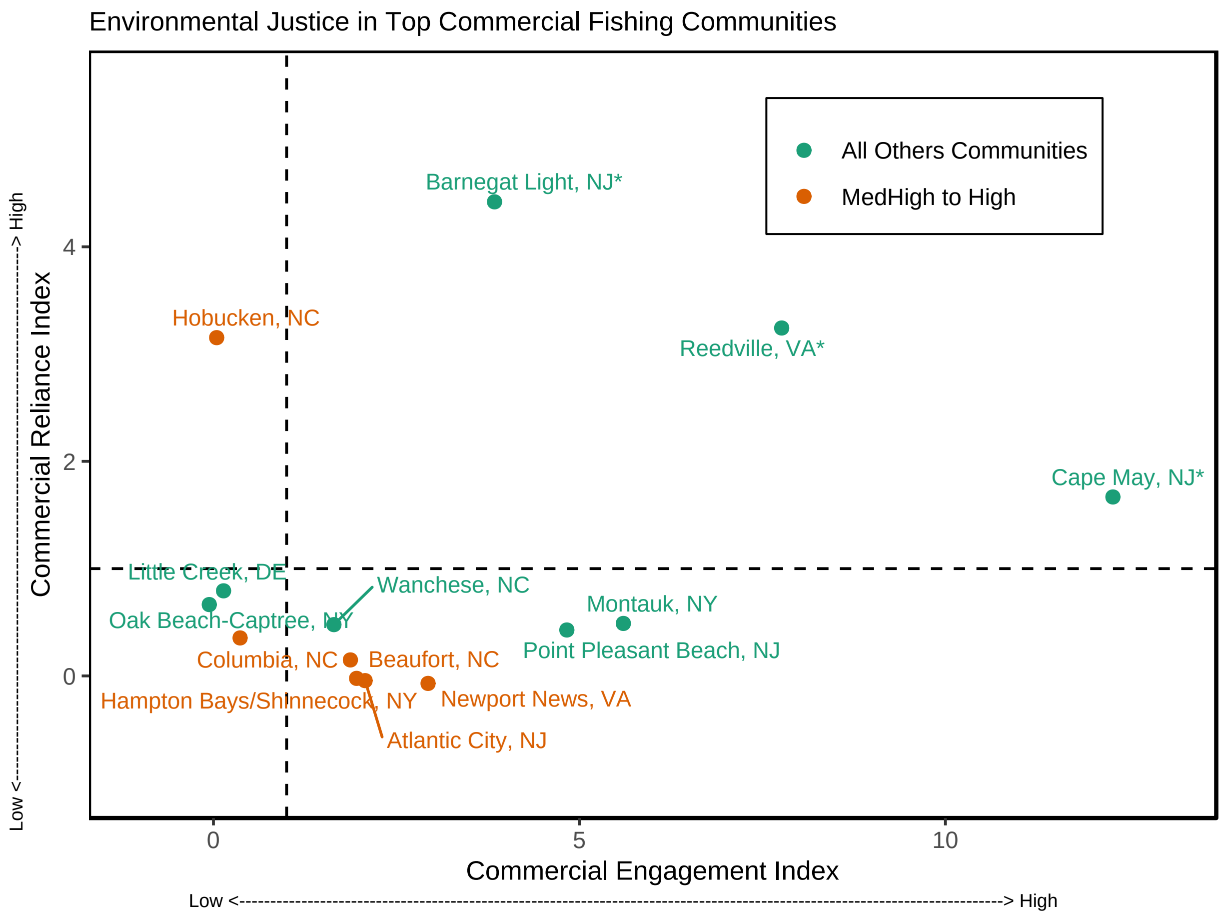


Figure 4: Commercial engagement, reliance, and environmental justice vulnerability for the top commercially engaged and reliant fishing communities in the Mid-Atlantic. Communities ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange. *Community scored high (1.00 and above) for both commercial engagement and reliance indicators.

Fig. 5 shows the detailed scores of the three environmental justice indicators for the same communities plotted in Fig.4. Communities are plotted clockwise in a descending order of commercial engagement scores from high to low, with the most highly engaged community, Cape May, NJ, listed on the top. Among the communities ranked medium-high or above for environmental justice vulnerability, Newport News, VA scored medium-high for the population composition index. Atlantic City, NJ scored high for all of the three environmental justice indicators. Hampton Bays/Shinnecock, NY scored medium-high for the population composition index. Beaufort, NC scored medium-high and very close to high for the poverty index. Columbia, NC scored high for the personal disruption index and the poverty index, and medium-high for the population composition index. Hobucken, NC scored high for the personal disruption index and the poverty index.

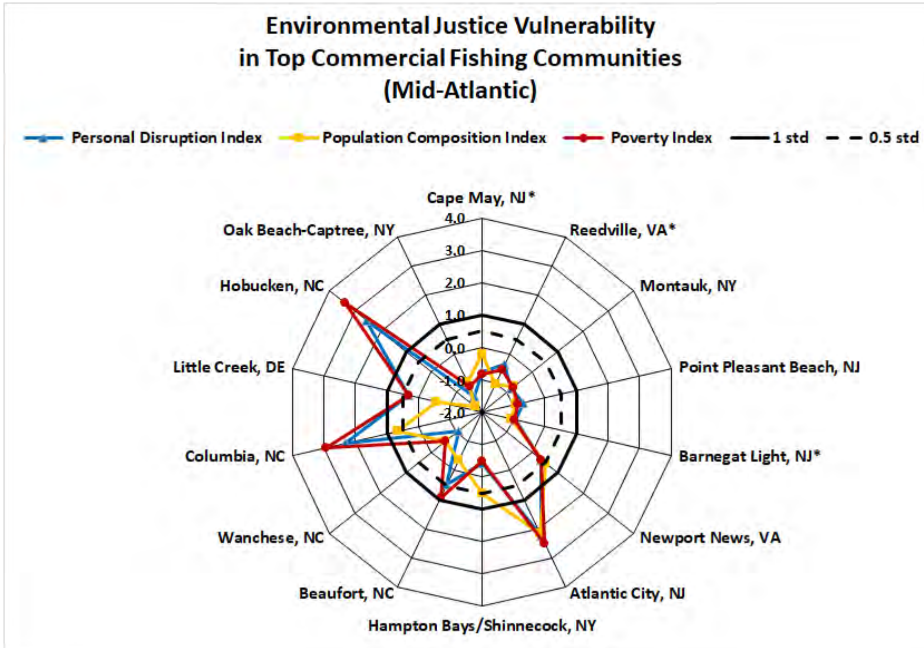


Figure 5: Environmental justice indicators (Poverty Index, population composition index, and personal disruption index) for top commercial fishing communities in Mid-Atlantic. *Community scored high (1.00 and above) for both commercial engagement and reliance indicators.

Communities plotted in the upper right section of Fig.6 scored high for both recreational engagement and reliance, including Barnegat Light, NJ and Deal Island, MD. Communities that ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange: Hatteras and Morehead City, NC.

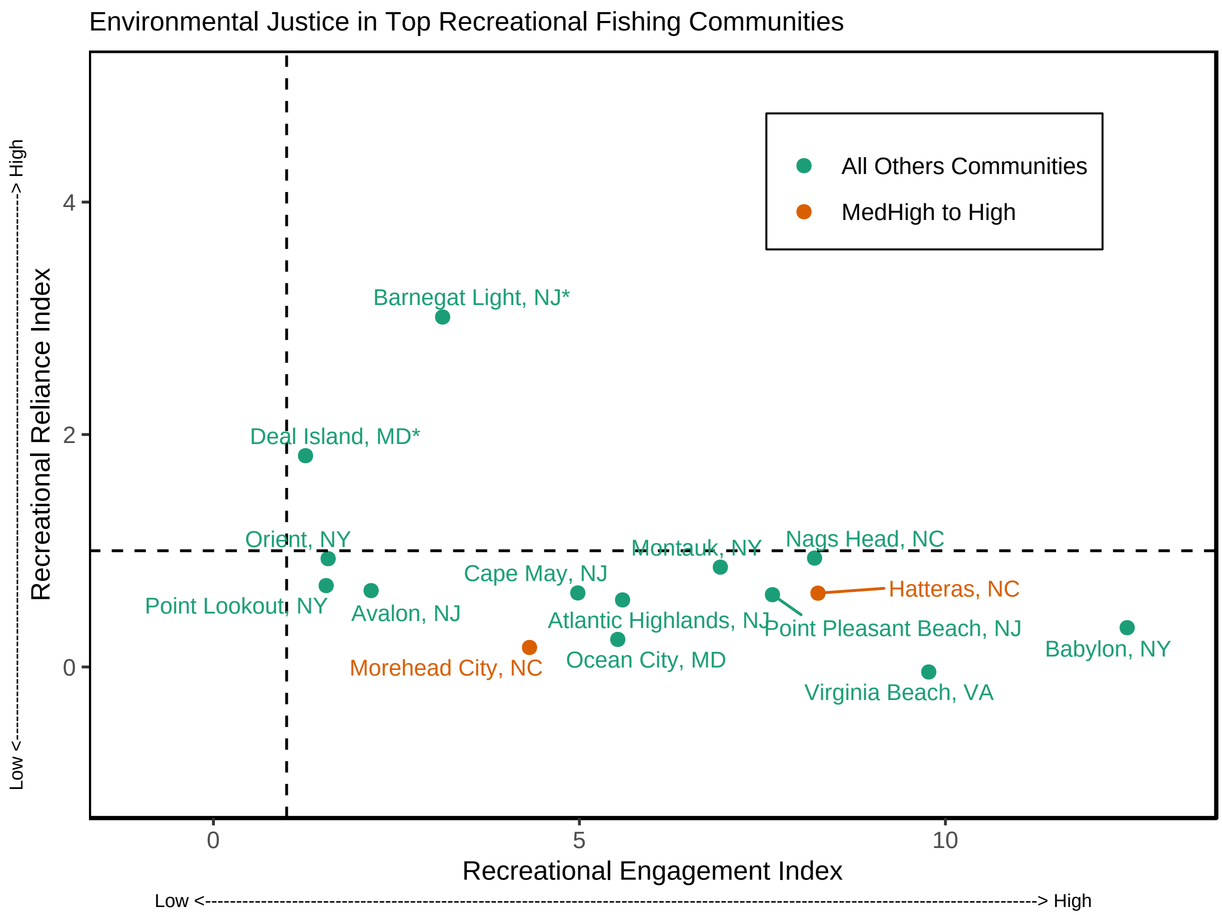


Figure 6: Recreational engagement and reliance, and environmental justice vulnerability, for the top recreationally engaged and reliant fishing communities in the Mid-Atlantic. Communities ranked medium-high or above for one or more of the environmental justice indicators are highlighted in bright orange. *Community scored high (1.00 and above) for both recreational engagement and reliance indicators.

Fig. 7 orders communities clockwise in a descending order of recreational engagement scores from high to low, with the most highly engaged community, Babylon, NY, listed on the top. The two communities with environmental justice concerns, Hatteras and Morehead City, NC, both scored medium-high for the poverty index.

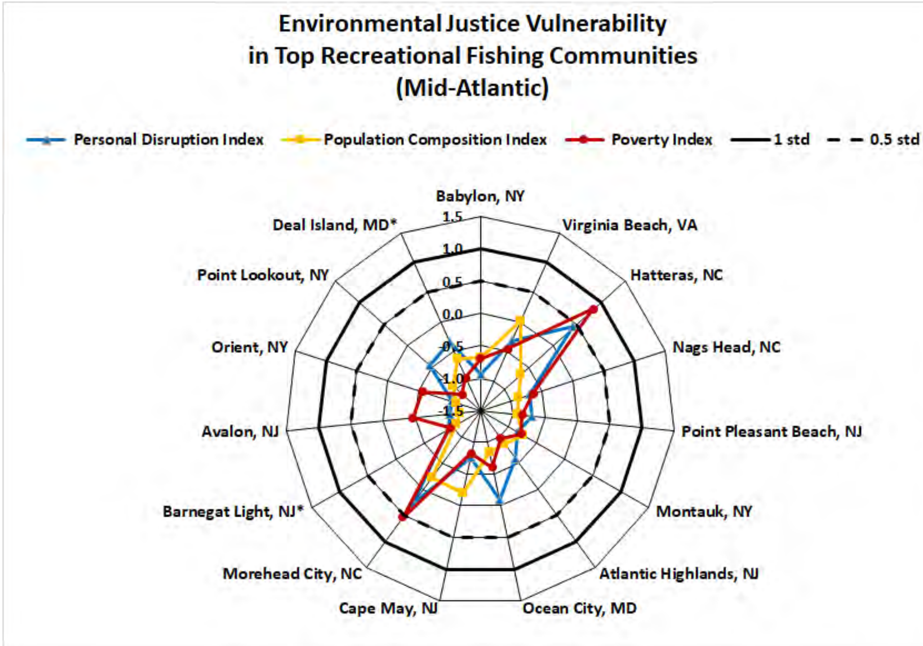


Figure 7: Environmental justice indicators (Poverty Index, population composition index, and personal disruption index) for top recreational fishing communities in Mid-Atlantic. *Community scored high (1.00 and above) for both recreational engagement and reliance indicators.

Both commercial and recreational fishing are important activities in Montauk, NY, Barnegat Light, Cape May and Point Pleasant Beach, NJ, meaning these communities may be impacted simultaneously by commercial and recreational regulatory changes. All of these communities scored lower than medium-high for all of the three environmental justice indicators, indicating that environmental justice may not be a major concern in these communities at the moment based on the indicators analyzed.

We seek Council feedback on whether to include fishing community environmental justice vulnerability and recreational diversity indicators within the EAFM risk assessment, and if so, what risk criteria should be applied to these indicators.

Changes from 2021: Management risk elements

Management risk elements contain a mixture of quantitatively (Fishing Mortality Control, Technical Interactions, Discards, and Allocation) and qualitatively (Other Ocean Uses and Regulatory Complexity) calculated rankings. In general, the management indicators evaluate a particular risk over several years; therefore, the rankings should remain fairly consistent on an annual basis unless something changed in the fishery or if a management action occurred. A comprehensive evaluation and update of all management risk elements was conducted by Council staff in 2020 and were updated in 2021. In 2022, a similar update was conducted with Council staff reviewing the 2021 rankings and associated justifications to determine if any significant fishery or management changes would result in a change in a risk element ranking. The updated management risk element rankings can be found in Table 7 and the justification for any ranking change can be found below.

Updated Justifications

The **Discards** risk ranking (moderate-high) for Surfclam and Ocean Quahog did not change from 2021 to 2022; however, the justification for the ranking was modified to be more reflective of current considerations. The justification now states: “allocated minimal coverage under SBRM as a result of discard being low percent of total catch; however, co-occurrence of surfclams and quahogs raised as major issue (2022 implementation plan action).”

The **Management Control** risk rankings were evaluated for all managed species with catch information through 2020. The justification language for each species was modified to reflect the updated data used to evaluate management control (total catch compared to ABC or ACL, as appropriate) but only those species with a change in risk ranking are included in this document (see Decreased/Increased Risk sections below). It was noted that this ranking may change in the next review for Scup given anticipated overages in 2021.

Decreased Risk: 8

The **Allocation** risk ranking for commercial Summer Flounder, Scup, Black Sea Bass, and Bluefish decreased from high to low. The Council took final action on the commercial/recreational allocation amendment for these species in 2021 and no additional allocation related actions are under consideration. The recreational allocation risk ranking for all for species remains as high risk given the Council's continued consideration of recreational sector separation as part of the Recreational Reform Initiative.

The **Regulatory Complexity/Stability** risk ranking for Butterfish and Longfin Squid decreased from high to medium-high. The regulations for these species are complex but have remained relatively unchanged for several years. The **Regulatory Complexity/Stability** risk ranking for both recreational and commercial Blueline Tilefish changed from medium-high to low-medium. Regulatory changes to the recreational possession limits for different vessel categories were approved several years ago and measures have not changed since. Similarly, regulatory changes to the commercial trip limits to accommodate larger landings and achieve optimal were approved several year ago and have not changed since.

Increased Risk: 4

The **Regulatory Complexity/Stability** risk ranking for recreational Atlantic Mackerel increased from low to low-medium. There are currently minimal recreational management regulations for Atlantic Mackerel; however, the Council is considering potential new/additional regulations as part of the rebuilding amendment currently being developed.

The **Regulatory Complexity/Stability** risk ranking for *Illex* Squid increased from low-medium to medium-high. *Illex* regulations are somewhat complex and have not changed much recently, but potential new regulations are being considered.

The **Management Control** risk ranking for both commercial and recreational Blueline Tilefish increased from low to low-medium. Recent overages have been observed in both sectors (the 2021 recreational overage could be large). A two-step lowering of the commercial trip limit has been implemented and should minimize future overages.

Potential new indicators

Other ocean uses: offshore wind energy development timeline, revenue in lease areas, coastal community vulnerability

As of February 2022, 24 offshore wind development projects are proposed for construction over the next decade in the Northeast (timelines and project data are based on Tables E-2, E-4, and E-4-2 of South Fork Wind Farm Final Environmental Impact Statement). Offshore wind areas are anticipated to cover more than 1.7 million acres by 2030 in the Greater Atlantic region (Fig. 8). Beyond 2030 values include acreage for the NY Wind Energy Areas (WEA) and Gulf of Maine Area of Interest for floating research array.

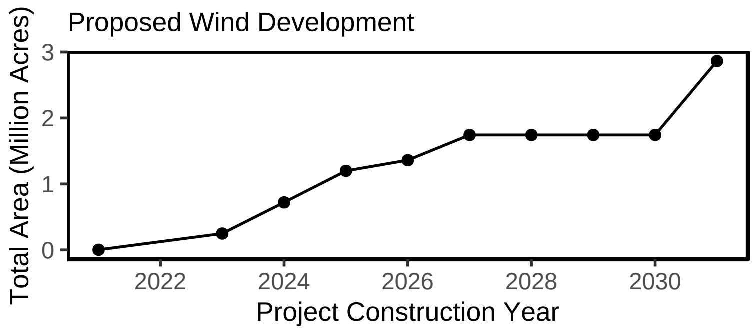
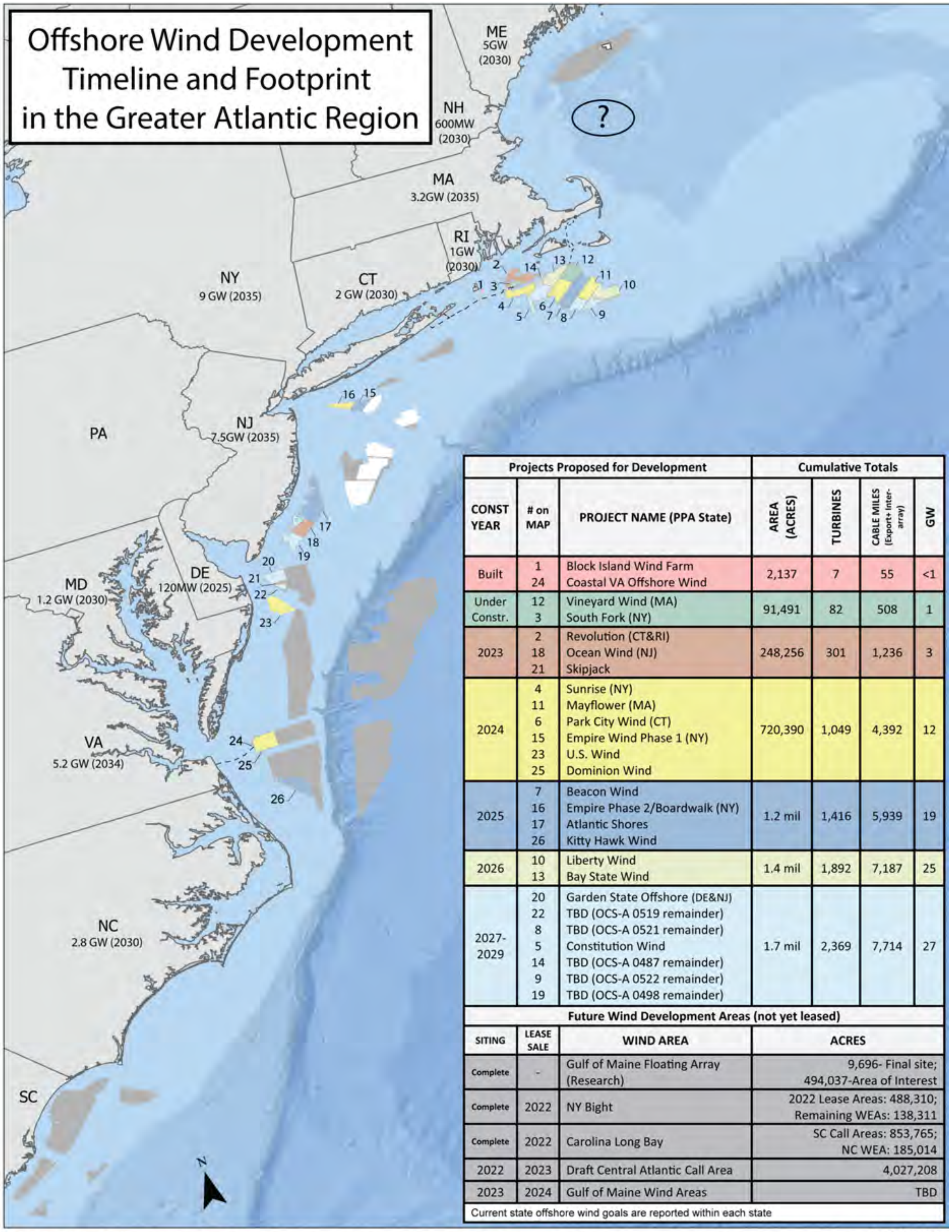


Figure 8: Proposed wind development on the northeast shelf.

Just over 2,500 foundations and more than 7,000 miles of inter-array and offshore export cables are proposed to date. The colored chart in Fig. 9 also presents the offshore wind development timeline in the Greater Atlantic region with the estimated year that foundations would be constructed (matches the color of the wind areas). These timelines and data estimates are expected to shift but represent the most recent information available as of February 2022. Based on current timelines, the areas affected would be spread out such that it is unlikely that any one particular area would experience full development at one time. Future wind development areas are also presented. Additional lease areas, totalling over 488,000 acres in the NY Bight are available for BOEM's 2022 lease sale. It's anticipated that the NY Bight leases will fulfill outstanding offshore wind energy production goals for NY and NJ. VA and NC have outstanding goals that cannot be fulfilled within the existing lease areas, and it is expected that these will be fulfilled with future development off the Delmarva Peninsula.



Projects Proposed for Development			Cumulative Totals			
CONST YEAR	# on MAP	PROJECT NAME (PPA State)	AREA (ACRES)	TURBINES	CABLE MILES (Export+ Inter-array)	GW
Built	1 24	Block Island Wind Farm Coastal VA Offshore Wind	2,137	7	55	<1
Under Constr.	12 3	Vineyard Wind (MA) South Fork (NY)	91,491	82	508	1
2023	2 18 21	Revolution (CT&RI) Ocean Wind (NJ) Skipjack	248,256	301	1,236	3
2024	4 11 6 15 23 25	Sunrise (NY) Mayflower (MA) Park City Wind (CT) Empire Wind Phase 1 (NY) U.S. Wind Dominion Wind	720,390	1,049	4,392	12
2025	7 16 17 26	Beacon Wind Empire Phase 2/Boardwalk (NY) Atlantic Shores Kitty Hawk Wind	1.2 mil	1,416	5,939	19
2026	10 13	Liberty Wind Bay State Wind	1.4 mil	1,892	7,187	25
2027-2029	20 22 8 5 14 9 19	Garden State Offshore (DE&NJ) TBD (OCS-A 0519 remainder) TBD (OCS-A 0521 remainder) Constitution Wind TBD (OCS-A 0487 remainder) TBD (OCS-A 0522 remainder) TBD (OCS-A 0498 remainder)	1.7 mil	2,369	7,714	27

Future Wind Development Areas (not yet leased)			
SITING	LEASE SALE	WIND AREA	ACRES
Complete	-	Gulf of Maine Floating Array (Research)	9,696- Final site; 494,037-Area of Interest
Complete	2022	NY Bight	2022 Lease Areas: 488,310; Remaining WEAs: 138,311
Complete	2022	Carolina Long Bay	SC Call Areas: 853,765; NC WEA: 185,014
2022	2023	Draft Central Atlantic Call Area	4,027,208
2023	2024	Gulf of Maine Wind Areas	TBD

Current state offshore wind goals are reported within each state

Figure 9: All Northeast Project areas by year construction ends (each project has 2 year construction period).

Based on federal vessel logbook data, average commercial fishery revenue from trips in the current offshore wind lease areas and the New York Bight leasing areas identified in the proposed sale notice represented 2-20% of the total annual revenue for the most affected fisheries in federal waters from 2008-2019 (Fig. 10).

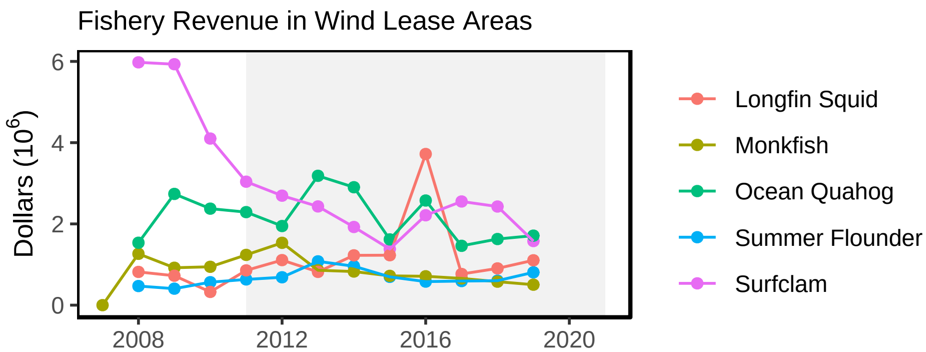


Figure 10: Wind energy revenue in the Mid-Atlantic.

The surfclam fishery could be the most affected fishery, with a maximum of 20% of annual fishery revenue occurring within potential wind lease areas during this period, followed by chub mackerel (15%), ocean quahog (13%), and Atlantic mackerel (10%). The *Illex* squid and bluefish fisheries were the least affected, at 1-2% maximum annual revenue affected, respectively. A maximum of 9% of the annual scup revenues were affected by these areas, with similar effects for the longfin squid (8%), blueline tilefish and black sea bass (7%), and monkfish and golden tilefish (6%) fisheries. The proposed New York Bight lease areas represented up to 5% of total annual fishery revenue from any MAFMC fishery during 2008-2019, with the surfclam fishery most affected. Similar patterns are observed when examining the proportion of annual fishery landings within current and proposed lease areas (see Table 3).

Table 3: Top ten species Landings and Revenue from Wind Energy Areas.

GARFO and ASMFC Managed Species	Maximum Percent Total Annual Regional Species Landings	Minimum Percent Total Annual Regional Species Landings	Maximum Percent Total Annual Regional Species Revenue	Minimum Percent Total Annual Regional Species Revenue
Atlantic surfclam	21 %	6 %	20 %	6 %
American eel	13 %	2 %	18 %	0 %
Atlantic menhaden	17 %	3 %	17 %	3 %
Atlantic chub mackerel	15 %	0 %	16 %	0 %
Yellowtail flounder	14 %	0 %	15 %	0 %
Offshore hake	14 %	0 %	14 %	0 %
Ocean quahog	14 %	5 %	13 %	5 %
Atlantic sea scallops	12 %	1 %	10 %	1 %
Skate wings	10 %	5 %	10 %	5 %
Atlantic mackerel	9 %	0 %	10 %	0 %

Proposed wind development areas interact with the region's federal scientific surveys. Scientific surveys are impacted by offshore wind in four ways: 1. Exclusion of NOAA Fisheries' sampling platforms from the wind development area due to operational and safety limitations; 2.Impacts on the random-stratified statistical design that is the basis for scientific assessments, advice, and analyses; 3.Alteration of benthic and pelagic habitats, and airspace in and around the wind energy development, requiring new designs and methods to sample new habitats; and, 4.Reduced sampling productivity through navigation impacts of wind energy infrastructure on aerial and vessel survey operations. Increase vessel transit between stations may decrease data collections that are already limited by annual days-at-sea day allocations. The total survey area overlap ranges from 1-14% for all Greater Atlantic federal surveys. Individual survey strata have significant interaction with wind, including the sea scallop survey (up to 96% of individual strata) and the bottom trawl survey (BTS, up to 60% strata overlap). Additionally, up to 50% of the southern New England North Atlantic right whale survey's area overlaps with proposed project areas. A region-wide survey mitigation program is underway (Table 4)

Table 4: Survey mitigation planning.

Survey	1.Evaluate designs & Impacts	2.Design New Methods	3.Calibrate New/Existing Surveys	4.Bridge Solutions	5.Conduct New Surveys	6.Comms & Data
Fall BTS	Started	Initial	No	No	No	Initial
Spring BTS	Started	Initial	No	No	No	Initial
EcoMon	No	No	No	No	No	No
Scallop	Started	Initial	No	No	No	No
Shellfish(Clams)	No	No	No	No	No	No
Right Whale (Air)	Inital	Initial	Initial	No	No	No
Marine Mammal/Turtle (Ship/Air)	No	No	No	No	No	No
Altantic Shark (Bottom Long-Line	No	No	No	No	No	No
GOM Bottom Long-Line	No	No	No	No	No	No
GOM Shrimp Survey	No	No	No	No	No	No
Atlantic Shark COASTPAN	No	No	No	No	No	No

Equity and environmental justice (EJ) are priority concerns with offshore wind development and fisheries impacts in the Northeast. Fig. 11 links historic port revenue (2008-2019) from within all wind lease areas as a proportion of the port's total revenue based on vessel trip reports as described in the revenue and landings of species in the wind indicator above. The range (minimum and maximum) of total percent revenue from within wind energy areas is presented in the graph and ports are sorted from greatest to least revenue from within wind areas.

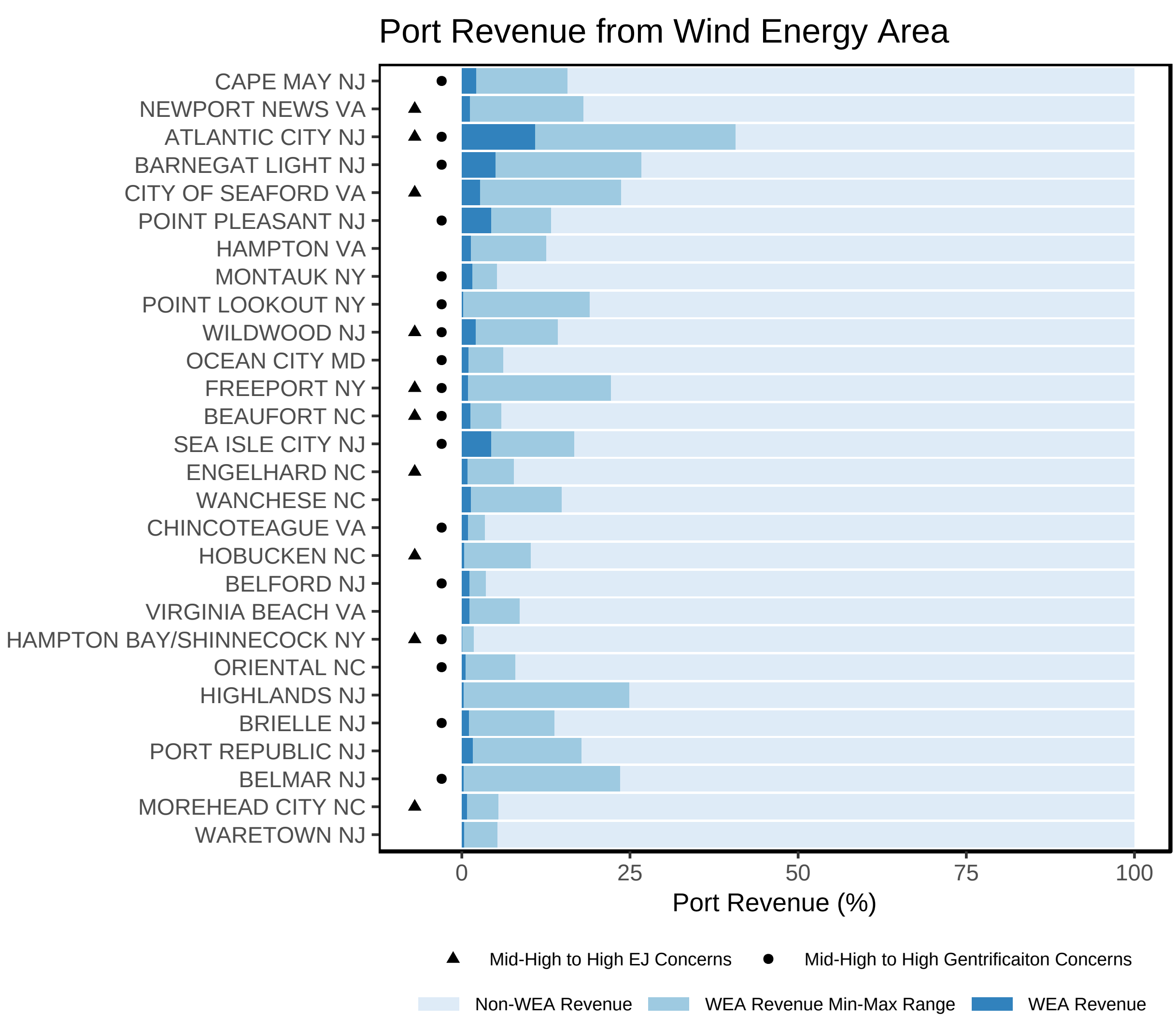


Figure 11: Percent of port revenue from Wind Energy Areas (WEA) in descending order from most to least port revenue from WEA. EJ = Environmental Justice.

For example, Atlantic City, NJ had a minimum of 11% and maximum of 30% overlap of wind energy revenue to the total port revenue between 2008-2019. Those communities that score Med-High or higher in at least one of the vulnerability indicators that address environmental justice concerns (i.e., Poverty, Population Composition, Personal Disruption; see indicator definitions) are noted with a triangle. Gentrification pressure is also highlighted here, with those communities that score Med-High or higher in one or more gentrification pressure indicators (i.e., Housing Disruption, Retiree Migration, Urban Sprawl) represented with a circle (Fig. 11). BOEM reports that cumulative offshore wind development (if all proposed projects are developed) could have moderate impacts on low-income members of environmental justice communities who work in the commercial fishing and for-hire fishing industry due to disruptions to fish populations, restrictions on navigation and increased vessel traffic, as well as existing vulnerabilities of low-income workers to economic impacts [12].

Top fishing communities high in environmental justice concerns (i.e., Atlantic City, NJ, Newport News, VA, Hobucken and Beaufort, NC) should be considered in decision making to reduce the social and economic impacts and aid in the resilience and adaptive capacity of underserved communities. It also highlights communities where we need to provide further resources to reach underserved and underrepresented groups and create opportunities for and directly involve these groups in the decision-making process.

Implications

Current plans for rapid buildout of offshore wind in a patchwork of areas spreads the impacts differentially throughout the region (Fig. 9).

Up to 20% of total average revenue for major Mid-Atlantic commercial species in lease areas could be forgone or reduced and associated effort displaced if all sites are developed. Displaced fishing effort can alter historic fishing area, timing, and method patterns, which can in turn change habitat, species (managed and protected), and fleet interactions. Several factors, including fishery regulations, fishery availability, and user conflicts affect where, when, and how fishing effort may be displaced.

Scientific data collection surveys for ocean and ecosystem conditions, fish, and protected species will be altered, potentially increasing uncertainty for management decision making.

The increase of offshore wind development can have both positive (e.g., employment opportunities) and negative (e.g., space-use conflicts) effects. Continued increase in coastal development and gentrification pressure has resulted in loss of fishing infrastructure space within ports. Understanding these existing pressures can allow for avoiding and mitigating negative impacts to our shore support industry and communities dependent on fishing. Some of the communities with the highest revenue overlap with offshore wind that are also vulnerable to gentrification pressure are Point Pleasant and Atlantic City, NJ, Ocean City, MD, and Beaufort, NC.

We seek Council feedback on whether to include offshore wind development and related indicators within the EAFM risk assessment, and if so, what risk criteria should be applied to these indicators.

2022 EAFM Risk Tables

Table 5: Species level risk analysis results; l=low risk (green), lm= low-moderate risk (yellow), mh=moderate to high risk (orange), h=high risk (red)

Species	Assess	Fstatus	Bstatus	FW1Pred	FW1Prey	FW2Prey	Climate	DistShift	EstHabitat
Ocean Quahog	l	l	l	l	l	l	h	mh	l
Surfclam	l	l	l	l	l	l	mh	mh	l
Summer flounder	l	l	lm	l	l	l	lm	mh	h
Scup	l	l	l	l	l	l	lm	mh	h
Black sea bass	l	l	l	l	l	l	mh	mh	h
Atl. mackerel	l	h	h	l	l	l	lm	mh	l
Chub mackerel	h	lm	lm	l	l	l	na	na	l
Butterfish	l	l	lm	l	l	l	l	h	l
Longfin squid	lm	lm	lm	l	l	lm	l	mh	l
Shortfin squid	lm	lm	lm	l	l	lm	l	h	l
Golden tilefish	l	l	lm	l	l	l	mh	l	l
Blueline tilefish	h	h	mh	l	l	l	mh	l	l
Bluefish	l	l	h	l	l	l	l	mh	h
Spiny dogfish	lm	l	lm	l	l	l	l	h	l
Monkfish	h	lm	lm	l	l	l	l	mh	l
Unmanaged forage	na	na	na	l	lm	lm	na	na	na
Deepsea corals	na	na	na	l	l	l	na	na	na

Table 6: Ecosystem level risk analysis results; l=low risk (green), lm= low-moderate risk (yellow), mh=moderate to high risk (orange), h=high risk (red)

System	EcoProd	CommRev	RecVal	FishRes1	FishRes4	FleetDiv	Social	ComFood	RecFood
Mid-Atlantic	lm	mh	lm	l	mh	l	lm	h	mh

Table 7: Species and sector level risk analysis results; l=low risk (green), lm= low-moderate risk (yellow), mh=moderate to high risk (orange), h=high risk (red)

Species	MgtControl	TecInteract	OceanUse	RegComplex	Discards	Allocation
Ocean Quahog-C	l	l	lm	l	mh	l
Surfclam-C	l	l	lm	l	mh	l
Summer flounder-R	mh	l	lm	mh	h	h
Summer flounder-C	lm	mh	lm	mh	mh	l
Scup-R	lm	l	lm	mh	mh	h
Scup-C	l	lm	mh	mh	mh	l
Black sea bass-R	h	l	mh	mh	h	h
Black sea bass-C	h	lm	h	mh	h	l
Atl. mackerel-R	lm	l	l	lm	l	l
Atl. mackerel-C	l	lm	mh	h	lm	h
Butterfish-C	l	lm	mh	mh	mh	l
Longfin squid-C	l	mh	h	mh	h	l
Shortfin squid-C	lm	lm	lm	mh	l	h
Golden tilefish-R	na	l	l	l	l	l
Golden tilefish-C	l	l	l	l	l	l
Blueline tilefish-R	lm	l	l	lm	l	l
Blueline tilefish-C	lm	l	l	lm	l	l
Bluefish-R	lm	l	l	lm	mh	h
Bluefish-C	l	l	lm	lm	lm	l
Spiny dogfish-R	l	l	l	l	l	l
Spiny dogfish-C	l	mh	mh	mh	lm	l
Chub mackerel-C	l	lm	lm	lm	l	l
Unmanaged forage	l	l	mh	l	l	l
Deepsea corals	na	na	mh	na	na	na

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MID-ATLANTIC | FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 23, 2022

To: Chris Moore, Executive Director

From: Kiley Dancy, Staff

Subject: East Coast Climate Change Scenario Planning Update for April Council Meeting

On Tuesday, April 5, the Council will receive an update on East Coast Climate Change Scenario Planning, including 1) a recap of recent webinars held to explore drivers of change in east coast fisheries and 2) a summary of plans for an upcoming scenario creation workshop.

A summary of the drivers of change webinars will be posted to the meeting page as supplemental material for this agenda item. To inform discussion of the scenario creation workshop, this briefing tab includes a document that was provided to the Northeast Region Coordinating Council (NRCC) for their March 2022 meeting. The NRCC reviewed and agreed to a proposal for a 2.5-day scenario creation workshop in June 2022 in the Washington, DC area. Due to high interest in this initiative and the need to limit in person participants, an online questionnaire will be distributed soliciting applications to participate in the workshop. The core team and NRCC will select a group of approximately 75 participants that balances representation of stakeholder groups and regions. Additional information about the purpose and logistics of the scenario planning workshop can be found in the NRCC briefing document.

The NRCC briefing document also contains a summary of activities planned for after the scenario creation workshop, including a series of webinars to further discuss and develop the scenarios. This will provide an additional opportunity for involvement in the scenario creation process for those that may not be able to participate in the scenario workshop. Following this process, we will conduct an applications phase to directly address the implications of the scenarios and to develop recommendations and other products from this initiative. Council member and other fishery manager input will be particularly critical during this stage.

Additional information and documents from previous phases can be found on the initiative webpage at: https://www.mafmc.org/climate-change-scenario-planning. Information about the forthcoming scenario creation workshop will also be posted there once available.

East Coast Scenario Planning
Phase 4: Scenario Creation Workshop - Design and Logistics Considerations
For Discussion at NRCC Intersessional Meeting: March 17, 2022

1. Summary of Proposed Scenario Creation Workshop

The core team is seeking NRCC feedback on the following proposed elements of a scenario creation workshop:

- A 2.5-day agenda that includes both plenary and breakout group sessions;
- Proposed dates of June 21-23;
- Approximately 75 in-person attendees, plus an additional ~10-15 facilitators, note-takers and support staff;
- Workshop participants selected based on responses to an online application/nomination questionnaire requesting demographic and representation information as well as short responses about potential workshop contributions. A list of recommended participants will be forwarded to the NRCC to identify any major representation issues.
- A workshop location at a hotel or conference center in a relatively easily accessible city such as Raleigh/Durham, NC; Providence, RI; the Washington, DC metro area; Baltimore, MD; or Atlanta, GA;
- The majority of workshop costs will be covered by the existing grant from NOAA Fisheries (being administered by the ASMFC), with some travel costs covered by NRCC member organizations for select staff, Council or Commission members, and advisory body members.

2. Background

The purpose of the overall ECSP initiative is to explore how East Coast fishery governance and management will be affected by future climate-driven change, with a particular emphasis on changing stock availability and distribution.

The work to date has been to establish the initiative, scope it (in terms of agreed objectives and issues to cover) and explore future drivers of change. As we complete the first three phases, the initiative is in a good position: there are many people interested in the process and are developing a solid understanding of the drivers of change and issues that they think are important to consider in assessing climate change and the next 20 years of East Coast fisheries.

The next key process step is to *create a set of scenarios* – a handful of alternative stories that describe possible future conditions. This is usually achieved in a workshop that brings many different stakeholders together in a multi-day meeting. **The purpose and outcome of the scenario workshop is to create 3-5 plausible yet divergent scenarios about how climate change might affect East Coast fisheries in the next 20 years.**

Designing and organizing a scenario creation workshop involves several decisions and trade-offs, involving participant type and numbers, session duration and location. This document highlights the different considerations and then proposes an approach to deliver a quality outcome and experience, while also taking account of a range of other considerations, such as representation, access, diversity and cost.

3. <u>Workshop Sessions and Duration</u>

All participatory scenario creation workshops involve a series of conversations and exercises that explore the future. Workshop attendees are asked to review and discuss material, generate ideas and reach agreements as they work towards creating 3-5 stories. Both in-person and remote workshops contain these elements. In-person workshops are typically more conversational, engaging and easier to modify as the workshop unfolds.

Some of these conversations are "divergent" – i.e., they are designed to expand the range of ideas and possibilities that participants should consider (e.g., a brainstorming exercise). Other conversations are "convergent", designed to limit or constrain the number of ideas and possibilities to be considered (e.g., a voting or prioritization exercise).

Effective workshops employ both types of conversations. In a scenario creation workshop to explore the future of East Coast fisheries, the agenda will most likely include the following conversations / exercises:

- Introductions and context-setting
- Review of drivers of change material and webinars
- Discussion and agreement on changes that we *confidently expect* in the next 20 years
- Idea generation to outline areas of uncertainty and hence several different possible conditions for 2042
- Sharing and comparison of different possible 2042 conditions
- Discussion and agreement on a framework containing 3-5 possible scenarios
- Idea generation to fill in the details of each scenario (i.e., 3-5 stories that connect selected oceanographic, biological and social/economic changes in separate coherent narratives)
- Discussion and report out to summarize the main elements and differences between each scenario
- Reflections and discussion about next steps

This is a lot to cover. Many of the ideas and conversations can be new and challenging to grasp. Because of this, it can be helpful to give attendees time to discuss and process the ideas that are emerging from the group. However, we also realize the difficulties of getting people to commit to participating for multiple days. **We propose that the workshop will be 2.5 days in duration**.

4. <u>Workshop Date</u>

It is important to hold this workshop before the end of June to maintain momentum for the initiative and to remain on track with the project timeline. There are many weeks where existing Council / Commission meetings are already scheduled for later May and June. Accordingly, the preferred dates for the workshop are **Tuesday June 21 - Thursday June 23, 2022.**

This date does not have a competing Council or Commission meeting. It is also convenient for nearly all members of the core team. In addition, a date in late June provides a sufficient time to engage in workshop invitations, participant selection, and planning.

5. Attendee Numbers and Meeting Format

The ECSP initiative has generated significant interest to date. The scenario creation workshop is a critically important part of the overall work, so we can expect that many people will want to attend the workshop. This is a good problem to have – more people at a workshop usually means we can gather a wide range of views in order to inform the scenarios.

But there are trade-offs involved. Large one-off workshops (e.g. involving hundreds of participants) are great for engagement, representation of different regions & roles, and broad idea generation. But large workshops are also more expensive to organize, and trickier to facilitate toward our goal of 3-5 scenarios. Smaller workshops (e.g. 30-40 people) are easier to manage but do not allow for the breadth of representation that this initiative requires.

As a result, ***it is recommended that a workshop be held that strikes an appropriate balance, with ~75 in-person attendees, plus an additional ~10-15 facilitators, note-takers and support staff.*** This number will allow for a broad range of participation, while also maintaining an ability to ensure that the group can discuss and agree on the 3-5 scenarios that will form the output of the workshop.

Jonathan Star, our process facilitator, will lead the workshop. The Core Team will provide most of the facilitation resources, and The Nature Conservancy can help with note-taking and other logistics as needed. It is not anticipated that additional external facilitators will be required.

During the Covid-19 pandemic, virtually all meetings have been on-line. As we transition back to in-person meetings, it is important to acknowledge that there are some benefits to on-line meetings, such as an ability for many more people to log in, observe and, when possible, engage in proceedings. ***Accordingly, the scenario creation workshop should be designed as a hybrid workshop, engaging in-person attendees and others that will view and listen remotely for some of the workshop proceedings.***

On-line participants will only attend presentations and plenary sessions. They will not attend break-out group sessions. They will be encouraged to provide comments and suggestions via an online chat function, but there will be no expectation that these comments will be integrated into the workshop conversations in real time. Instead, the comments will be reviewed at the end of each day and addressed if necessary, during the following days' proceedings. In addition, online suggestions for the scenario stories will be noted and used as the narratives are further developed following the workshop.

6. Attendees and Selection Process

It is important that scenario workshops contain a diversity of participants, in terms of expertise, experience, role and geographic region. One broad way to characterize attendees is:

- Stakeholders – who will be directly affected by these scenarios and the possible changes that might happen to fishery governance and management?
- Knowledge holders – who has the expertise in terms of science, management, on-the-water experience and traditional ecological knowledge?
- Curious and creative "outsiders" – who has perspectives that provide a novel or different viewpoint from others? What new voices should be brought into the conversation? What views are likely to emerge as more important over the next 20 years?

It is also important to make sure that each region (New England, Mid-Atlantic and South Atlantic) is well-represented.

The following provides a classification of 10 different 'roles' that cover a wide range of interests regarding the future of east coast fisheries. This can help in planning for a workshop with a diverse set of attendees. This classification will be used to ensure that we have at least 2-3 participants from each category. There is no expectation of equal representation of these groups. Instead, it is expected that some categories (e.g. commercial and recreational anglers) will have more representatives than others.

1. Commercial vessel owners/crew (representing both state and federal waters)
2. Recreational private boat and shore anglers (representing both state and federal waters)
3. Recreational for-hire (party and charter boat) business owners/crew
4. Marketing, suppliers, purchasing and support infrastructure
5. Environmental NGOs
6. Local economic development (e.g. tourism, local authorities)
7. Other ocean users (e.g. wind power, aquaculture)
8. Climate change / fishery scientists
9. Fishery managers
10. Social scientists & economists
11. Tribes, community leaders, concerned citizens

It will be important to identify a number of 'outsiders' - new voices who will bring fresh ideas into the mix. To do this, it is necessary to think differently about the approach to inviting workshop attendees. It will not be enough to choose participants based on existing connections, instead, this is an opportunity to bring new voices into the conversations. To encourage new voices and promote coverage of roles that we lack, we propose to invite attendees to apply to attend the workshop.

Selection Process

The core team is designing a very short online questionnaire that will serve as an application to attend the scenario creation workshop. This will be distributed broadly to existing mailing lists, and also to others who have already expressed an interest in this initiative. This questionnaire will describe the details of the workshop (purpose, date, location) and request some demographic information (e.g., role, location, gender, age) that will provide data to help ensure a diverse set of attendees. Applicants will also be asked to provide a very short explanation of why they are interested in this initiative and what they might contribute to the scenario creation workshop.

The questionnaire will be open for 2 weeks (~1st two weeks of April). Following that, the core team will review applications and narrow the range of applicants based on a formula. This formula will be designed to ensure that the workshop is attended by a diverse group (role, region, gender, age) who will contribute effectively to the conversation. Additional information provided by applicants about their interest and potential contributions will be used to further refine a list of recommended participants. This list will be distributed to the NRCC to highlight any specific concerns before finalization.

Applicants will be told whether they are invited to the workshop by early May, providing sufficient time to make final logistical arrangements before the workshop on June 21-23. All applicants who do not make the cut will be encouraged to listen and provide comments electronically and will be invited to later 'scenario deepening' online webinars.

Is the NRCC supportive of this workshop participant application and selection process? Are there any important roles or categories that are missing, and/or are there categories of participants that should be weighted more or less heavily?

7. <u>Workshop Location</u>

The core team proposes that the workshop be held in a location that is easily accessible from locations all along the coast - specifically that it is nearby a major airport with reasonable flight costs from many different locations. It is not essential that the workshop be held in a coastal location. Holding the workshop away from the coast might avoid any perception that the process was biased towards a particular coastal region and reduce the number of individuals that show up in-person not on the list of invited participants. If members of the public do show up in-person they will be permitted to observe the plenary discussions and participate during specified public comment opportunities, but will not be assigned to break out groups etc.

We will identify a meeting location (hotel or conference center) with reasonable facility costs and nearby food options. Some potential location options include:

- Raleigh/Durham, NC
- Washington, DC/Silver Spring, MD/Arlington, VA
- Providence, RI
- Baltimore, MD
- Atlanta, GA

Does the NRCC have any specific feedback about meeting location to consider?

8. Workshop Costs and Financial Support

It is expected that the majority of workshop costs will be covered by the grant from NOAA. A rough estimate for a 75 person meeting with 3 hotel night stays and 3 meeting days is approximately $62,000, not including additional expenses for enhanced IT needs (if applicable) and lunch catering (recommended to ensure that the workshop timeline stays on track and to encourage additional dialogue among participants).

The Councils and Commission have previously agreed to cover costs for any Council members/Commissioners and staff who will attend. The NRCC should discuss whether the Councils and Commission will also be able to cover the costs of Advisory Panel or Scientific and Statistical Committee members if they are identified as workshop participants, and whether/how that should impact the selection of participants. Additional participant travel can be covered by the NOAA grant, with the exception of federal employee travel.

Are NRCC member organizations still planning to pay travel costs for their staff, Council members, Commissioners, and/or advisory body members?

9. Activities Following the Scenario Creation Workshop

While the Scenario Creation workshop is a vital part of the overall initiative, there will be other important webinars and meetings that follow.

In the weeks following the main scenario creation workshop (i.e. likely throughout July), it is suggested that a small number of 'scenario deepening' online webinars be held. These webinars will encourage attendees to comment on the basic scenarios, and add details so that the storylines are fleshed out and as relevant as possible. This provides an opportunity for hundreds of participants to actively develop the scenarios. In this way, the ~75 attendees at the scenario creation workshop might generate the platform, but many more webinar attendees can supplement with further details.

Further, in Phase 5 (throughout the Fall of 2022), the scenarios will be used as a platform for discussion and suggestions for how East Coast fishery governance and management must adapt to cope with an era of climate change. There will be multiple workshops and working sessions held, based around the following questions:

- Under each scenario, what are the particular challenges that fisheries governance and management would face?
- How well would our current fishery governance and management arrangements cope if these scenario conditions were to occur?
- What needs to change in fisheries governance and management to prepare for these scenario possibilities?
- What are the tools and processes that need to be advanced now to ensure that fisheries are governed and managed effectively in an era of climate change?

These working sessions can be held in a variety of locations and formats. It is proposed that, at a minimum, a scenario planning agenda item be added to each Council and Commission meeting over the Fall. Once these multiple meetings have been held, it is proposed that we hold a summit meeting in late Fall, where a few representatives from each of the Council / Commission and other meetings will gather. Their task will be to review all the ideas and suggestions emerging from multiple meetings and then decide upon adaptations and new tools that are suitable and feasible to implement. It will be important that fishery managers play a central role in these Phase 5 conversations, alongside many other stakeholders who will offer valuable perspectives and suggestions on these questions.

Appendix: Illustrative Agenda Template for 2.5 Day Scenario Workshop

Day 1

8.30am	Welcome, Overview & Introductions ● Manage expectations about the workshop ● Introduction to scenario planning
9.15am	Review of Drivers of Change ● Summary of briefing material ● Review of 3 Drivers of Change webinars ● Confident Predictions to 2042 ● o When we think 20 years ahead, what factors are we confident about (i.e. should be featured in all scenarios?)
10.30am	Break
10.30am	Key Uncertainties / Building Blocks ● Plenary presentation and discussion about 'critical uncertainties'. When we think 20 years ahead, what factors are important and highly uncertain? ● Set up for afternoon breakout exercises
11.30am	Small Group Conversations ● ~10 groups of 8 people. Precise exercise depends on our scenario creation process: ● Combinations of scenario axes (deductive) ● Future events and storylines (inductive)
12.30pm	Lunch
1.30pm	Small Group Conversations (continued)
3.00pm	Break
3.15pm	Small Group Report Out Each group reports out on their work ● ~10 minutes per group ● Common themes from small groups ● Discuss framework possibilities
4.30pm	Main session adjourns
5.00pm	Core Team convenes to suggest a framework ● This is the chance for a smaller group to work on 'pattern recognition' and propose a framework for the following day

Day 2

8.30am	Day 1 Reflections & Hopes for Day 2
9.15am	Proposal(s) for framework(s) ● Based on Day 1 conversations
10.30am	Break
10.45am	Scenario Building - Breakout Groups ● New configuration of groups each work on a specific scenario drawn from the framework ● Combine oceanographic, biological, social/economic developments into 3-5 coherent stories about EC fisheries 2022 - 2042
12.30pm	Lunch
1.30pm	Scenario Building - Breakout Groups (cont.)
2.30pm	Break
3.00pm	Review of Scenarios - Plenary ● Each group summarizes main themes and presents out in plenary ● Look for patterns, logic gaps, inconsistencies etc.
4.30pm	Adjourn

Day 3

8.30am	Day 1 Reflections & Hopes for Day 2
9.00am	Scenario Review and Comparison Plenary discussion to test for: ● Plausibility (can each story conceivably happen in 20 years?) ● Relevance (do the stories tell us different things about changing stock distribution / availability, and do we think they will raise relevant questions about governance and management?) ● Challenge (do the stories challenge some of our assumptions about what we think will happen?) ● Memorable (can we bring more powerful stories and ideas into each?) ● Divergent (are the 3-5 stories meaningfully different from each other?) Are there important issues that the scenario do not yet cover? (Organize in table format to clarify distinctions between scenarios)
10.30am	Break

11.00am	Next Steps ● Suggestions and recommendations for deepening and finalizing the scenarios ● Explanation of how they will be used in Phase 5 (application / implications) sessions ● What lessons can we draw right now?
12.00pm	ADJOURN

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 23, 2022

To: Council

From: Jessica Coakley, Staff

Subject: Presentation on research project entitled, "Surfclam species diagnostics and population connectivity estimates to inform management"

The Council contracted researchers at Cornell University to examine species connectivity among the commercially important Atlantic surfclam, *Spisula solidissima solidissima*, and its sister-taxon the Southern surfclam, *Spisula solidissima similis*. While these taxa are impossible to distinguish in the field, they are easily distinguished using genetic markers. Atlantic surflcam population structure and connectivity are important factors that shape the types of management approaches needed to maintain sustainable surfclam harvests.

Despite some delays and sampling challenges associated with COVID-19, the project is nearing completion. At the April Meeting, Dr. Mathew Hare and Hannah Hartung will present the Council with the results of this project to date. A summary of this work has been provided behind this tab.

The final report from the project is anticipated in June 2022, with a presentation on those results to be given to the Scientific and Statistical Committee at their July 2022 meeting.

Preliminary summary of results on surfclam population structure and population connectivity
Matt Hare & Hannah Hartung, Cornell University
mph75@cornell.edu
Federal Identification Number: 51-6148342

Key Project Objectives:

- Generate sequence data for the full transcriptome of expressed genes in both subspecies. Assemble these sequences de novo into a transcriptome "reference" for each subspecies for use in whole genome sequence analysis and to design a species diagnostic.
- Develop a species diagnostic assay based on three nuclear DNA markers that can be applied at low cost to identify first generation hybrids as well as subspecies.
- Because New York indicated an inability to sample outside their standard survey design, contract with a fisherman to do targeted sampling around Long Island, NY.
- Apply the species diagnostic to 3000 samples from nearshore survey sites where the two subspecies have overlapping range distributions. To the extent possible, collect and analyze samples in such a way that depth can be tested as a habitat variable with differential subspecies affinities.
- Collect genome-scale data from 350 samples and identify DNA variants within and between each subspecies.
- Analyze and report on population connectivity among populations within each taxon using methods that establish the geographic scale of gene flow and evolutionary independence.

Background - the utility of genomics

Scientists focus on differences. In biology, whether the goal is taxonomy, molecular biology, or fisheries management, one of the greatest challenges is the need to evaluate how meaningful differences are for the goals at hand. In some cases, when advances provide higher resolution discrimination of differences, like our recent ability to detect transcription from 70-80 percent of the human genome (protein coding genes account for only 1-2% of the genome), it opens up discoveries that lead to whole new definitions of "function" vs "junk", relevant signal vs noise.

Genomic-scale assays of DNA variation, and the ability to apply these to population samples from taxa with no genomic resources (i.e., no reference genome sequence), are enriching the longstanding contributions of genetics to population studies. However, it typically is not obvious what demographic and population biology meaning to place on subtle population genetic differences. Interpretation requires careful consideration of population processes happening at both ecological and evolutionary time scales, and molecular impacts of those processes on functional DNA variation influencing relative fitness (selection, gene flow and genetic drift) as well as on "neutral" variation not affecting fitness (gene flow and genetic drift). Unlike demographic and ecological studies of population biology, where the boundaries of a distinct population often are defined by the impact of immigration on population growth, or the degree of independence between vital rates, population genetic differentiation is most informative about reproductive interactions (random mating within populations, gene flow among populations). Depending on the study design and context, population genetic variation can be used to estimate contemporary processes (using high resolution multilocus genotypes as 'tags' for tracking movements in recent generations), or to infer average processes in the recent evolutionary past, typically with the benefit of an evolutionary model.

Cryptic surfclam subspecies are partially sympatric 'good' species
Taxa that have evolved some measure of reproductive isolation but are still phenotypically the same where they co-occur, are ideal subjects for informative genetic analysis. For a long time the two nominal subspecies of surfclam, *Spisula solidissima solidissima* and *S.s. similis* were thought to be largely allopatric, with the latter rarely occurring north of Cape Hatteras, if at all, and confined to nearshore waters. Thus, observations of life history differences between inshore vs. offshore populations of *S.s. solidissima* have been interpreted solely as the plastic phenotypic consequences of inshore/offshore environmental differences or density effects (Jones et al. 1978; Ropes 1979; Jones 1980; Ambrose et al. 1980; Cerrato and Keith 1992).

Hare and Weinberg (2005) and then Hare et al. (2010) used genetic markers to demonstrate the presence of *S. solidissima similis* in Southern New England, including the previously fished surfclam population in Long Island Sound, NY. The reported genetic patterns were interpreted as consistent with full species status because the degree of genetic differentiation would be unlikely if gene flow were continuing between these two taxa, and sampling showed co-occurence of these taxa in Southern New England. However, shell morphometric analysis did not yield any traits or combinations of traits that easily distinguish these taxa.

High resolution genomics reveals an additional cryptic taxon
Sampling of *S.s. solidissima* for this project was hampered by the pandemic. We acquired Georges Bank samples from the federal survey but Nantucket Shoals and Delmarva shelf samples were obtained from commercial sources. Additional federal samples from 1999 and archived by M. Hare also were analyzed. Closer to shore, samples included a 2012 sample from the New York State DEC survey along the South shore of Long Island, and 2019 samples from the same region collected in shallow water near inlets by a contractor for this project. Additional *S.s. solidissima* samples were obtained from Massachusetts state surveys in Cape Cod Bay and south of Cape Cod. Samples of *S.s. similis* were based on effort by the contractor along the North shore of Long Island, Massachusetts state survey efforts, and a 2012 contract to sample the Georgia population (previous federal Hatch funds). The location of all samples is shown in Fig. 1. Note that mixed populations of these two taxa occur only south of Cape Cod. Only *S.s. similis* was found in Peconic Bay (end of Long Island) and in Long Island Sound, and only *S.s. solidissima* was observed along the South shore of Long Island.

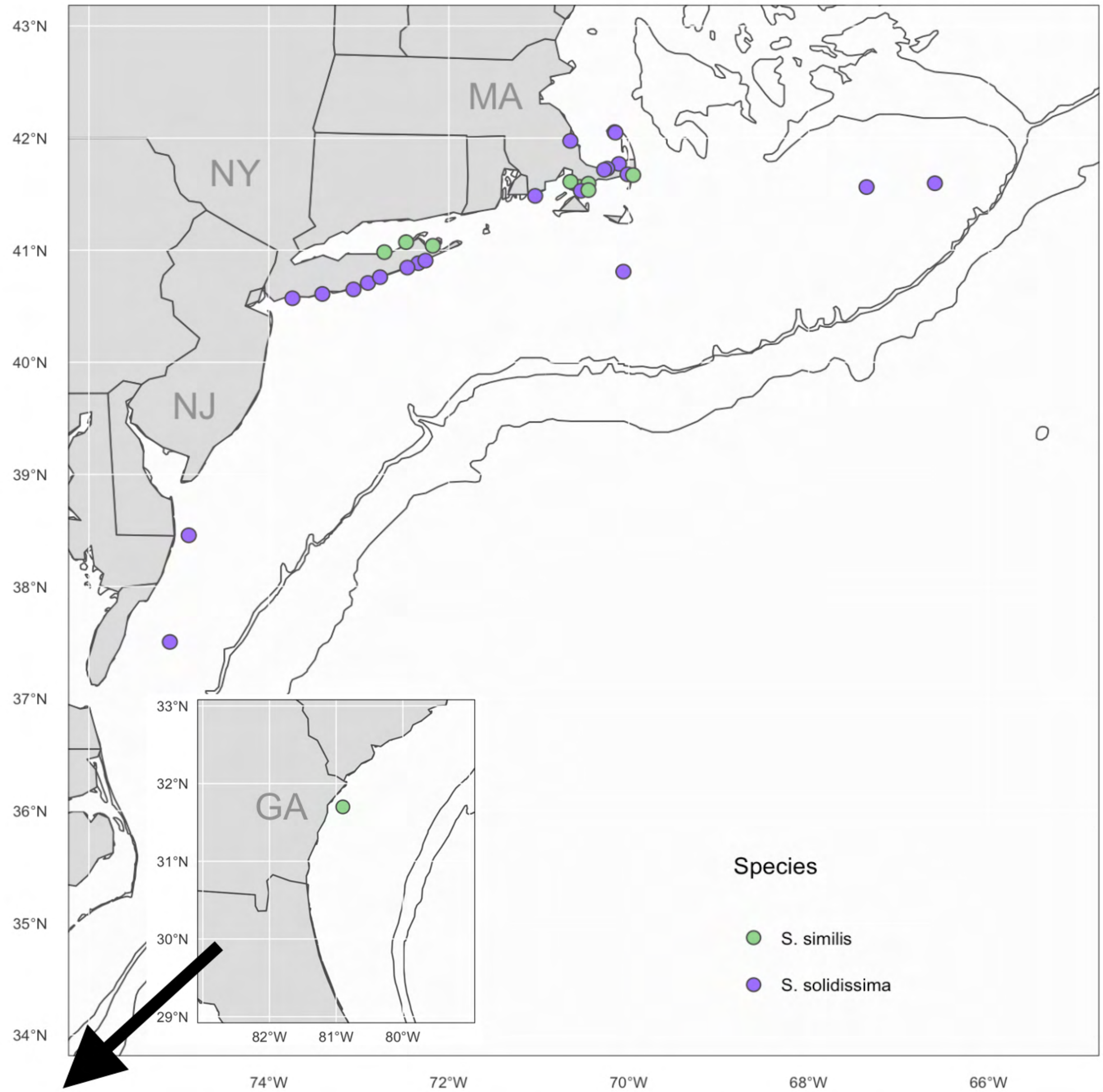

Fig. 1: Sample collection locations for *S.s. solidissima* (purple) and *S.s. similis* (green) used in genomic analyses.

Using a 'reduced representation' method of randomly sampling surfclam genomes, so that the same homologous chromosomal positions are sampled in each individual, we now have a high resolution dataset consisting of 2.6 thousand quality-filtered single nucleotide polymorphisms (SNPs) from chromosomal loci scattered through the genome. This dataset consists of loci that have been carefully selected to be comparable (i.e. homologous) between *S.s. solidissima* and *S.s. similis*. Larger numbers of high quality loci and SNPs have been identified for analyses within each taxon.

Using principal component analysis to explore the multidimensional allele frequency variance across individual specimens in both nominal taxa, the greatest variance explained by PC1 and separates *S.s. solidissima* from *S.s. similis* (Fig. 2). Surprisingly, *S.s. solidissima* samples show extensive allele frequency variance along PC2. The allele frequency variance explained by these two PC axes, 9.18% and 7.99% respectively, indicate that the two *S.s. solidissima* clusters have nearly as much allele frequency differentiation between them as found between the two nominal subspecies. For now, we are referring to these two clusters as Genotype A and Genotype B.

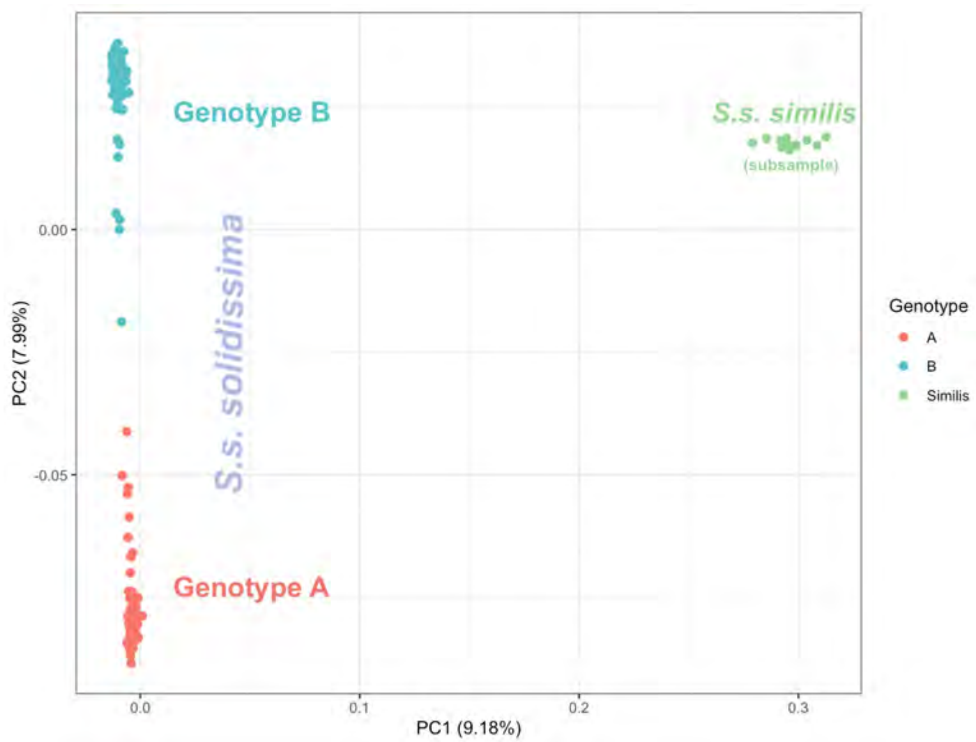

Fig. 2: Principal components analysis plot of PC1 and PC2 summarizing allele frequency differentiation among individuals from both nominal subspecies. Genetically differentiated clusters of S.s. solidissima are labeled Genotype A and Genotype B.

Spisula s. similis

Using PCA to explore patterns of population differentiation among all samples of *S.s. similis*, using 12.7 thousand SNPs, the three geographically discrete groups of samples show genetic differentiation (Fig. 3). The greatest differentiation along PC1 (2.88% allele frequency variance explained) separates Southern New England (NY+MA) from Georgia. Along PC2 the differentiation between samples from the North shore of eastern Long Island and Peconic Bay (NLI) versus the Southern coast of Massachusetts (SCC) is subtle, but it is interesting that there is any distinction at all. Using F_{ST} as a metric of allele frequency differentiation that spans from 0 to 1.0, the latitudinal contrast has average F_{ST}=xx whereas the two southern New England populations have average F_{ST}=xx. Our ongoing analyses are testing hypotheses about demographic history (e.g. historical population bottlenecks or admixture) that might explain the distinct patterns in NY and MA populations.

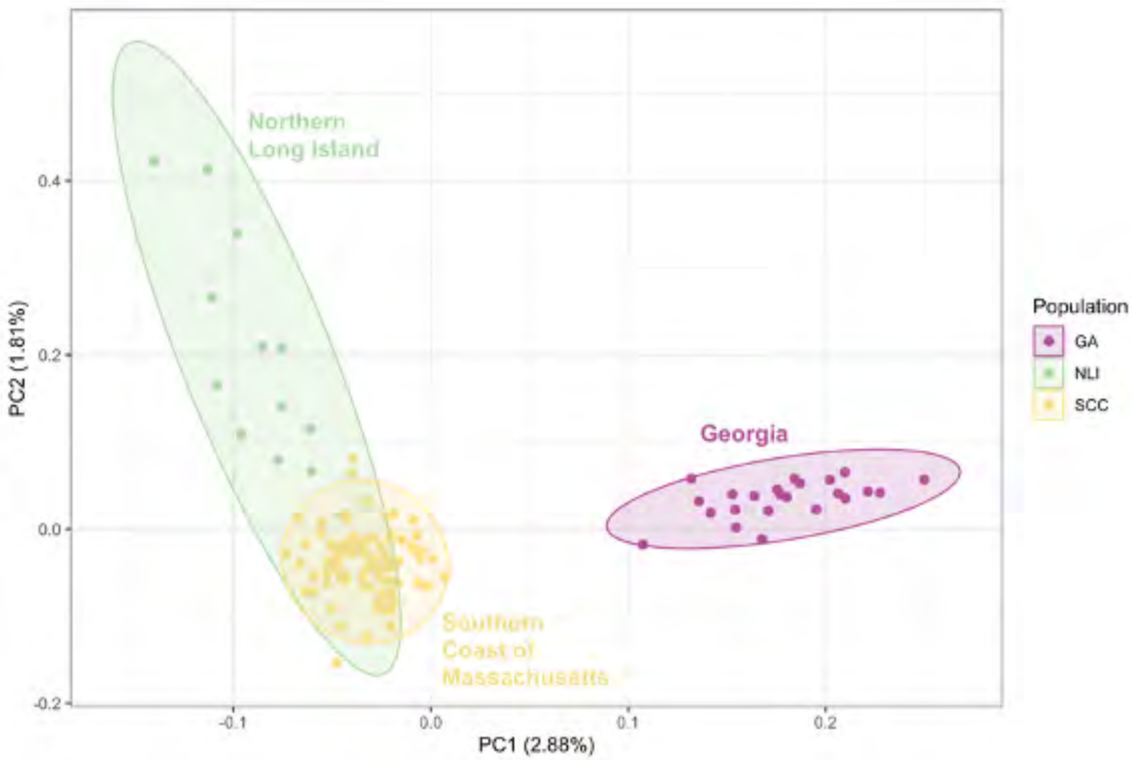

Fig. 3: Principal component analysis of all *S.s. similis* samples based on 12.7 thousand SNPs.

Spisula s. Solidissima

Focusing analysis on *S.s. solidissima* yielded 49 thousand high quality SNPs. Genotype clusters A and B are largely partitioned along PC1, whereas PC2 shows some distinction within Genotype B between clams from Cape Cod Bay and the rest of the Genotype B cluster (Fig. 4). Some Cape Cod Bay clams also show intergradation between the A and B genotype clusters. To examine this in more detail we used a model-based analysis that infers how many differentiated source populations are contributing to the observed genotypic variation, and at the individual level, whether genomic variation is best explained by a hypothesis of admixture (interbreeding between the hypothesized source populations). Admixture inferred with this model is more likely to be recent, not ancient. One way to think about admixture is with expectations from a pedigree when starting with two genetically distinct parents - the first generation offspring will have 50/50 genomes consisting of homologous paternal and maternal chromosomes. If F1 individuals backcross to a parental type, the expected proportionality in the F2 generation is 75/25, and so forth. The history of interbreeding is likely to be complicated and there are many histories that could produce a 75/25 pattern in an individual, but in general between to very distinct source populations, moderate admixture (50/50) is likely to be more recent and minor admixture (90/10) is older.

As with the PCA, the greatest number of admixed individuals was found in Cape Cod Bay, but only a small minority of clams (15%) had moderate levels of admixture (Fig. 5). The admixed clams were scattered all around Cape Cod Bay and no ‘pure’ type A clams were found. New Jersey had the same pattern, but with only slight admixture in only a few specimens. Southern Cape Cod and Southern Long Island were the only regions where ‘pure’ genotype A

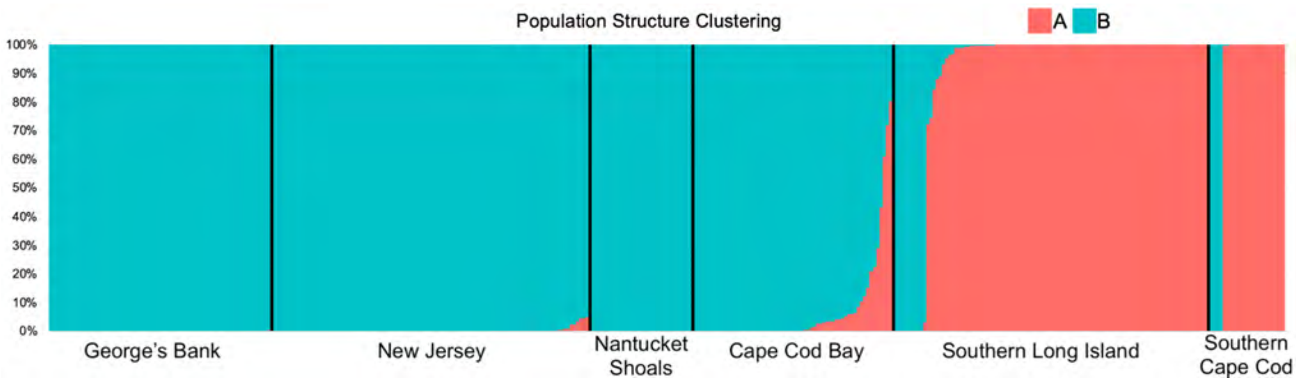

Fig. 5: Clustering and admixture results from program STRUCTURE applied to all S.s. solidissima samples using 2.6 thousand SNPs. Models assuming K=2 source populations showed the greatest support from the data, here depicted as blue-green for the Genotype B source population and orange for the Genotype A source population. Black vertical lines separate population samples. Each individual specimen is represented with a thin bar that is either blue-green, orange or a combination indicating proportional contributions from these two sources (admixture). In mixed populations, individual clams are ordered from fully type B to increasing proportions of type A.

and B co-occurred, meaning they had the opportunity for interbreeding. Southern Long Island also included a few admixed clams.

Patterns of A/B admixture and sample sizes are shown on a map in Fig. 6 for Southern New England. We are making efforts to compare the depth distribution of genotype A vs. genotype B clams, and to analyze length by age patterns for the subset of genotyped clams that were aged (by federal and NY state labs). In both cases a very uneven distribution of samples makes interpretation difficult. Shells are being sent to the Woods Hole NOAA lab for aging to improve our ability to estimate von Bertalanffy growth curve parameters for both genotype A and genotype B populations.

Genetic Diversity

To our surprise, all surfclam populations have similar levels of genetic diversity as measured by one of the most sensitive indicators, allelic richness (i.e., the average number of alleles per locus in a population after correcting for sample size differences). Typically a SNP locus only has two alternate nucleotides segregating in the population. Instead, for allelic richness we analyzed nearby SNPs jointly as a haplotype, so for a haplotype consisting of 3 SNPs we might distinguish alleles AGG, AGT, TGG, TGT, ACG, ACT, TCG, TCT. Structuring the SNP data this way provides a measure of genetic diversity that is more sensitive to recent fluctuations in population size. For example, this single locus haplotype example might show 8 alleles in a large population but only 5 alleles in a numerically small population. Allelic richness averaged near 3 for all three S.s. similis regional populations and for S.s. solidissima genotype A and genotype B populations.

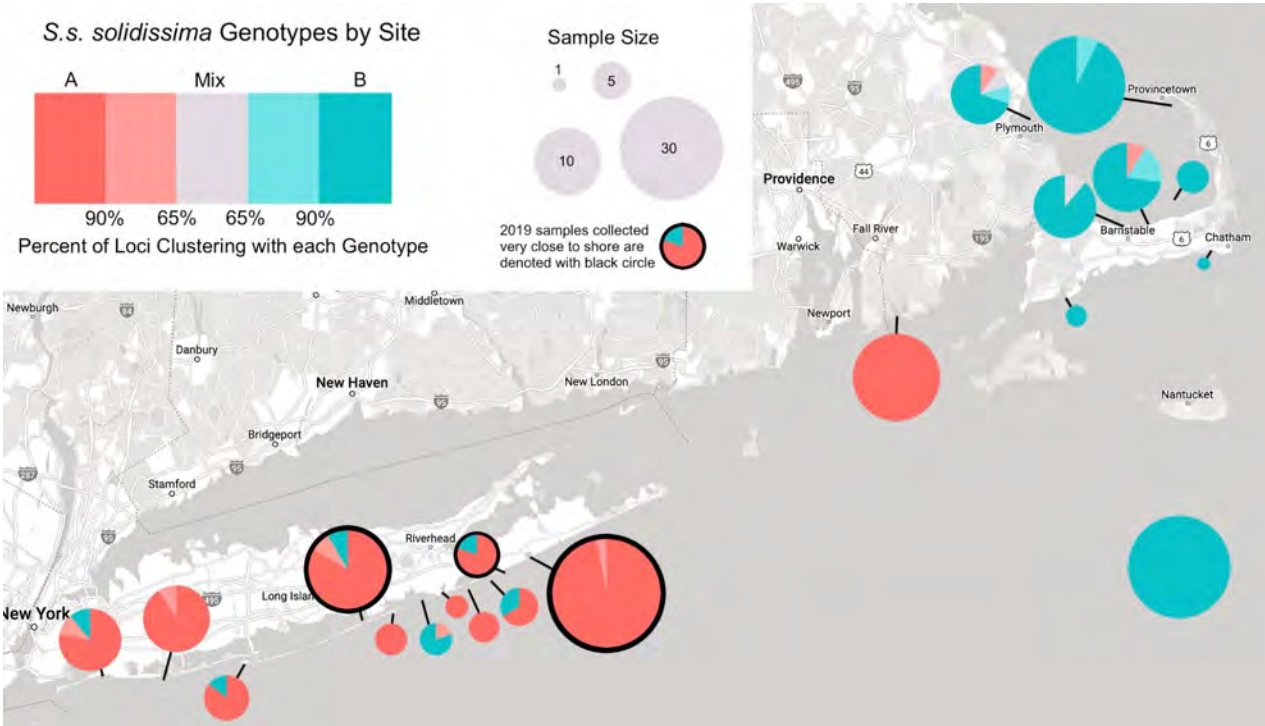

Fig. 6: Southern New England pie diagrams depicting sample size and distribution of genotype A, genotype B and admixed individuals.

Model based estimates of genetically effective population size and demographic history are ongoing. For now, here is our informal suggestion for why a sparse nearshore population of *S.s. similis* might have comparable levels of genetic diversity compared to an abundant, commercially important taxon distributed across much more extensive habitat. If contemporary demographic processes are limiting *S.s. solidissima* effective population size (genetic diversity) relative to *S.s. similis* then the most likely candidates are a relatively higher variance in reproductive success or a more skewed sex ratio in the former, both factors that lower effective population size below census size. Alternatively, because historical fluctuations in population size can reduce genetic diversity and lower effective population size, *S.s. solidissima* may have experienced greater Pleistocene or post-Pleistocene population size fluctuations than *S.s. similis*. The third possibility for metapopulations (both taxa include an array of regional populations connected by larval dispersal) is that *S.s. similis* experiences greater large scale gene flow relative to *S.s. solidissima*, effectively enlarging its genetically effective population size. Analyses of gene flow are ongoing, and are challenging to compare between taxa for a test of this hypothesis.

Gene Flow

The preliminary result on gene flow that can be shared at this point is based on a population genetic estimation of relative gene flow magnitude and directionality. The program divMigrate uses a novel pairwise population analysis approach to test whether the differences in allele frequencies, and the pattern of private vs shared alleles between two populations, supports a model of asymmetric gene flow. The populations are assumed to be at an evolutionary equilibrium between the homogenizing force of gene flow and differentiation caused by genetic drift. Every pairwise comparison is made between subpopulations to determine which pairs have statistically supported nonzero gene flow, and the direction of exchange if the gene flow is significantly asymmetric. The report of results from a biophysical model by Zhang et al. (2016) suggested that *S.s. solidissima* larvae are strongly advected to the southwest, like a conveyor belt from Georges Bank to the Delmarva shelf. The genomic results we report here are the first opportunity we are aware of to empirically address their model based predictions.

In *S.s. similis* the highest relative level of gene flow was inferred to be between the Massachusetts and Georgia populations with a strongly southwestern directionality. The connection between Massachusetts and Long Island Sound surfclams also was directional and westward, with only half the magnitude of gene flow relative to MA->GA. This result is based on 1250 haplotype loci, using 10,000 bootstraps for the statistical significance testing.

Gene flow inference with S.s. solidissima is ongoing. Preliminary results will be included in the presentation.

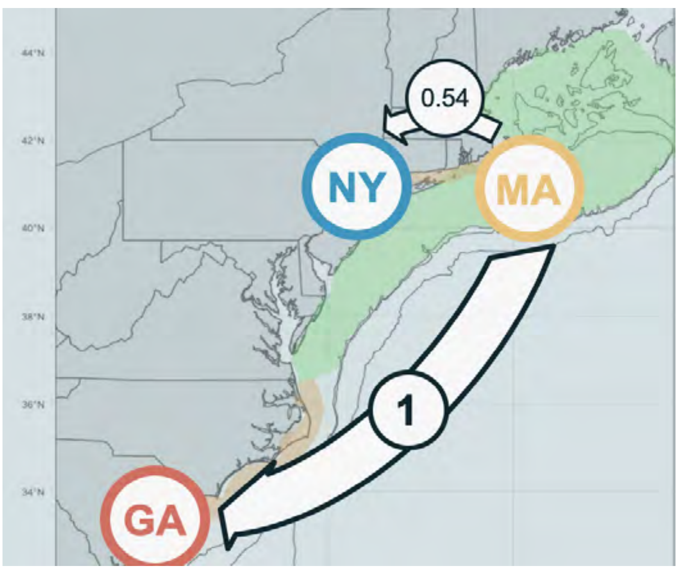

Fig. 7: divMigrate inference of gene flow directionality
and relative strength. The maximum observed gene
Flow is labeled “1” and other gene flow levels are relative
To that.

Summary and Conclusions

We want to emphasize that this summary describes the preliminary results from many gigabytes of genomic data obtained only a couple months ago. We are presenting patterns that seem robust and reliable, but many checks and further analyses are still in the works.

The most dramatic new information is population subdivision within *S.s. solidissima*. Patterns in the data suggest that the genomic differentiation between genotype A and B is not driven by a small number of markers showing extreme differences. Instead, population subdivision in both *S.s. solidissima* and *S.s. similis* seems to involve small differences at many loci such that the cumulative signal from genomic scale sampling was necessary to detect differences. This pattern of differentiation, consistent with slow genetic drift between large populations, may make it difficult or impossible to find one or a few diagnostic loci for easy genetic screening of samples. Determining the minimum effort required (loci to genotype) to discriminate the nominal subspecies or the two types of *S.s. solidissima* is one of our analytical goals.

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Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 25, 2022

To: Council

From: Julia Beaty, staff

Subject: Updates on Offshore Wind Energy Development

During their meeting on April 5, 2022, the Council will receive updates on the Ocean Wind and Atlantic Shores offshore wind energy projects, both of which are located in federal waters off New Jersey. The Bureau of Ocean Energy Management (BOEM) will also provide updates on several developments related to offshore wind energy development.

The following materials are included behind this tab:

1) Fact sheet on Ocean Wind project area. Additional information on Ocean Wind is available here.
2) Map of Atlantic Shores project areas. Additional information on Atlantic Shores is available here.
3) Updates from BOEM
4) Additional materials submitted by wind project developers not on the agenda:
    a. March 21, 2022 Mariners Briefing on US Wind project off Delaware and Maryland

Ocean Wind 1

Project overview

Ocean Wind 1 is an 1,100 MW offshore wind farm, developed by Ørsted and PSEG, that is located 15 miles off the coast of Southern New Jersey. As New Jersey's first utility-scale offshore wind farm, Ocean Wind 1 will provide clean and reliable energy, local jobs, and infrastructure enhancements to the Garden State – helping realize New Jersey's vision of becoming a world-class leader in the offshore wind industry.

Ocean Wind 1 is bringing unparalleled experience to New Jersey, focusing on responsible development, environmental stewardship, transparent stakeholder engagement and robust job and supply chain creation efforts. Ørsted is the global leader in offshore wind development with over 30 years' experience, and PSEG has expertise in executing complex energy infrastructure projects and power market knowledge in New Jersey.

Stakeholder engagement, project survey work and permitting is underway. In March 2021, Ocean Wind 1 received its Notice of Intent from the Bureau of Ocean Energy Management and expects a draft Environmental Impact Statement to be issued in May 2022. Additional work, including extensive environmental impact studies and coordination with the New Jersey Department of Environmental Protection to complete the state-specific permit process, is on-going.

Who
75/25 JV partnership between Ørsted & PSEG

What
1,100 MW offshore wind farm with the capacity to provide over half a million homes in New Jersey with clean, reliable energy

When
Ocean Wind 1 could provide first power in late 2024, subject to federal permitting timelines, other development and construction activities, and final investment decisions by Ørsted and PSEG.

Where
15 miles off the coast of Southern New Jersey at its closest point, with minimal visual impacts

Why
Providing New Jersey residents with 100% renewable energy and helping to meet the State's ambitious goal of 7,500 MW of offshore wind by 2035

Benefits to New Jersey

Local investment

As part of the commitment to supporting New Jersey's clean energy goals of creating a new, long-term, sustainable and equitable clean energy industry, Ocean Wind 1 has committed to meeting ambitious spending and job creation targets.

Ocean Wind 1 anticipates spending **$695 million** in New Jersey while creating about **1,000 construction jobs per year** during the construction phase of the project. To meet these commitments, Ocean Wind 1 will draw upon Ørsted's extensive network of global suppliers to bring thousands of construction and manufacturing jobs to the state.

Once construction is complete, an Operations and Maintenance (O&M) base will be established in Atlantic City to service Ocean Wind. The O&M facility will drive economic development by providing 69 high- skilled jobs during the 25+ year lifespan of the project.

Ocean Wind 1 will also remove **110 million tons of CO_2** during the project's 25+ year lifespan. That's the equivalent of **removing 21.6 million cars** off New Jersey roads.

Pro-NJ Grantor Trust

Ocean Wind 1 believes offshore wind presents an opportunity for local businesses and has invested $15 million in the Pro-NJ Grantor Trust. The Trust offers small, women-owned and minority owned businesses support in entering the emerging offshore wind industry. The Trust also provides funding for coastal resiliency projects in Ocean, Atlantic and Cape May Counties. Oversight of the Trust is provided by a group of volunteer Trustees representing the tri-county area, each offering a deep understanding of their respective counties.

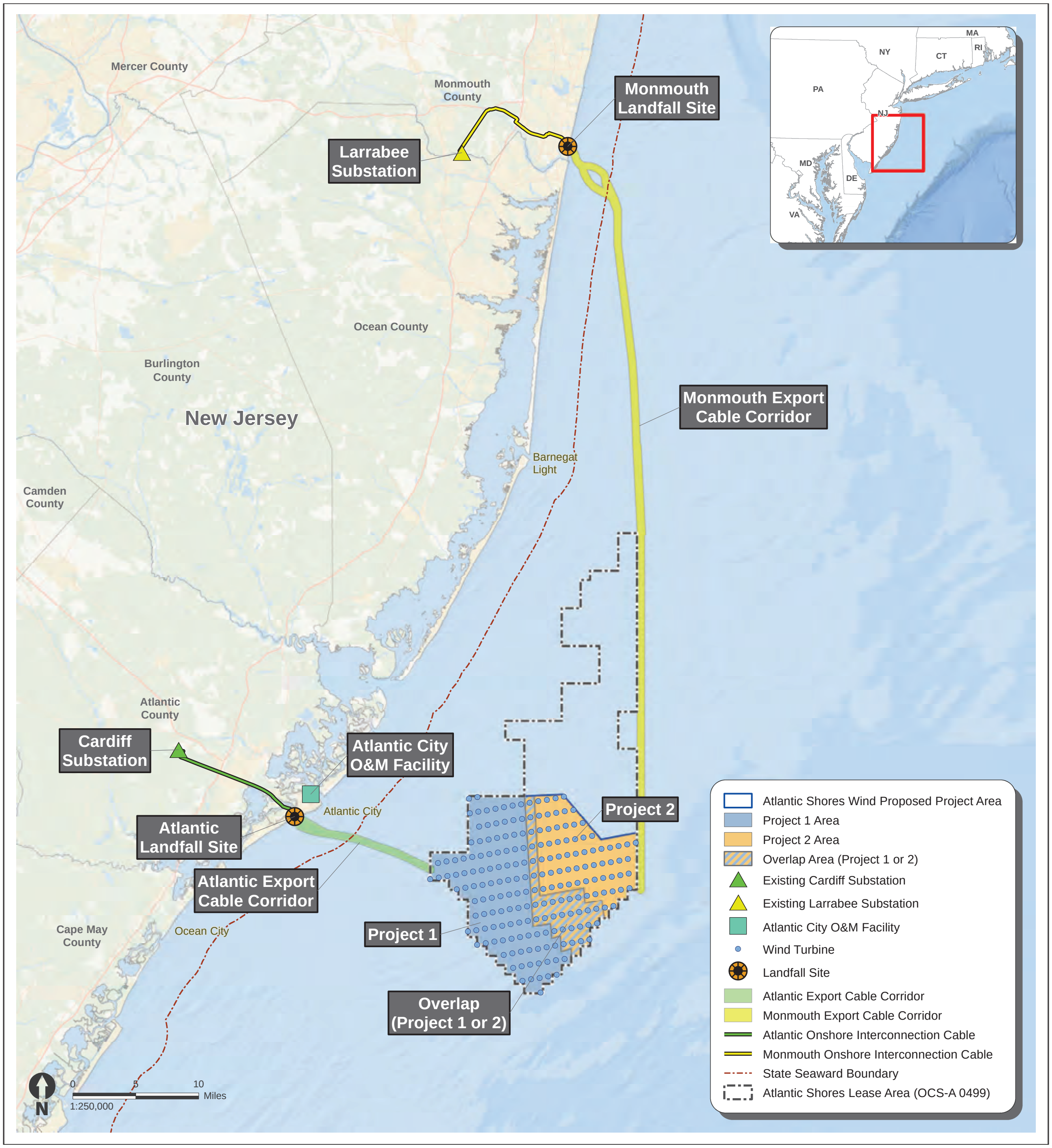
About Ocean Wind 1

Ocean Wind 1 is an 1,110 MW offshore wind project by Ørsted and PSEG that will provide enough clean energy to power 500,000 New Jersey homes. To learn more visit oceanwind.com.

The Ørsted vision is a world that runs entirely on green energy. In the United States, Ørsted operates the Block Island Wind Farm, America's first offshore wind farm, and constructed the two-turbine Coastal Virginia Offshore Wind pilot project – the first turbines to be installed in federal waters. Ørsted has secured over 4,000 megawatts of additional capacity through six projects in the Northeast and Mid-Atlantic. To learn more visit us.orsted.com or follow us on Facebook, Instagram and Twitter @OrstedUS.

Public Service Enterprise Group Inc. (PSEG) (NYSE: PEG) is a publicly traded diversified energy company with approximately 13,000 employees. Headquartered in Newark, N.J., PSEG's principal operating subsidiaries are: Public Service Electric and Gas Co. (PSE&G), PSEG Power and PSEG Long Island. PSEG is a Fortune 500 company included in the S&P 500 Index and has been named to the Dow Jones Sustainability Index for North America for 13 consecutive years To learn more visit https://corporate.pseg.com.

Atlantic Shores Project Areas



BOEM Offshore Wind Update for MAFMC April 2022 Briefing Book

March 24, 2022

New York Bight lease sale update

The BOEM New York Bight website (most of the info below can be found here): https://www.boem.gov/renewable-energy/state-activities/new-york-bight

Since the presentation given at the last MAFMC meeting in December 2021, BOEM has:

- Published the Final Sale Notice (January 14, 2022), leases for each of the 6 areas auctioned, and BOEM's response to comments received during the Proposed Sale Notice (PSN) comment period.
- Held a post-FSN meeting (January 19, 2022) with the fishing industry to explain how comments from the PSN were incorporated in final lease decisions.
  - Meeting Recording
  - Meeting Summary
- Held Auction: February 23-25
  - Competitive winning bids totaled $4.37 billion, highest-grossing competitive ocean energy lease sale in history.
  - Press Release
- Next Steps:
  - Execute Leases (early April) - Lease Effective Date: likely May 1.

Central Atlantic Call Area development

Since the presentation given at the last MAFMC meeting in December 2021, BOEM has:

- Held engagement meetings to collect feedback on a draft Central Atlantic Planning Area with fishing, wind energy and marine industry representatives, as well as environmental NGOs.
- Held several engagement meetings with state, federal and tribal governments to discuss the development of the Call for Information and Nominations area.
- Convened the Central Atlantic Intergovernmental Renewable Energy Task Force to collect feedback on the draft Call for Information and Nomination area.
- Summaries of these meetings, along with presentations and a DRAFT Call Area shapefile are available for download here: https://www.boem.gov/renewable-energy/state-activities/central-atlantic-activities
- Next steps: Publication of the Call for Information and Nominations in the *Federal Register* in early May 2022

Offshore wind fisheries mitigation guidance development

Since the last MAFMC update BOEM has:

- Posted the comments on the request for information on regulations.gov (Docket No. BOEM-2021-0083).

- Posted summaries of six virtual meetings (https://www.boem.gov/renewable-energy/request-information-reducing-or-avoiding-impacts-offshore-wind-energy-fisheries).
- BOEM is considering the feedback received and are aiming to publish draft guidance for public comment in early May and final guidance in the summer of 2022.

NOAA Fisheries and BOEM Federal Survey Mitigation Implementation Strategy - Northeast U.S. Region

BOEM and NOAA Fisheries have been working cooperatively to develop a Federal Survey Mitigation Implementation Strategy

- The Implementation Strategy describes NOAA Fisheries' and BOEM's cooperative approach to mitigate impacts of OSW energy on NOAA Fisheries surveys.
- This Implementation Strategy is specific to the Northeast U.S. region and can serve as a model for other NOAA Fisheries regions.
- March 22, 2022, BOEM and NOAA Fisheries' released a draft Implementation Strategy
- Two informational webinars will be held on March 29 and 30, 2022. See the NOAA Fisheries Events page for webinar details and registration: https://www.fisheries.noaa.gov/event/webinar-noaa-fisheries-and-bureau-ocean-energy-management-federal-survey-mitigation
- BOEM and NOAA Fisheries seek public comment on this Strategy by May 6, 2022
- Visit regulations.gov and to Docket BOEM-2022-0012: https://www.regulations.gov/docket/BOEM-2022-0012

US Wind[1] Mariners Briefing – March 21, 2022

Geophysical Survey Activities

US Wind's geophysical survey vessel, the ***R/V Fugro Brasilis***, has been conducting geophysical survey work in the Lease area since January 8, 2022. On February 7, 2022, after confirming that local fishermen were not actively fishing in the Lease area and providing a seven-day notification window, the ***R/V Fugro Brasilis*** began survey work in **All Zones (A-D)** *(see chartlet below)*. Local scout vessels and observers onboard the survey vessel, including the Offshore Fisheries Liaison, have maintained a sharp lookout for fishing gear to ensure avoidance. Some lost gear has been identified and returned it to its owners. US Wind's fisheries liaisons continue to share information and coordinate activities with local fishermen.

R/V *Fugro Brasilis* – 219 ft LOA; Call Sign: C6AP7; MMSI: 311000115

(New) Near Shore Geophysical Survey Activity

On March 28, 2022 the **R/V Westerly** will being conducting geophysical survey operations in the near shore Atlantic Ocean in **Zone D**. The **Westerly** will be accompanied by the vessel **Ocean City Girl**, which will carry Protected Species Observers to support survey operations.

R/V Westerly – 50 ft LOA; Call Sign: WDF7918

Geotechnical Survey Activities

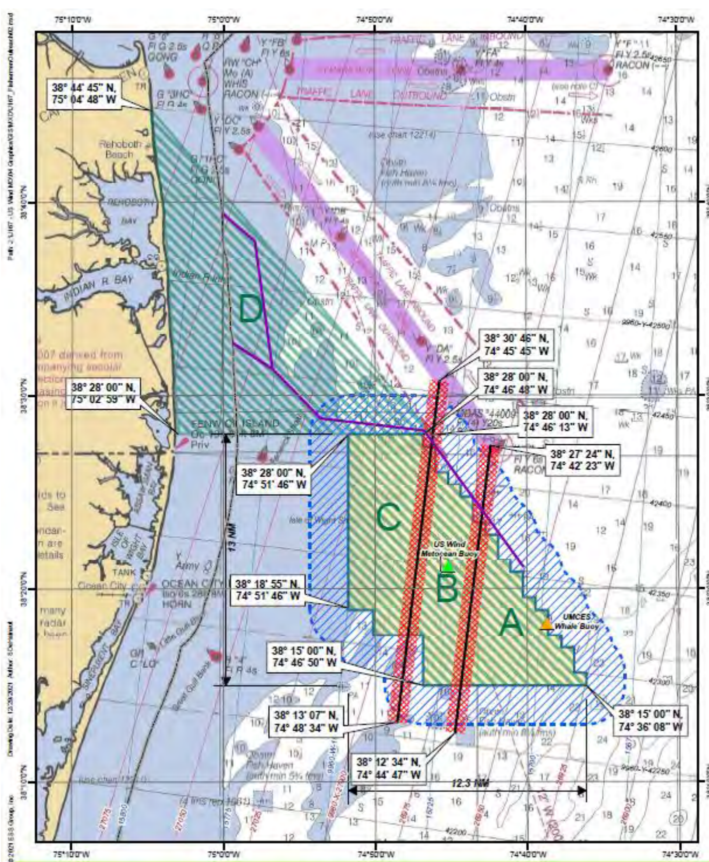
US Wind continues to conduct geotechnical survey work using the ***PSV Regulus*** in the southeastern portion of the Lease area. No fishing gear interactions have been noted since the survey began on December 15, 2021. The ***PSV Regulus*** will continue to work in **Zone A** and **Zone B** for the foreseeable future.

[1] In 2014, US Wind acquired a federal Lease area off the coast of Maryland, which has the potential to generate approximately 2,000 MW in offshore wind power. In 2017, Maryland approved the company's ~300 MW **MarWin** project, and in December 2021, the state approved the 808 MW **Momentum Wind** project. For more information, please visit our website: https://uswindinc.com.

PSV *Regulus* – 272 ft LOA; Call Sign: WDG8927; MMSI: 366987000

Mariners Briefings can be found on the US Wind website at https://uswindinc.com/mariners/ or requested from Benjamin Cooper, US Wind's Director of Marine Affairs (b.cooper@uswindinc.com). You may also wish to contact US Wind's Fisheries Liaison Officers for fisheries specific information (Wolfgang Rain: 206-427-6553; wrain@searisksolutions.com and Ron Larsen: 570-242-5023; ronlarsen@searisksolutions.com) or the Offshore Fisheries Liaison (OFL2@Offshorewfs.com).

The chartlet below depicts survey zones in and around the US Wind Lease area off Maryland's coast (not to be used for navigation purposes).



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

MEMORANDUM

Date: March 22, 2022

To: Chris Moore, Executive Director

From: José Montañez, Staff

Subject: Review 2023 Golden Tilefish Specifications

As part of the 2022-2024 multi-year specification process for Golden Tilefish, the Scientific and Statistical Committee (SSC) and Tilefish Monitoring Committee (MC) reviewed the most recent information available to determine whether modification of the current 2023 specifications is warranted.

The following materials are enclosed on this subject:

1) March 2022 SSC Report – See Committee Reports Tab

2) Report of the March 2022 Meeting of the MAFMC Tilefish MC

3) Golden Tilefish Fishery Performance Report (February 2022)

4) Golden Tilefish Fishery Information Document, Council Staff (February 2022)

5) Staff Recommendation Memo to Chris Moore (March 2022)

SSC Report is behind the Committee Reports tab.

MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

Tilefish Monitoring Committee
2023 Golden Tilefish and
Blueline Tilefish Recommendations

March 2022

The Mid-Atlantic Fishery Management Council's (Council) Tilefish Monitoring Committee (MC) met via webinar on March 17, 2021 to review the most recent information and to determine whether modifications to the current 2023 specifications for golden tilefish and blueline tilefish were warranted. The primary purpose of this report is to summarize the Tilefish MC recommendations for the golden tilefish and blueline tilefish 2023 specifications.

Committee Members present: José Montañez and Jason Didden (Council Staff), John Maniscalco (NYSDEC), Michael Auriemma (NJDFW), Laurie Nolan (Commercial), Paul Nitschke (NEFSC), and Doug Potts (GARFO).

Others present: Wes Townsend and Dan Farnham (Council Members).

Golden Tilefish Discussion

The Tilefish MC was presented with a summary of the Scientific and Statistical Committee (SSC) March 15, 2022 SSC meeting, where the SSC reviewed the 2022 Golden Tilefish Fishery Document, the 2022 Golden Tilefish Advisory Panel Information Document, and other relevant information. At that meeting, the SSC noted that this is a textbook example of an equilibrium fishery, with stable catches, high constant prices, stable seasonal supply, and low levels of discards. The SSC also indicated that the size distribution of the catch is well represented. Lastly, the SSC noted that there was a relatively large increase in reported private recreational catch (although still small) through the new permit/reporting system and additional information is needed to better understand what this means. The SSC recommended no change to ABC specifications used by the Council for the 2023 fishing year (1.964 million pounds or 891 mt).

After reviewing all available data, the MC discussed the different components of the golden tilefish catch and recent fishery trends. The MC indicated that fishing trends are behaving as previously expected. Therefore, the MC recommends no change to the catch and landings limits specified for the 2023 fishing year (Table 1).

The MC discussed recent trends in the recreational fishery and incidental commercial fishery. The MC did not recommend changes to the current 500-pounds whole weight (458-pounds gutted) incidental trip limit or the 8-fish per person per trip bag limit. However, the MC noted that close monitoring of the targeting of golden tilefish during directed blueline tilefish trips, as recently reported by some Advisory Panel members, was needed.

The MC also shared the concerns raised by the SSC and Tilefish AP regarding the need to maintain/increase port sampling.

Blueline Tilefish Discussion

The MC reviewed the fishery performance of the commercial and recreational blueline tilefish fisheries in the context of the SSC endorsing a status-quo ABC, with a Commercial ACL of 27,140 pounds and a Recreational ACL of 73,380 pounds. The MC did not find cause to recommend any changes at this time. The discussion regarding commercial performance was straightforward given 2021 landings. The discussion regarding recreational performance was more detailed given the increase in Marine Recreational Information Program (MRIP) landings in 2021 and higher private reporting in 2021. However, the MC concluded that given the uncertainty in both MRIP catches (including very few intercepts) and private reporting, the Delphi expansion of charter catch to estimate private recreational catch still appears most reasonable. The endorsement of the Delphi expansion in the last assessment and use of that data in constructing the current Blueline Tilefish ABC also suggested continued use of the Delphi expansion. If MRIP estimates and/or private reporting improve, other methods of estimating catch will need to be re-considered, both for the numbers of fish caught and the weight per fish used to expand numbers of fish to total weight. Alignment of historical data and new data, and any implications for the ABC, would also need to be considered.

Table 1. Summary of golden tilefish MC recommended catch and landings limits (in pounds unless otherwise noted) for 2022, 2023, and 2024.

	2022	2023	2024	Basis
OFL	2,228,873 (1,011 mt)	2,226,669 (1,010 mt)	2,151,712 (976 mt)	Projections
ABC	1,964,319 (891 mt)	1,964,319 (891 mt)	1,964,319 (891 mt)	Staff recommendation based on overfishing probability averaging
ACL	1,964,319 (891 mt)	1,964,319 (891 mt)	1,964,319 (891 mt)	ABC = ACL
IFQ fishery ACT	1,763,478 (800 mt)	1,763,478 (800 mt)	1,763,478 (800 mt)	Deduction from management uncertainty = 0. IFQ ACT = 95% of the ACL and incidental ACT = 5% of the ACL. However, the MC is recommending an ACT that is below the ABC/ACL derived from the SSC recommendation and it is based on the more stable long-term productivity of the stock to acknowledge the positive development in the stock status but also to mitigate the potential risk to the stability and success in managing this relative data poor fishery
Incidental fishery ACT	92,815 (42 mt)	92,815 (42 mt)	92,815 (42 mt)	
Projected IFQ fishery discards	0	0	0	Data indicates no discards in the IFQ fishery (directed fishery). IFQ fishery discards are prohibited in the FMP
Projected incidental fishery discards	17,405 (8 mt)	17,405 (8 mt)	17,405 (8 mt)	Average discards (2016-2020) mostly sm/lg mesh OT and Gillnet gear
IFQ fishery TAL = IFQ fishery quota	1,763,478 (799.900 mt)	1,763,478 (799.900 mt)	1,763,478 (799.900 mt)	IFQ fishery TAL = IFQ fishery ACT – IFQ fishery discards. No additional reductions applied between IFQ TAL amounts and final IFQ fishery quota amounts
Incidental fishery TAL = incidental fishery quota	75,410 (34.205 mt)	75,410 (34.205 mt)	75,410 (34.205 mt)	IFQ fishery TAL = IFQ fishery ACT – IFQ fishery discards. No additional reductions applied between IFQ TAL amounts and final IFQ fishery quota amounts

Note: Initial OFL and ABC values are in metric tons (mt) and thus, the management measures are developed using mt. When values are converted to millions of pounds the numbers may change due to rounding. Projected incidental discards are initially reported in pounds and then converted to mt. 1 mt = 2,204.6226 pounds.

Golden Tilefish Fishery Performance Report

February 2022

The Mid-Atlantic Fishery Management Council's (Council) Tilefish Advisory Panel (AP) met via webinar on February 24, 2022 to review the Fishery Information Document and develop the following Fishery Performance Report. The primary purpose of this report is to contextualize catch histories by providing information about fishing effort, market trends, environmental changes, and other factors. A series of trigger questions listed below were posed to the AP to generate discussion of observations in the golden tilefish fishery. Please note: Advisor comments described below are not necessarily consensus or majority statements.

Advisory Panel members present: Fred Akers (Private), Daniel Farnham Jr. (Commercial), Carl Forsberg (For-Hire/Commercial), Gregory Hueth (Private/For-hire), Michael Johnson (Commercial), and Laurie Nolan (Commercial).

Others present: Wes Townsend (Council), Paul Nitschke (NEFSC), Daniel Farnham Sr. (Council Member), Scott Lenox (Council Member), Joe Cimino (Council Member), Doug Potts (GARFO), Lee Anderson (SSC), Jason Didden (Council Staff), and José Montañez (Council Staff).

Trigger questions:

1. What factors have influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

Market/Economic Conditions

While market prices and landings have been improving, the fishery is still experiencing some COVID-19 pandemic issues. The Industry is not working at full capacity, making fewer trips per year, trying to maintain consistent product prices. The market cannot handle too much volume of tilefish or prices drop dramatically. Due to price increases in all operating expenses, fuel, bait, food, ice and fishing gear, the Industry must continue to stagger landings and cap their total catch per trip.

Environmental Conditions

Industry reported that windy conditions have impacted fishing (e.g., timing, trip duration, etc.) in some instances.

Management Issues

The AP recommends that MRIP not be used as a tool for management or stock assessment purposes. When discussing the MRIP data, it is pointed out that there is a huge lack of shoreside intercepts, causing the data to be unreliable, and therefore does not capture recreational golden tilefish effort or landings accurately. There is also fear that MRIP data could somehow be used down the line for allocation purposes.

Two advisors suggested there should be further analysis of directed fishing at the current blueline trip limit and golden incidental limits. These limits were generally designed to cover incidental catch in other directed fisheries, but can be combined, currently to create a directed trip. The goal is to not encourage directed fishing with these limits, but to accommodate incidental catch in other directed fisheries that encounter tilefish as an incidental catch to their other directed fishing efforts.

General Fishing Trends

Industry members commented CPUE increased in 2021. More fish are being caught with the same trip effort than were caught in 2020.

Fishermen indicated a good mix of fish in 2021, perhaps better than in previous years (both in terms of weight and landings mix). The overall catch percentage of small/kittens is increasing for some of the Montauk and Barnegat Light vessels.

A larger amount of small/kittens (2 to 3.5 pounds) were present in 2021 compared to previous years. Industry feels that biomass is increasing and they see multiple year classes being recruited into the fishery. Overall, a positive trend is evident and CPUE is increasing as a result.

Other Issues

NOAA should have a link or reference to the Tilefish permit requirement on their HMS permit renewal website. Almost every private vessel fishing deep enough to catch tilefish has an HMS permit. I have made this comment before. I renewed my HMS permit for this year, and there was no reference to the tilefish permit requirement. There have been recurring complaints that many private vessels are fishing for tilefish without the permit. NOAA and MAFMC are missing an important outreach opportunity by not putting a reference to the tilefish permit on the HMS permit shop website.

Advisors also indicated that more enforcement at the state level is required to enforce tilefish/recreational permit requirements.

Another AP member indicated that while there are five headboats that fish for tilefish (both blueline and golden) in the mid-Atlantic they have a limited number of dedicated tilefish trips throughout the season (summertime). For example, the boat that has the largest number of trips scheduled during the year (a boat Point Pleasant) has about 24 scheduled trips per year and not all trips are conducted (i.e., taking 50 to 60% of scheduled trips) and in some instances not all of them are full. The other four boats have substantially less tilefish trips scheduled per year.

For-hire effort was reduced in 2020/2021 due to COVID-19, and the industry is expecting the same for 2022. In addition, the industry experienced cancellations of overnight trips in 2020/2021 due to the pandemic. Furthermore, in 2020/2021, tuna fishing was better than average, which resulted in less boats targeting golden tilefish. As a general rule, when tuna fishing is not good, anglers offset those trips by targeting tilefish.

AP members indicated that Captains and crew should be included in the comingled bag limit (recreational possession limit) for a trip. In other words, the Captain and Crew should also be allotted a bag limit.

AP members indicated that the landings monitoring program of the IFQ system is very reliable. In all, there is good accountability mechanisms to track landings in the directed commercial fishery (IFQ vessel) and VTR data (commercial and recreational vessels). However, there is concern that directed incidental trips (non-otter trawl vessels) may be missing. Currently, there is no accurate information of catch/landings by private recreational anglers. Happy to see that the recreational permitting/reporting requirements are in place. However, we need to do further outreach/enforcement to improve reporting.

Some AP members would like the Council to consider a differential trip limit (for-hire vs private) and longer recreational trips. In addition, they suggested that the Council considers recreational management strategies (e.g., longer recreational trips, multi-day bag limits), structured after the Gulf of Mexico regulations (would make filling trips easier). Multi-day bag limits are important because a hand full of boats target tilefish in January-February when the black sea bass season is closed and while they do not catch much tilefish, this management change could help their business sell more trips. These management changes could be considered when a quota liberalization is on the table (quota going up).

Some AP members would like the Council to consider a recreational allocation.

Some AP members indicated concerns about relaxing recreational regulations (as they could potentially lead to higher recreational landings) while the commercial quota could remain at *status quo* levels or potentially decrease in the future.

A commercial AP member expressed concerns over increasing any effort, bag limit or quota in the fishery at this time. They felt it would be unfair to allow for an increase in effort/bag limit in the recreational sector while maintaining *status quo* for the commercial sector.

Research Priorities

Panel members indicated concern about the lack of biological sampling of landings on the dock. They emphasized the need of the shoreside sampling and the importance of this data for stock assessment purposes. Advisors indicated that keeping sampling at the current level or increasing it is very important.

Golden Tilefish Fishery Information Document

February 2022

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for golden tilefish with an emphasis on 2021. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel trip report (VTR), permit, and Marine Recreational Information Program (MRIP) databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit http://www.mafmc.org/tilefish/.

Key Facts

- There has been no change to the status of the golden tilefish stock in 2021; the stock is not overfished and overfishing is not occurring.
- In 2021, 1.4 million pounds (landed weight) of golden tilefish were landed with an ex-vessel value (revenues) of $6.2 million. This represented an increase in golden tilefish landings and ex-vessel value of approximately 13 percent and 29 percent, respectively, when compared to 2020. For 2021, the mean price for golden tilefish was $4.31 per pound, this represented a 15 percent increase from 2020 ($3.75 per pound).
- According to VTR data, party/charter vessel landed 6,799 golden tilefish in 2021. This represented a 96 percent increase from 2020 (3,466 fish landed).
- Private Recreational Angler Permitting and Reporting started August 2020. According to VTR data, private recreational vessels landed a total of 50 golden tilefish in 2020 (August 2020 to December 2020). For 2021, 199 golden tilefish were landed by recreational anglers.

Basic Biology

The information presented in this section can also be found in the Tilefish Fishery Management Plan (FMP) (MAFMC, 2001; http://www.mafmc.org/fisheries/fmp/tilefish). Golden tilefish (*Lopholatilus chamaeleonticeps*; tilefish from this point forward in this section) are found along the outer continental shelf and slope from Nova Scotia, Canada to Surinam on the northern coast of South America (Dooley 1978 and Markle et al. 1980) in depths of 250 to 1,500 feet. In the southern New England/mid-Atlantic area, tilefish generally occur at depths of 250 to 1,200 feet and at temperatures from 48°F to 62°F (Nelson and Carpenter 1968; Low et al. 1983; Grimes et al. 1986).

Katz et al. (1983) studied stock structure of tilefish from off the Yucatan Peninsula in Mexico to the southern New England region using both biochemical and morphological information. They identified two stocks – one in the mid-Atlantic/southern New England and the other in the Gulf of Mexico and the south of Cape Hatteras.

Tilefish are shelter seeking and perhaps habitat limited. There are indications that at least some of the population is relatively nonmigratory (Turner 1986). Warme et al. (1977) first reported that tilefish occupied excavations in submarine canyon walls along with a variety of other fishes and invertebrates, and they referred to these areas as "pueblo villages." Valentine et al. (1980) described tilefish use of scour depressions around boulders for shelter. Able et al. (1982) observed tilefish use of vertical burrows in Pleistocene clay substrates in the Hudson Canyon area, and Grimes et al. (1986) found vertical burrows to be the predominant type of shelter used by tilefish in the mid-Atlantic/southern New England region. Able et al. (1982) suggested that sediment type might control the distribution and abundance of the species, and the longline fishery for tilefish in the Hudson Canyon area is primarily restricted to areas with Pleistocene clay substrate (Turner 1986).

Males achieve larger sizes than females, but do not live as long (Turner 1986). The largest male reported by Turner was 44.1 inches at 20 years old, and the largest female was 39 years at 40.2 inches FL (fork length). The oldest fish was a 46 year old female of 33.5 inches, while the oldest male was 41.3 inches and 29 years. On average, tilefish (sexes combined) grow about 3.5 to 4 inches FL per year for the first four years, and thereafter growth slows, especially for females. After age 3, mean last back-calculated lengths of males were larger than those of females. At age 4, males and females averaged 19.3 and 18.9 inches FL, respectively, and by the tenth year males averaged 32.3 while females averaged 26.4 inches FL (Turner 1986).

The size of sexual maturity of tilefish collected off New Jersey in 1971-73 was 24-26 inches TL (total length) in females and 26-28 inches TL in males (Morse 1981). Idelberger (1985) reported that 50 percent of females were mature at about 20 inches FL, a finding consistent with studies of the South Atlantic stock, where some males delayed participating in spawning for 2-3 years when they were 4-6 inches larger (Erickson and Grossman 1986). Grimes et al. (1988) reported that in the late 1970s and early 1980s, both sexes were sexually mature at about 19-26 inches FL and 5-7 years of age; the mean size at 50 percent maturity varied with the method used and between sexes. Grimes et al. (1986) estimated that 50 percent of the females were mature at about 19 inches FL using a visual method and about 23 inches FL using a histological method. For males, the visual method estimated 50 percent maturity at 24 inches FL while the histological method estimated 50 percent maturity at 21 inches FL. The visual method is consistent with NEFSC (Northeast Fisheries Science Center) estimates for other species (O'Brien et al. 1993). Grimes et al. (1988) reported that the mean size and age of maturity in males (but not females) was reduced after 4-5 years of heavy fishing effort. Vidal (2009) conducted an aging study to evaluate changes in growth curves since 1982, the last time the reproductive biology was evaluated by Grimes et al. (1988). Histological results from Vidal's study indicate that size at 50 percent maturity was 18 inches for females and 19 inches for males (NEFSC 2009).

Nothing is known about the diets and feeding habits of tilefish larvae, but they probably prey on zooplankton. The examination of stomach and intestinal contents by various investigators reveal that tilefish feed on a great variety of food items (Collins 1884, Linton 1901a,b, and Bigelow and Schroeder 1953). Among those items identified by Linton (1901a,b) were several species of crabs, mollusks, annelid worms, polychaetes, sea cucumbers, anemones, tunicates, and fish bones. Bigelow and Schroeder (1953) identified shrimp, sea urchins and several species of fishes in tilefish stomachs. Freeman and Turner (1977) reported examining nearly 150 tilefish ranging in length from 11.5 to 41.5 inches. Crustaceans were the principal food items of tilefish with squat lobster (*Munida*) and spider crabs (*Euprognatha*) the most important crustaceans. The authors report that crustaceans were the most important food item regardless of the size of tilefish, but that small tilefish fed more on mollusks and echinoderms than larger tilefish. Tilefish burrows provide habitat for numerous other species of fish and invertebrates (Able et al. 1982 and Grimes et al. 1986) and in this respect, they are similar to "pueblo villages" (Warme et al. 1977).

Able et al. (1982) and Grimes et al. (1986) concluded that a primary function of tilefish burrows was predator avoidance. The NEFSC database only notes goosefish as a predator. While tilefish are sometimes preyed upon by spiny dogfish and conger eels, by far the most important predator of tilefish is other tilefish (Freeman and Turner 1977). It is also probable that large bottom-dwelling sharks of the genus *Carcharhinus*, especially the dusky and sandbar, prey upon free swimming tilefish.

Status of the Stock

There has been no change to the status of the golden tilefish stock in 2021; the stock is not overfished and overfishing is not occurring.

Biological Reference Points

The biological reference points for golden tilefish were updated during the 2021 management track assessment (Nitschke 2021). The fishing mortality threshold for golden tilefish is $F_{40\%}$ (as F_{MSY} proxy) = 0.261, and $SSB_{40\%}$ (SS_{BMSY} proxy) is 24.23 million pounds (10,995 mt).

Stock Status

The latest assessment indicates that the golden tilefish stock was not overfished and overfishing was not occurring in 2020, relative to the newly updated biological reference points (Nitschke 2021). Fishing mortality in 2020 was estimated at F=0.160; 39 percent below the fishing mortality threshold of F=0.261 (F_{MSY} proxy). SSB in 2020 was estimated at 23.28 million pounds (10,562 mt), and was at 96 percent of the biomass target (SSB_{MSY} proxy).

Data Update

The NEFSC is developing a golden tilefish data update through 2021. The update will contain recent trends in the golden tilefish fishery, including, commercial landings, catch per unit effort, and commercial landings by market category (size composition). The update will be posted at the Council's website (http://www.mafmc.org/) as soon as it is available.

The next research track assessment for golden tilefish will be conducted in the Spring of 2024.

Management System and Fishery Performance

Management

There have been no significant changes to the overall golden tilefish management system since the Individual Fishing Quota (IFQ) system was implemented in 2009 (Amendment 1). However, Framework 2 to the Tilefish FMP (implemented in 2018) made several changes to the management system intended to improve and simplify the administration of the golden tilefish fishery. These changes include removing an outdated reporting requirement, proscribing allowed gear for the recreational fishery, modifying the incidental trip landings, requiring commercial golden tilefish be landed with the head attached, and revising how assumed discards are accounted for when setting harvest limits.

In the Fall on 2021, the Council submitted to NMFS Framework Adjustment 6 to the Tilefish Fishery Management Plan, which proposes measures to revise the specifications process by considering the duration for setting multi-year management measures and the timing of the fishing year. The final rule for this framework is expected in early 2022.

The commercial golden tilefish fisheries (IFQ and incidental) are managed using catch and landings limits, commercial quotas, trip limits, gear regulations, permit requirements, and other provisions as prescribed by the FMP. While there is no direct recreational allocation, Amendment 1 implemented a recreational possession limit of eight golden tilefish per angler per trip, with no minimum fish length. Golden tilefish was under a stock rebuilding strategy beginning in 2001 until it was declared rebuilt in 2014. The Tilefish FMP, including amendments and frameworks, are available on the Council website at: http://www.mafmc.org/fisheries/fmp/tilefish.

Commercial Fishery

In 2021, 1.4 million pounds (landed weight) of golden tilefish were landed with an ex-vessel value (revenues) of $6.2 million. This represented an increase in golden tilefish landings and ex-vessel value of approximately 13 percent and 29 percent, respectively, when compared to 2020. For 2021, the mean price for golden tilefish was $4.31 per pound, this represented a 15 percent increase from 2019 ($3.75 per pound).

For the 1970 to 2021 calendar years, golden tilefish landings (live weight) have ranged from 128 thousand pounds live weight (1970) to 8.7 million pounds (1979). For the 2001 to 2021 period (since FMP was implemented), golden tilefish landings have averaged 1.8 million pounds live weight, ranging from 1.1 (2016) to 2.5 (2004) million pounds. In 2021, commercial golden tilefish landings were 1.6 million pounds live weight (Figure 1).

The principal measure used to manage golden tilefish is monitoring via dealer weighout data that is submitted weekly to the Greater Atlantic Regional Fisheries Office (GARFO). The directed fishery is managed via an IFQ program. If a permanent IFQ allocation is exceeded, including any overage that results from golden tilefish landed by a lessee in excess of the lease amount, the permanent allocation will be reduced by the amount of the overage in the subsequent fishing year. If a permanent IFQ allocation overage is not deducted from the appropriate allocation before the IFQ allocation permit is issued for the subsequent fishing year, a revised IFQ allocation permit reflecting the deduction of the overage will be issued. If the allocation cannot be reduced in the subsequent fishing year because the full allocation had already been landed or transferred, the IFQ allocation permit would indicate a reduced allocation for the amount of the overage in the next fishing year.

The commercial/incidental trip limit (for vessels that possess a Commercial/Incidental Tilefish Permit without an IFQ Allocation Permit) is 500 pounds or 50 percent, by weight, of all fish (including the golden tilefish) onboard the vessel, whichever is less. If the incidental harvest exceeds 5 percent of the TAL for a given fishing year, the incidental trip limit of 500 pounds may be reduced in the following fishing year.

Table 1 summarizes the golden tilefish management measures for the 2007-2024 fishing years.[1] Commercial golden tilefish landings have been below the commercial quota specified each year since the Tilefish FMP was first implemented except for fishing years 2003-2004 (not shown in Table 1), and 2010. In 2003 and 2004, the commercial quota was exceeded by 0.3 (16 percent) and 0.6 (31 percent) million pounds, respectively.[2] In 2020 and 2021, 1.4 million pounds (86 percent of the quota) and 1.5 million pounds (93 percent of the quota) of golden tilefish were landed, respectively.

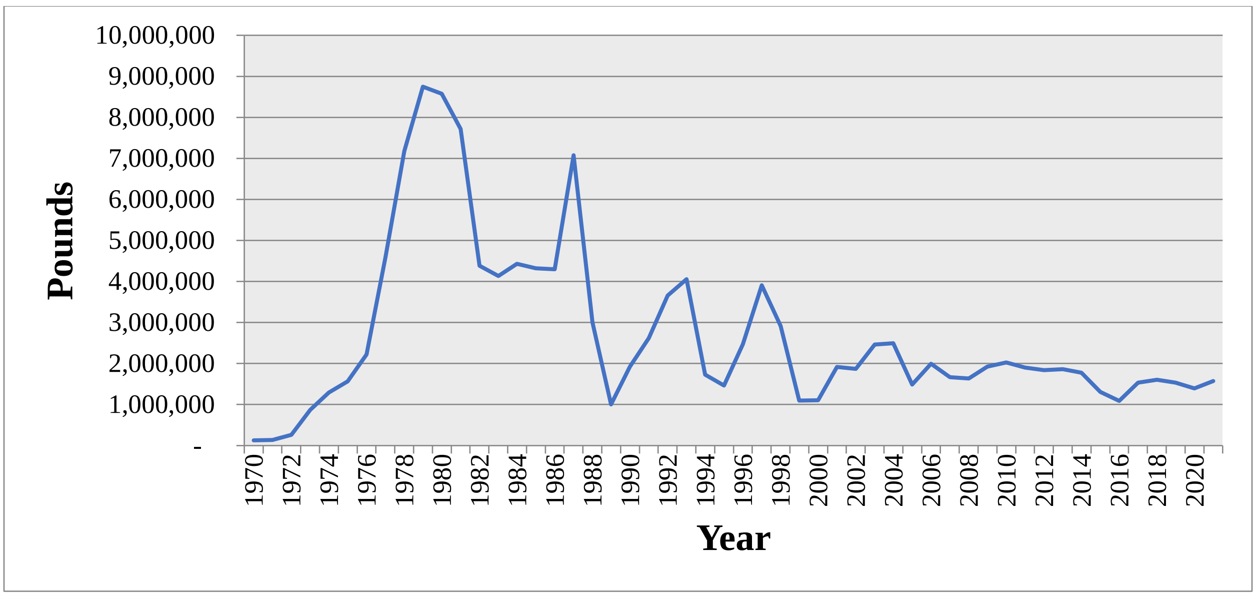

Figure 1. Commercial U.S. Golden Tilefish Landings (live weight) from Maine-Virginia, 1970-2021 (calendar year). Source: 1970-1993 Tilefish FMP; 1994-2021 NMFS unpublished dealer data.

Golden tilefish are primarily caught by longline and bottom otter trawl. Based on dealer data from 2017-2021, the bulk of the golden tilefish landings are taken by longline gear (97 percent) followed by bottom trawl gear (< 2 percent). No other gear had any significant commercial landings. Minimal catches were also recorded for hand line, gillnets, and dredge (Table 2).

[1] Note that measures for the 2022 to 2024 fishing years were approved by the Council but have not yet been implemented by NMFS yet. The proposed rule implementing these measure is expected in early 2022.
[2] As a result of the decision of the Hadaja v. Evans lawsuit, the permitting and reporting requirements for the FMP were postponed for close to a year (May 15, 2003 through May 31, 2004). During that time period, it was not mandatory for permitted golden tilefish vessels to report their landings. In addition, during that time period, vessels that were not part of the golden tilefish limited entry program also landed golden tilefish.

Table 1. Summary of management measures and landings for fishing year 2007-2024.[a]

Management Measures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ABC (m lb)	-	-	-	-	-	-	2.013	2.013	1.766	1.898	1.898	1.636	1.636	1.636	1.636	1.964	1.964	1.964
TAL (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887	1.626	1.626	1.626	1.625	1.839	1.839	1.839
Com. quota- (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887	1.626	1.626	1.626	1.625/ 1.672*	1.839	1.839	1.839
Com. landings	1.794	1.689	1.906	2.021	1.924	1.873	1.840	1.826	1.351	1.051	1.501	1.624	1.563	1.403	1.546	-	-	-
Com. Overage / underage (m lb)	-0201	-0.306	-0.089	+0.026	-0.071	-0.122	-0.155	-0.169	-0.404	-0.836	-0.387	-0.003	-0.064	-0.223	-0.125	-	-	-
Incidental trip limit (lb)	300	300	300	300	300	500	500	500	500	500	500	500	500	500	500	500	500	500
Rec. possession limit	-	-	-	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]

[a] From 2001 to 2021, fishing year = November 1 – October 31 period. For example, 2007 fishing year = November 1, 2006 – October 31, 2007. For 2022, proposed fishing year = November 1, 2021 – December 31, 2022. For 2023 on, proposed fishing year = January 1 – December 31. [b] Eight fish per person per trip. *The Council requested for emergency action to allow unharvested 2020 IFQ pounds to be carried over into the 2021 fishing year, up to 5 percent of the quota shareholders initial 2020 allocation.

Table 2. Golden tilefish commercial landings ('000 pounds live weight) by gear, Maine through Virginia, 2017-2021 (calendar year).

Gear	Pounds	Percent
Otter Trawl Bottom, Fish	125	1.6
Otter Trawl Bottom, Other	5	*
Gillnet, Anchored/Sink/Other	12	*
Lines, Hand	27	*
Lines, Long Set with Hooks	7,414	97.0
Pot & Trap	*	*
Dredge, other	19	*
Unknown, Other Combined Gears	42	*
All Gear	7,646	100.0

Note: * = less than 1,000 pounds or less than 1 percent. Source: NMFS unpublished dealer data.

Approximately 54 percent of the landings for 2021 were caught in statistical area 616; statistical area 537 had 39 percent; statistical areas 539, 613, and 612 had slightly over 1 percent each (Table 3). NMFS statistical areas are shown in Figure 2.

For the 1999 to 2021 period, commercial golden tilefish landings are spread across the years with no strong seasonal variation (Tables 4 and 5). However, in recent years, a slight downward trend in the proportion of golden tilefish landed during the winter period (November-February) and a slight upward trend in the proportion of golden tilefish landed during the May-June period are evident when compared to earlier years (Table 5).

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Table 3. Golden tilefish percent landings by statistical area and year, 1996-2021 (calendar year).

Year	525	526	537	539	612	613	616	622	626	Other
1996	0.05	5.21	64.04	0.39	*	1.09	27.81	0.01	-	1.40
1997	0.03	0.67	79.51	0.02	*	2.59	16.41	0.01	*	0.74
1998	1.26	2.19	81.95	0.04	0.02	5.45	8.55	*	*	0.53
1999	0.97	0.22	55.79	0.02	0.22	3.71	36.60	0.02	0.02	0.43
2000	0.36	3.79	46.10	0.01	0.05	2.36	43.94	0.47	0.14	2.78
2001	0.23	3.09	23.92	*	0.01	3.16	68.96	*	0.10	0.52
2002	0.12	8.73	35.86	0.07	0.01	18.50	36.54	0.02	0.02	0.14
2003	0.88	1.81	38.48	0.10	-	11.85	46.51	0.05	0.05	0.26
2004	1.03	2.59	62.85	0.05	5.28	0.70	25.95	0.03	0.06	1.66
2005	0.12	0.25	62.99	0.02	0.03	6.11	25.68	0.03	0.20	4.56
2006	*	1.54	64.30	0.50	1.24	0.71	30.09	0.04	0.05	1.53
2007	0.02	0.42	57.61	0.01	-	5.53	33.93	0.85	0.45	1.18
2008	1.09	0.06	44.07	0.01	-	4.62	46.94	2.05	0.02	1.14
2009	2.17	0.01	42.62	1.30	0.04	4.37	46.12	1.34	1.16	0.88
2010	0.01	0.01	57.14	0.55	0.02	8.39	32.83	0.69	0.04	0.31
2011	0.02	*	53.06	0.01	-	3.12	39.98	0.31	0.06	3.44
2012	0.01	0.01	52.54	0.03	*	0.58	43.92	0.20	0.10	2.62
2013	*	0.67	56.22	1.06	0.03	0.68	35.39	1.21	4.59	0.16
2014	0.01	0.52	49.36	1.89	0.01	1.29	42.85	2.67	0.35	1.06
2015	3.06	0.98	30.00	2.55	-	0.01	55.02	2.34	5.53	1.50
2016	1.03	4.77	32.33	0.01	-	0.98	54.50	0.17	5.81	0.39
2017	0.01	5.45	27.73	2.69	0.01	0.94	55.33	0.16	5.49	2.19
2018	*	1.65	46.99	3.27	-	0.06	41.18	0.57	6.13	0.15
2019	0.01	1.39	55.63	1.86	*	1.69	38.64	0.06	0.35	0.74
2020	0.02	3.40	35.98	4.81	0.02	1.39	48.19	0.10	2.15	3.95
2021	*	0.22	39.24	1.43	1.09	1.20	54.46	0.13	0.39	2.93
All	0.46	1.85	52.77	0.78	0.41	3.56	37.29	0.47	1.07	1.35

Note: - = no landings; * = less than 0.01 percent. Source: NMFS unpublished VTR data.

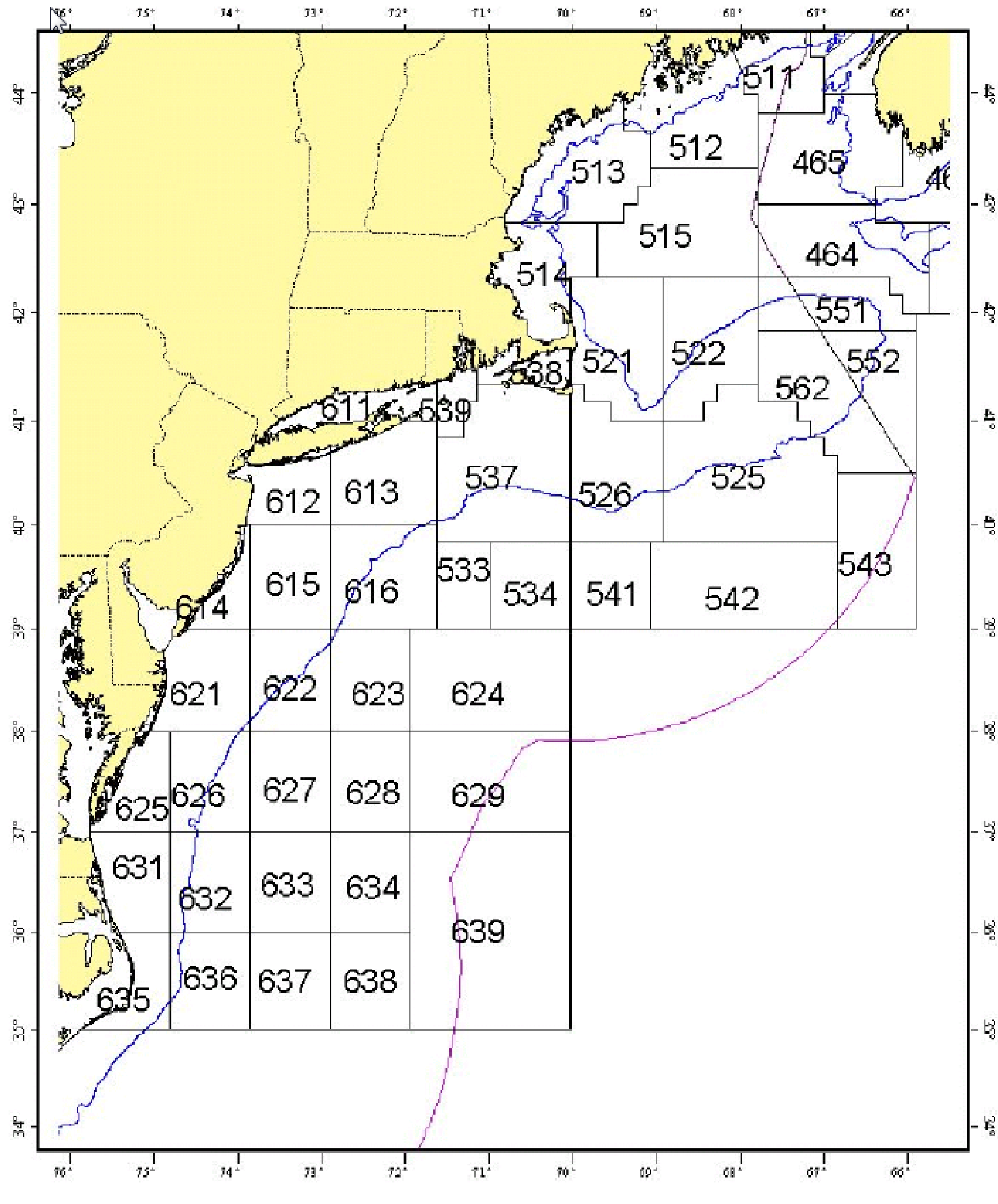

Figure 2. NMFS Statistical Areas.

Table 4. Golden tilefish commercial landings ('000 pound live weight) by month and year, Maine through Virginia, 1999-2021 (calendar year).

Year	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	118	114	124	103	93	91	55	106	83	59	77	75	1,096
2000	52	105	159	101	107	99	34	91	42	107	96	112	1,105
2001	107	151	159	188	153	179	177	157	156	156	161	176	1,920
2002	143	232	257	144	164	117	107	141	148	146	68	200	1,867
2003	183	181	295	254	209	185	152	180	210	202	189	223	2,463
2004	192	354	514	323	143	56	113	122	181	236	71	189	2,492
2005	127	159	234	168	33	57	117	104	96	94	141	158	1,487
2006	210	226	292	125	127	124	86	152	116	140	169	228	1,996
2007	122	118	192	147	159	96	131	133	125	174	77	189	1,664
2008	235	206	219	173	124	123	62	90	101	90	109	104	1,636
2009	90	145	185	200	237	211	184	157	157	128	94	134	1,922
2010	149	133	273	216	195	157	149	157	176	188	98	137	2,027
2011	152	94	269	209	227	137	138	149	120	194	65	150	1,905
2012	146	114	142	207	151	131	157	204	186	221	39	139	1,836
2013	105	115	146	269	234	193	147	157	126	169	67	133	1,862
2014	114	93	146	183	187	233	215	171	134	149	50	102	1,778
2015	68	70	144	128	181	146	130	127	123	82	48	62	1,308
2016	43	53	91	71	110	119	131	136	91	96	83	64	1,089
2017	86	69	77	193	195	179	135	134	105	180	47	133	1,533
2018	81	134	124	194	149	196	181	148	133	103	64	98	1,606
2019	91	106	131	130	234	164	131	137	158	119	40	96	1,537
2020	75	95	143	54	187	160	147	133	93	180	65	66	1,397
2021	77	125	128	143	180	190	137	166	131	139	49	109	1,574
Total	2,764	3,193	4,446	3,923	3,780	3,342	3,015	3,252	2,990	3,351	1,967	3,075	39,098
Avg. 12-21	89	98	127	157	181	171	151	151	128	144	55	100	1,552

Source: NMFS unpublished dealer data.

Table 5. Percent of golden tilefish commercial landings (live weight) by month and year, Maine through Virginia, 1999-2021 (calendar year).

Year	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	10.75	10.38	11.28	9.41	8.50	8.29	4.99	9.66	7.55	5.36	6.98	6.86	100.00
2000	4.68	9.48	14.41	9.13	9.67	8.95	3.05	8.26	3.78	9.71	8.70	10.18	100.00
2001	5.59	7.88	8.30	9.77	7.95	9.32	9.24	8.16	8.13	8.11	8.40	9.14	100.00
2002	7.64	12.43	13.76	7.73	8.78	6.28	5.74	7.56	7.91	7.85	3.63	10.70	100.00
2003	7.44	7.33	11.98	10.31	8.47	7.52	6.18	7.32	8.52	8.19	7.68	9.05	100.00
2004	7.69	14.21	20.64	12.95	5.74	2.23	4.52	4.88	7.25	9.46	2.87	7.57	100.00
2005	8.54	10.71	15.77	11.28	2.24	3.82	7.85	6.98	6.43	6.32	9.46	10.60	100.00
2006	10.50	11.32	14.65	6.28	6.38	6.22	4.33	7.60	5.82	7.04	8.46	11.41	100.00
2007	7.35	7.08	11.55	8.83	9.56	5.79	7.86	7.99	7.53	10.48	4.63	11.35	100.00
2008	14.37	12.59	13.40	10.56	7.60	7.50	3.77	5.53	6.18	5.49	6.66	6.35	100.00
2009	4.67	7.55	9.64	10.39	12.36	10.97	9.56	8.18	8.16	6.65	4.88	6.99	100.00
2010	7.35	6.54	13.49	10.68	9.61	7.73	7.37	7.75	8.68	9.25	4.81	6.74	100.00
2011	7.96	4.96	14.13	10.99	11.93	7.20	7.24	7.82	6.30	10.18	3.41	7.88	100.00
2012	7.94	6.22	7.72	11.26	8.22	7.11	8.57	11.09	10.14	12.03	2.15	7.55	100.00
2013	5.66	6.18	7.84	14.47	12.54	10.37	7.90	8.45	6.75	9.07	3.61	7.14	100.00
2014	6.41	5.25	8.20	10.31	10.50	13.09	12.07	9.63	7.55	8.40	2.84	5.74	100.00
2015	5.21	5.37	10.97	9.78	13.86	11.15	9.91	9.71	9.40	6.23	3.67	4.73	100.00
2016	3.94	4.85	8.34	6.52	10.11	10.97	12.00	12.47	8.39	8.85	7.66	5.91	100.00
2017	5.59	4.52	5.05	12.56	12.72	11.67	8.84	8.72	6.87	11.73	3.05	8.68	100.00
2018	5.02	8.37	7.73	12.07	9.31	12.20	11.28	9.22	8.31	6.40	3.99	6.10	100.00
2019	5.93	6.87	8.53	8.46	15.24	10.64	8.49	8.92	10.26	7.77	2.62	6.27	100.00
2020	5.38	6.78	10.24	3.86	13.42	11.43	10.52	9.52	6.66	12.85	4.62	4.71	100.00
2021	4.86	7.96	8.14	9.10	11.41	12.09	8.72	10.52	8.30	8.85	3.10	6.94	100.00
Total	7.07	8.17	11.37	10.03	9.67	8.55	7.71	8.32	7.65	8.57	5.03	7.87	100.00

Source: NMFS unpublished dealer data.

For the 1999 to 2021 calendar years, commercial golden tilefish landings (landed weight) have ranged from 1.0 million pounds in 2016 (calendar year) to 2.3 million pounds in 2004. Commercial golden tilefish ex-vessel revenues have ranged from $2.5 million in 2000 to $6.2 million in 2021. In 2021, 1.4 million pounds (landed weight) of goldend tilefish were landed with an ex-vessel value (revenues) of $6.2 million.

From 1999-2020, the mean price for golden tilefish (adjusted) has ranged from $2.00 per pound in 2004 to $4.77 per pound in 2016 (Figure 3). For 2021, the mean price for golden tilefish was $4.31 per pound.

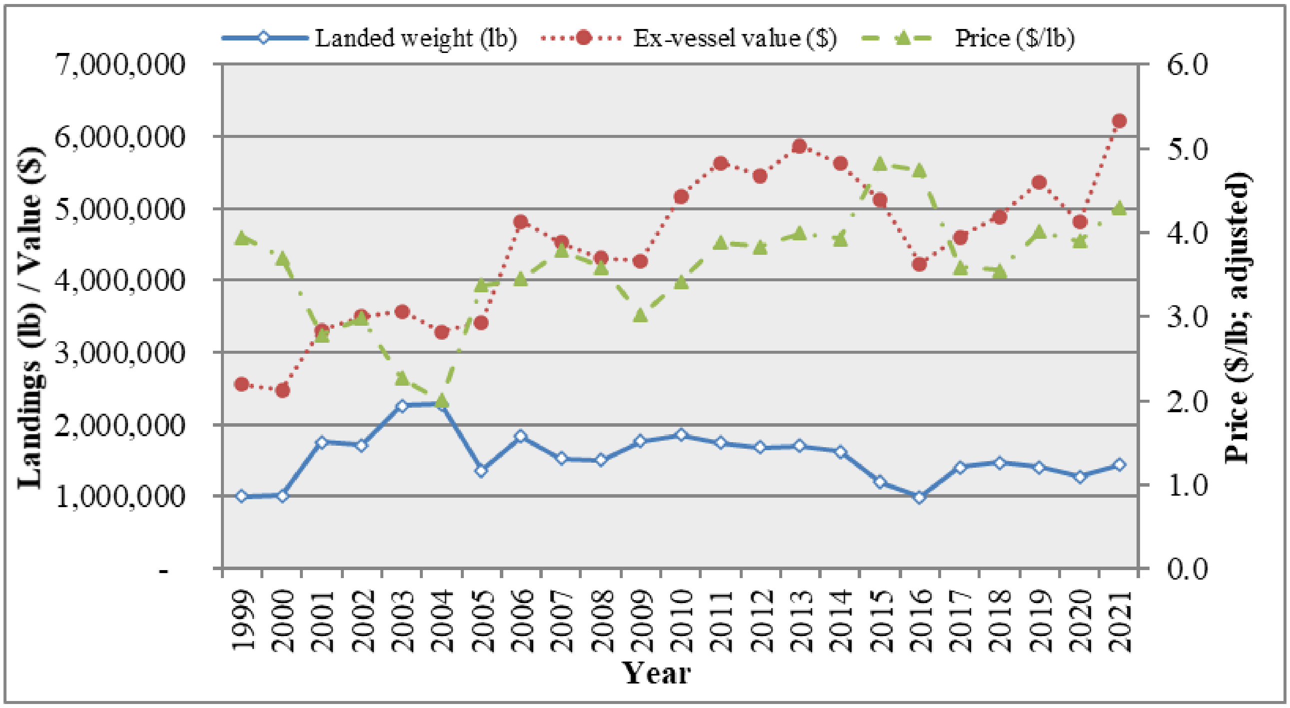

Figure 3. Landings (landed weight), ex-vessel value, and price for golden tilefish, Maine through Virginia combined, 1999-2021 (calendar year). Note: Price data have been adjusted by the GDP deflator indexed for 2021 (https://fred.stlouisfed.org). Source: NMFS unpublished dealer data.

The 2017 through 2021 coastwide average ex-vessel price per pound for all market categories combined was $3.69. Price differential indicates that larger fish tend to bring higher prices (Table 6). Nevertheless, even though there is a price differential for various sizes of golden tilefish landed, golden tilefish fishermen land all fish caught as the survival rate of discarded fish is very low (L. Nolan 2006; Kitts et al. 2007). Furthermore, Amendment 1 to the Tilefish FMP prohibited the practice of highgrading (MAFMC 2009).

Table 6. Landings, ex-vessel value, and price of golden tilefish by size category, from Maine thought Virginia, 2017-2021 (calendar year).

Market category	Landed weight (pounds)	Value ($)	Price ($/pound)	Approximate market size range (pounds)
Extra large	158,618	749,261	4.72	> 25
Large	1,560,477	7,666,936	4.91	7 – 24
Large/medium[a]	929,819	3,872,904	4.17	5 – 7
Medium	2,173,011	7,774,254	3.58	3.5 – 5
Small or kittens	1,975,855	5,236,496	2.65	2 – 3.5
Extra small	126,923	267,533	2.11	< 2
Unclassified	96,326	333,446	3.46	– – –
All	7,021,029	25,900,830	3.69	– – –

[a]Large/medium code was implemented on May 1, 2016. Prior to that, golden tilefish sold in the large/medium range were sold as unclassified fish. Source: NMFS unpublished dealer data.

The ports and communities that are dependent on golden tilefish are fully described in Amendment 1 to the FMP (section 6.5; MAFMC 2009; found at http://www.mafmc.org/fisheries/fmp/tilefish). Additional information on "Community Profiles for the Northeast US Fisheries" can be found at https://apps-nefsc.fisheries.noaa.gov/read/socialsci/communitySnapshots.php.

To examine recent landings patterns among ports, 2020-2021 NMFS dealer data are used. The top commercial landings ports for golden tilefish are shown in Table 7. A “top port” is defined as any port that landed at least 10,000 pounds of golden tilefish. Ports that received 1 percent or greater of their total revenue from golden tilefish are shown in Table 8.

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Table 7. Top ports (≥ 10,000 pounds per year) of landing (live weight) for golden tilefish, based on NMFS 2020-2021 dealer data (calendar year). Since this table includes only the "top ports," it may not include all of the landings for the year.

Port	2020		2021	
	Landings (pounds)	# Vessels	Landings (pounds)	# Vessels
Montauk, NY	782,096 (777,381)	13 (3)	940,776 (938,183)	15 (3)
Barnegat Light/Long Beach, NJ	C (374,995)	C (5)	C (366,946)	C (4)
Hampton Bays, NY	188,556 (C)	5 (C)	220,645 (C)	4 (C)
Point Judith, RI	9,792 (0)	52 (0)	12,070 (0)	57 (0)

[a]Values in parentheses correspond to IFQ vessels. Note: C = Confidential. Source: NMFS unpublished dealer data. Note: ports that may have had landings ≥ 10,000 pounds not added to this table due to confidentiality issues.

Table 8. Ports that generated 1 percent or greater of total revenues from golden tilefish, 2016-2020 (calendar year).

Port	State	Ex-vessel revenue all species combined	Ex-vessel revenue golden tilefish	Golden tilefish contribution to total port ex-vessel revenues
Ocean City	NJ	18,405	4,565	25%
Montauk	NY	85,039,313	15,092,495	18%
Hampton Bays	NY	27,781,838	3,968,469	14%
Barnegat & Barnegat Light/Long Beach	NJ	122,578,564	6,222,422	5%
Shinnecock	NY	7,484,160	237,445	3%

Source: NMFS unpublished dealer data.

In 2021 there were 47 federally permitted dealers who bought golden tilefish from 110 vessels that landed this species from Maine through Virginia. In addition, 54 dealers bought golden tilefish from 105 vessels in 2020. These dealers bought approximately $6.2 and $4.8 million of golden tilefish in 2020 and 2021, respectively, and are distributed by state as indicated in Table 9. Table 10 shows relative dealer dependence on golden tilefish. In 2021, 1,897 open access commercial/incidental tilefish permits (valid for both golden and blueline tilefish) were issued.

Table 9. Dealers reporting buying golden tilefish, by state in 2020-2021 (calendar year).

# of dealers	MA		RI		CT		NY		NJ		VA		MD		Other	
	'20	'21	'20	'21	'20	'21	'20	'21	'20	'21	'20	'21	'20	'21	'20	'21
	6	6	11	6	6	6	14	14	8	7	4	4	3	4	2	0

Note: C = Confidential. Source: NMFS unpublished dealer data.

Table 10. Dealer dependence on golden tilefish, 2017-2021 (calendar year).

Number of dealers	Relative dependence on golden tilefish
65	<5%
4	5%-10%
5	10% - 25%
3	25% - 50%
2	50% - 75%
2	90%+

Source: NMFS unpublished dealer data.

According to VTR data, none to very little discarding was reported by longline vessels that targeted golden tilefish from 2019-2021 (Table 11). In addition, the 2021 management track assessment (Nitschke 2021) indicate that golden tilefish discards in the trawl and longline fishery appear to be a minor component of the catch.

Table 11. Catch disposition for directed golden tilefish trips[a], Maine through Virginia, 2019, 2020, and 2021 (calendar year).

(2019)

Common name	Kept pounds	% species	% total	Discarded pounds	% species	% total	Total pounds	Disc: Kept ratio
GOLDEN TILEFISH	1,316,702	100.00%	95.87%	0	0.00%	--	1,316,702	0.00
SPINY DOGFISH	41,605	100.00%	3.03%	0	0.00%	--	41,605	0.00
SMOOTH DOGFISH	5,315	100.00%	0.39%	0	0.00%	--	5,315	0.00
BLUELINE TILEFISH	3,551	100.00%	0.26%	0	0.00%	--	3,551	0.00
CONGER EEL	2,134	100.00%	0.16%	0	0.00%	--	2,134	0.00
YELLOWFIN TUNA	2,086	100.00%	0.15%	0	0.00%	--	2,086	0.00
BIG EYE TUNA	734	100.00%	0.05%	0	0.00%	--	734	0.00
SAND TILEFISH	506	100.00%	0.04%	0	0.00%	--	506	0.00
DOLPHIN FISH	455	100.00%	0.03%	0	0.00%	--	455	0.00
ANGLER	119	100.00%	0.01%	0	0.00%	--	119	0.00
SKATES OTHER	80	100.00%	0.01%	0	0.00%	--	80	0.00
ALBACORE TUNA	50	100.00%	0.00%	0	0.00%	--	50	0.00
BLACK BELLIED ROSEFISH	44	100.00%	0.00%	0	0.00%	--	44	0.00

SILVER HAKE (WHITING)	43	100.00%	0.00%	0	0.00%	--	43	0.00
SHKIPJACK TUNA	24	100.00%	0.00%	0	0.00%	--	24	0.00
BLACK SEA BASS	9	100.00%	0.00%	0	0.00%	--	9	0.00
ALL SPECIES	1,373,457	100.00%	100.00%	0	0.00%	--	1,373,457	0.00

[a] Directed trips for golden tilefish were defined as trips comprising 75 percent or more by weight of golden tilefish landed. Number of trips = 92.
Source: NMFS unpublished VTR data.

(2020)

Common name	Kept pounds	% species	% total	Discarded pounds	% species	% total	Total pounds	Disc: Kept ratio
GOLDEN TILEFISH	1,118,461	100.00%	95.68%	0	0.00%	--	1,118,461	0.00
SPINY DOGFISH	41,350	100.00%	3.54%	0	0.00%	--	41,350	0.00
BLUELINE TILEFISH	3,474	100.00%	0.30%	0	0.00%	--	3,474	0.00
SMOOTH DOGFISH	2,425	100.00%	0.21%	0	0.00%	--	2,425	0.00
CONGER EEL	1,512	100.00%	0.13%	0	0.00%	--	1,512	0.00
YELLOWFIN TUNA	733	100.00%	0.06%	0	0.00%	--	733	0.00
DOLPHIN FISH	451	100.00%	0.04%	0	0.00%	--	451	0.00
MAKO SHORTFIN SHARK	100	100.00%	0.01%	0	0.00%	--	100	0.00
RED HAKE	98	100.00%	0.01%	0	0.00%	--	98	0.00
BIG EYE TUNA	80	100.00%	0.01%	0	0.00%	--	80	0.00
WHITE HAKE	68	100.00%	0.01%	0	0.00%	--	68	0.00
ALBACORE TUNA	60	100.00%	0.01%	0	0.00%	--	60	0.00
CUNNER	47	1	0.00%	0	0.00%	--	47	0.00
SWORDFISH	40	100.00%	0.00%	0	0.00%	--	40	0.00
BARRELFISH	33	100.00%	0.00%	0	0.00%	--	33	0.00
BLACK BELLIED ROSEFISH	28	100.00%	0.00%	0	0.00%	--	28	0.00
SILVER HAKE (WHITING)	14	100.00%	0.00%	0	0.00%	--	14	0.00
ANGLER	2	100.00%	0.00%	0	0.00%	--	2	0.00
ALL SPECIES	1,168,976	100.00%	100.00%	0	0.00%	--	1,168,976	0.00

[a] Directed trips for golden tilefish were defined as trips comprising 75 percent or more by weight of golden tilefish landed. Number of trips = 86.
Source: NMFS unpublished VTR data.

(2021)

Common name	Kept pounds	% species	% Total	Discarded pounds	% species	% total	Total pounds	Disc: Kept ratio
GOLDEN TILEFISH	1,384,226	100.00%	94.50%	3	0.00%	0.02%	1,384,229	0.00
SPINY DOGFISH	66,860	100.00%	4.56%	0	0.00%	0.00%	66,860	0.00
DOGFISH SMOOTH	7,075	100.00%	0.48%	0	0.00%	0.00%	7,075	0.00

CONGER EEL	4,199	100.00%	0.29%	0	0.00%	0.00%	4,199	0.00
BLUELINE TILEFISH	1,507	99.93%	0.10%	1	0.07%	0.01%	1,508	0.00
SAND TILEFISH	300	100.00%	0.02%	0	0.00%	0.00%	300	0.00
DOLPHIN FISH	199	100.00%	0.01%	0	0.00%	0.00%	199	0.00
YELLOWFIN TUNA	192	100.00%	0.01%	0	0.00%	0.00%	192	0.00
WRECKFISH	56	100.00%	0.00%	0	0.00%	0.00%	56	0.00
ALBACORE TUNA	50	100.00%	0.00%	0	0.00%	0.00%	50	0.00
WHITE HAKE	45	100.00%	0.00%	0	0.00%	0.00%	45	0.00
BLACK BELLIED ROSEFISH	22	100.00%	0.00%	0	0.00%	0.00%	22	0.00
ANGLER	10	20.83%	0.00%	38	79.17%	0.22%	48	3.80
BLACK SEA BASS	5	100.00%	0.00%	0	0.00%	0.00%	5	0.00
TIGER SHARK	0	0.00%	0.00%	6,050	100.00%	34.35%	6,050	--
SANDBAR SHARK	0	0.00%	0.00%	5,525	100.00%	31.37%	5,525	--
DOGFISH CHAIN	0	0.00%	0.00%	1,480	100.00%	8.40%	1,480	--
SKATE BARDOOR	0	0.00%	0.00%	1,420	100.00%	8.06%	1,420	--
HAMMERHEAD SHARK	0	0.00%	0.00%	1,250	100.00%	7.10%	1,250	--
JONAH CRAB	0	0.00%	0.00%	1,239	100.00%	7.03%	1,239	--
MAKO LONGFIN SHARK	0	0.00%	0.00%	250	100.00%	1.42%	250	--
SILVER HAKE (WHITING)	0	0.00%	0.00%	125	100.00%	0.71%	125	--
PORBEAGLE SHARK	0	0.00%	0.00%	100	100.00%	0.57%	100	--
LOBSTER	0	0.00%	0.00%	73	100.00%	0.41%	73	--
BLUEFISH	0	0.00%	0.00%	50	100.00%	0.28%	50	--
RED HAKE	0	0.00%	0.00%	10	100.00%	0.06%	10	--
ALL SPECIES	1,464,746	0.00%	100.00%	17,614	0.00%	100.00%	1,482,360	0.01

[a] Directed trips for golden tilefish were defined as trips comprising 75 percent or more by weight of golden tilefish landed. Number of trips = 90.
Source: NMFS unpublished VTR data.

Golden tilefish incidental commercial fishery landings in fishing year 2022 are slightly ahead of fishing year 2021 landings for the same time period (Figure 4; for data reported through February 2, 2022). Incidental golden tilefish commercial landings for 2013-2020 fishing years are shown in Table 12.

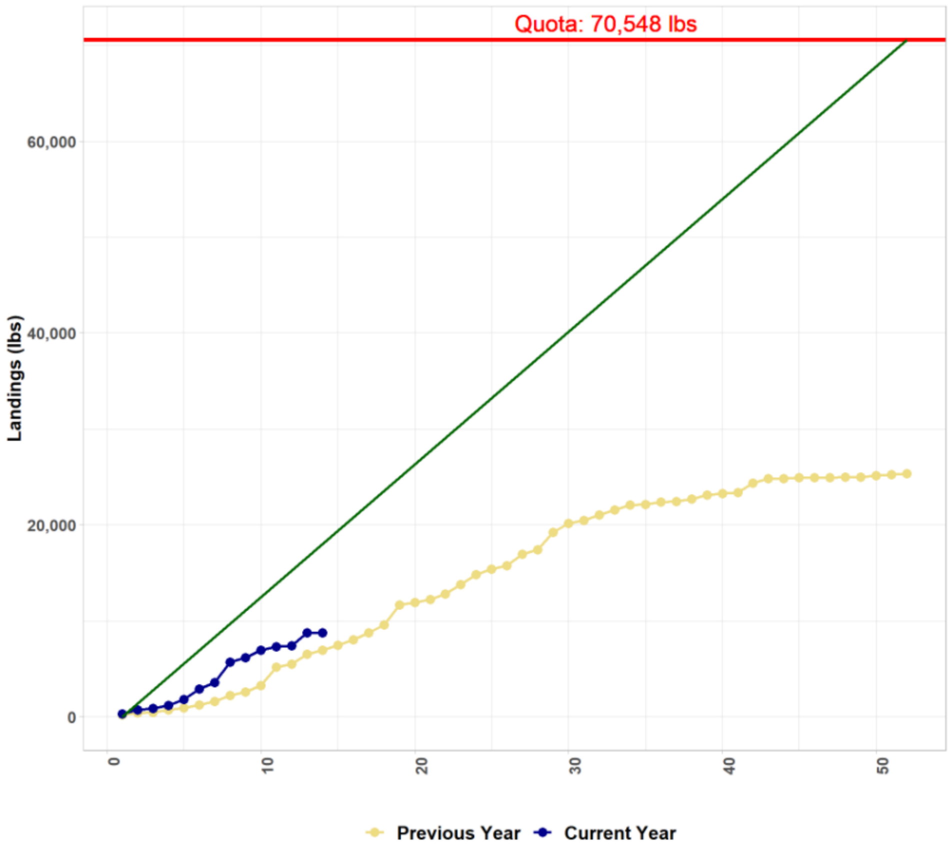

Figure 4. Incidental commercial landings for 2022 fishing year (FY) to date (for data reported through February 2, 2022). Blue Line = FY 2022, Yellow Line = FY 2021.
Source: https://www.fisheries.noaa.gov/new-england-mid-atlantic/quota-monitoring-greater-atlantic-region.

Table 12. Incidental golden tilefish commercial landings for fishing year 2013-2021.

Fishing year	Landings (pounds)	Incidental quota (pounds)	Percent of quota landed (%)
2013	36,442	99,750	37
2014	44,594	99,750	45
2015	18,839	87,744	21
2016	20,929	94,357	22
2017	60,409	94,357	64
2018	61,254	72,752	84
2019	22,246	72,752	31
2020	25,864	72,752	36
2021	25,356	70,548	36

Source: https://www.fisheries.noaa.gov/new-england-mid-atlantic/quota-monitoring-greater-atlantic-region.

Recreational Fishery

In 2021, 680 open access charter/party tilefish permits were issued. According to vessel trip report (VTR) data, 41 party/charter vessels reported a total of 152 trips that landed golden tilefish in 2021.

VTR data indicates that party/charter vessel landed 6,799 golden tilefish in 2021. This represented an increase of 96 percent from 2020 (3,466 fish landed).

A small recreational fishery briefly occurred during the mid-1970's, with less than 100,000 pounds landed annually (MAFMC 2001). Subsequent recreational catches have been low for the 1982 - 2021 period, ranging from zero for most years to approximately 213,000 fish in 2010 according to NMFS recreational statistics (Table 13). In 2021, approximately 10,000 fish were landed according to MRIP data.

VTR data indicates that the number of golden tilefish kept by party/charter vessels from Maine through Virginia is low for the 1996-2021 period, ranging from 81 fish in 1996 to 8,297 fish in 2015 (Table 14). Mean party/charter effort ranged from less than one fish per angler in 1999 throughout 2002 and 2005 to approximately eight fish per angler in the late 1990s, averaging 2.9 fish for the 1996-2021 period.

According to VTR data, for the 1996-2021 period, the largest number of golden tilefish caught by party/charter vessels were made by New Jersey vessels (57,094; average = 2,196), followed by New York (15,564; average = 599), Virginia (1,566; average = 60), Delaware (1,271; average = 49), Massachusetts (561; average = 22), and Maryland (939; average = 36; Table 15). The number of golden tilefish discarded by recreational anglers is low. According to VTR data, on average, approximately 8 fish per year were discarded by party/charter recreational anglers for the 1996-2021 period (196 discarded fish in total). The quantity of golden tilefish discarded by party/charter recreational anglers ranged from zero in most years to 60 in each 2015 and 2021.

Recreational anglers typically fish for golden tilefish when tuna fishing especially during the summer months (Freeman, pers. comm. 2006). However, some for-hire vessels from New Jersey and New York are golden tilefish fishing in the winter months (Caputi pers. comm. 2006). In addition, recreational boats in Virginia are also reported to be fishing for golden tilefish (Pride pers. comm. 2006). However, it is not known with certainty how many boats may be targeting golden tilefish. Nevertheless, accounting for information presented in the Fishery Performance Reports (2012-2014) and a brief internet search conducted by Council Staff in 2014 indicates that there have been approximately 10 headboats actively engaged in the tilefish fishery in the Mid-Atlantic canyons in recent years. It is estimated that approximately 4 of these boats conducted direct tilefish fishing trips, while the other 6 boats may have caught tilefish while targeting tuna/swordfish or fishing for assorted deep water species. In addition, it appears that recreational interest onboard headboats for tilefish has increased in the last few years as seen in the FPRs, internet search conducted by Council staff, and recent VTR recreational party/charter statistics (MAFMC 2014).

Anglers are highly unlikely to catch golden tilefish while targeting tuna on tuna fishing trips. However, these boats may fish for golden tilefish at any time during a tuna trip (i.e., when the tuna limit has been reached, on the way out or on the way in from a tuna fishing trip, or at any time when tuna fishing is slow). While fishing for tuna recreational anglers may trawl using rod and reel (including downriggers), handline, and bandit gear.[3] Rod and reel is the typical gear used in the recreational golden tilefish fishery. Because golden tilefish are found in relatively deep waters, electric reels may be used to facilitate landing (Freeman and Turner 1977).

Private Recreational Angler Permitting and Reporting

To improve tilefish management and reporting, GARFO implemented mandatory private recreational permitting and reporting for tilefish anglers in August 2020. This action was approved in late 2017, but with delayed implementation. Outreach materials and webinars were provided by GARFO and the Council leading up to the final rule and will continue to be circulated as these regulations become commonplace.

Under this rule, private recreational vessels (including for-hire operators using their vessels for non-charter, recreational trips) are required to obtain a federal vessel permit to target or retain golden or blueline tilefish north of the Virginia/North Carolina border. These vessel operators would also be required to submit VTRs electronically within 24 hours of returning to port for trips where tilefish were targeted or retained. For more information about the proposed requirements, check out the Recreational Tilefish Permitting and Reporting FAQs.

Permitting

Get your federal private recreational tilefish vessel permit through Fish Online. This new permit is required even if a vessel already holds a for-hire tilefish permit. Call the GARFO Permit Office at 978-282-8438 for questions about the permitting process.

Reporting

NOAA Fisheries is encouraging anglers not already using another electronic VTR system to utilize NOAA Fish Online, which is available through a mobile app or a web-based portal. Other systems that may be suitable for recreational anglers include SAFIS eTrips/mobile and SAFIS eTrips Online. You can access information about approved applications and other aspects of electronic reporting on the NOAA Fisheries website.

Additionally, a new app has been released to make the reporting process increasingly easy and convenient. Harbor Light Software's *eFin Logbook* has received certification from NOAA Fisheries as an approved application through which anglers can report their trips. Funded by the Council, *eFin Logbook* is a user-friendly application designed specifically for recreational tilefish anglers. The app is available for use on all Apple and Android mobile devices (iPhone, iPad, Android phone, and Android tablet).

At present, *eFin Logbook* can only be used by tilefish recreational anglers to satisfy reporting requirements. Future modifications may expand its capabilities to other reporting and personal fishing log applications. For-hire operators, many of whom have other reporting requirements, are encouraged to choose different software. To learn more about other electronic reporting options and decide which one is right for you, visit the NOAA Fisheries Greater Atlantic Region Electronic Reporting Web Page.

[3] Bandit gear is a vertical hook and line gear with rods attached to the vessel when in use. Manual, electric, or hydraulic reels may be used to retrieve lines.

As of October 28, 2021, 814 tilefish permits have been issued for private recreational anglers. This permit allows recreational anglers to land both golden and blueline tilefish. For the 2021, 199 fish were reported landed on 24 private recreational trips (with 5 fish discarded).

Table 13. Recreational golden tilefish data from the NMFS recreational statistics databases, 1982-2021 (calendar year).

Year	Landed no. A and B1				Released no. B2			
	Party/charter		Private/rental		Party/charter		Private/rental	
1982	0		2,225	(102.0)	0		0	
1983-93	0		0		0		0	
1994	555	(101.6)	0		0		0	
1995	0		0		0		0	
1996	1,765	(80.5)	0		0		0	
1997	0		0		0		0	
1998	0		0		0		0	
1999	0		0		0		0	
2000	0		0		0		0	
2001	98	(101.4)	0		0		0	
2002	0		122,443	(85.7)	0		8,163	(85.7)
2003	967	(75.2)	0		0		0	
2004	55	(102.2)	0		0		0	
2005	0		0		0		0	
2006	471	(103.7)	0		0		0	
2007	1,837	(71.4)	0		0		0	
2008	0		0		0		0	
2009	168	(89.8)	0		0		0	
2010	4,754	(81.9)	213,382	(98.4)	0		0	
2011	0		0		0		0	
2012	0		0		0		0	
2013	1,145	(0)	0		0		0	
2014	0		0		0		0	
2015	0		0		0		0	
2016	0		26,691	(70.4)	0		0	
2017	0		59,413	(59.4)	0		0	
2018	7,925	(80.3)	893	(102.9)	4	(106.8)	0	
2019	0		10,364	(64.2)	0		0	
2020	1,933	(30.3)	9,336	(94.7)	41	(100.3)	0	
2021	233	(103.0)	9,778	(55.5)	0		0	

Source: Recreational Fisheries Statistics Queries: https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index. PSE (proportional standard error) values in parenthesis expresses the standard error of an estimate as a percentage of the estimate and is a measure of precision. A PSE value greater than 50 indicates a very imprecise estimate. 2021 values are preliminary.

Table 14. Number of golden tilefish kept by recreational anglers and mean effort from Maine through Virginia, 1996-2021 (calendar year).

Year	Party/Charter		Private	
	Number of golden tilefish kept	Mean effort	Number of golden tilefish kept	Mean effort
1996	81	1.4	---	---
1997	400	7.5	---	---
1998	243	8.1	---	---
1999	91	0.4	---	---
2000	147	0.5	---	---
2001	172	0.7	---	---
2002	774	0.9	---	---
2003	991	1.6	---	---
2004	737	1.2	---	---
2005	498	0.9	---	---
2006	477	1.2	---	---
2007	1,077	1.2	---	---
2008	1,100	1.3	---	---
2009	1,451	1.3	---	---
2010	1,866	2.0	---	---
2011	2,938	3.4	---	---
2012	6,424	2.8	---	---
2013	6,560	3.2	---	---
2014	6,958	3.1	---	---
2015	8,297	4.2	---	---
2016	5,919	4.1	---	---
2017	7,014	4.6	---	---
2018	7,110	3.9	---	---
2019	5,424	3.1	---	---
2020 [a]	3,466	3.2	50	5.0
2021	6,799	3.2	199	2.7
All	77,048	2.9	50	5.0

[a] 2020 private recreational landings reported from August 1 to December 31, 2020. Source: NMFS unpublished VTR data.

Table 15. Number of golden tilefish caught by party/charter vessels by state, 1996-2021 (calendar year).

Year	NH	MA	RI	CT	NY	NJ	DE	MD	VA	Unknown	All
1996	0	0	0	0	81	0	0	0	0	0	81
1997	0	0	0	0	400	0	0	0	0	0	400
1998	0	0	102	0	141	0	0	0	0	0	243
1999	0	0	1	0	88	0	0	2	0	0	91
2000	0	0	0	0	108	39	0	0	0	0	147
2001	0	0	0	0	122	51	0	0	0	0	173
2002	0	0	0	0	401	373	0	0	0	0	774
2003	0	0	3	0	86	902	0	0	0	0	991
2004	0	0	0	0	12	628	0	0	104	0	744
2005	0	0	72	0	82	318	14	0	16	0	502
2006	0	0	0	0	265	65	2	133	12	0	477
2007	0	0	0	0	447	459	88	5	80	0	1,079
2008	0	0	3	0	488	545	22	32	10	0	1,100
2009	0	0	0	0	720	675	18	7	31	0	1,451
2010	0	0	0	0	595	1,194	19	23	48	0	1,879
2011	0	496	0	0	720	1,654	60	5	14	0	2,949
2012	0	0	1	0	1,116	5,146	42	23	98	0	6,426
2013	0	0	0	0	1,900	4,568	39	12	41	0	6,560
2014	0	0	0	3	957	5,716	180	40	73	0	6,969
2015	14	0	0	0	637	7,376	100	56	174	0	8,357
2016	0	0	0	0	676	5,073	69	43	67	0	5,928
2017	0	0	0	0	424	6,373	118	76	38	0	7,029
2018	0	0	0	0	1,202	5,573	46	87	195	7	7,110
2019	0	0	5	0	995	3,956	146	56	267	0	5,425
2020	0	32	0	0	447	2,536	233	33	185	0	3,466
2021	0	33	0	4	2,454	3,874	75	306	113	0	6,859
All	14	561	187	7	15,564	57,094	1,271	939	1,566	7	77,210
Avg. 96-21	< 1	22	7	<1	599	2,196	49	36	60	<1	2,970

Source: NMFS unpublished VTR data.

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MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 3, 2022

To: Chris Moore, Executive Director

From: José Montañez, Staff

Subject: Golden Tilefish 2023 Specifications Review/Revise

In 2021, the Council set specifications for 2022, 2023, and 2024 fishing years. As part of the 2022-2024 multiyear specification process for golden tilefish, the Scientific and Statistical Committee (SSC), the Tilefish Monitoring Committee (MC), and the Council will review the most recent information to determine whether modifications to the current 2023 specifications set by the Council are warranted.

From 2017 to 2021, commercial landings have been relatively stable, ranging from 1.4 (2020) to 1.6 (2018) million pounds (Table 1). In 2021, 1.5 million pounds of tilefish were landed. On average, for the last 5 years, the bulk of the tilefish quota has been landed (90.5 percent).

The latest results of the management track assessment received in June 2021, indicate that the tilefish resource was not overfished and overfishing was not occurring in the assessment terminal year (2020; Nitschke 2021). The 2020 stock (23.28 million pounds or 10,562 mt) was at 96% of the updated biomass target reference point (SSB_{MSY} proxy = $SSB_{40\%}$ = 24.23 million pounds or 10,995 mt). The fishing mortality rate (F) in 2020 was 0.160, 39% below the fishing mortality updated threshold reference point F_{MSY} proxy = $F_{40\%}$ = 0.261.

This year, we are not receiving a golden tilefish data update from the NEFSC. This is due to various timing and logistical constraints. More notable is that while preliminary landings data are available in CAMS (Catch Accounting and Monitoring System project)[1] they are still being vetted. Next year, Council staff expects that a data update for golden tilefish will be available.

Tilefish Advisors indicated that CPUE increased in 2021. More fish are being caught with the same effort than were caught in 2020. Fishermen indicated a good mix of fish in 2021, perhaps better than in previous years (both in terms of weight and landings mix). The overall catch of small/kittens is increasing for some of the Montauk and Barnegat Light vessels and a larger amount of small/kittens (2 to 3.5 pounds) were present in 2021 compared to previous years. In addition, industry feels that biomass is increasing and they see multiple year classes being recruited into the

[1] This is an initiative that aims to create one shared catch accounting and monitoring system for quota monitoring and assessment needs.

fishery. Overall, a positive trend is evident and CPUE is increasing as a result. Golden tilefish landings by market category for the 2017-2021 period are shown in Table 2.

Based on a review of this information, staff recommend no change to the 2023 fishing year specifications. In 2023, the SSC, MC, and Council will review the 2023 data update for golden tilefish, the Advisory Panel Information Document, the 2023 Fishery Performance Report, and other relevant information to support the specifications review for 2024 fishing year. In addition, a golden tilefish research track stock assessment is scheduled for spring of 2024 and this research track assessment will be used to set management measures for the next specifications cycle.

Table 1. Summary of management measures and landings for fishing year 2007-2024.[a]

Management Measures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ABC (m lb)	-	-	-	-	-	-	2.013	2.013	1.766	1.898	1.898	1.636	1.636	1.636	1.636	1.964	1.964	1.964
TAL (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887	1.626	1.626	1.626	1.625	1.839	1.839	1.839
Com. quota- (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887	1.626	1.626	1.626	1.625/ 1.672*	1.839	1.839	1.839
Com. landings	1.794	1.689	1.906	2.021	1.924	1.873	1.840	1.826	1.351	1.051	1.501	1.624	1.563	1.403	1.546	-	-	-
Com. Overage / underage (m lb)	-0201	-0.306	-0.089	+0.026	-0.071	-0.122	-0.155	-0.169	-0.404	-0.836	-0.387	-0.003	-0.064	-0.223	-0.125	-	-	-
Incidental trip limit (lb)	300	300	300	300	300	500	500	500	500	500	500	500	500	500	500	500	500	500
Rec. possession limit	-	-	-	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]	8[b]

[a] Source: NMFS unpublished dealer data. From 2001 to 2021, fishing year = November 1 – October 31 period. For example, 2007 fishing year = November 1, 2006 – October 31, 2007. For 2022, proposed fishing year = November 1, 2021 – December 31, 2022. For 2023 on, proposed fishing year = January 1 – December 31. [b] Eight fish per person per trip. *The Council requested for emergency action to allow unharvested 2020 IFQ pounds to be carried over into the 2021 fishing year, up to 5 percent of the quota shareholders initial 2020 allocation.

Table 2. Golden tilefish landings (landed weight) by market category and year, from Maine thought Virginia, 2017-2021 (calendar year).

Market category (Approximate market size range in pounds)	**2017**		**2018**		**2019**		**2020**		**2021**	
	Pounds	% of total	Pounds	% of total	Pounds	% of total	Pounds	% of total	Pounds	% of total
Extra-large (> 25)	52,400	4%	40,278	3%	32,808	2%	19,307	2%	13,825	1%
Large (7-24)	307,696	22%	219,103	15%	281,749	20%	386,285	30%	365,644	25%
Large/medium (5-7)	86,240	6%	141,623	10%	262,095	19%	271,247	21%	168,614	12%
Medium (3.5-5)	266,837	19%	468,097	32%	590,681	42%	408,220	32%	439,176	30%
Small/kittens (2-3.5)	605,492	43%	575,511	39%	223,055	16%	154,984	12%	416,813	29%
Extra small (< 2)	70,286	5%	14,958	1%	9,954	1%	23,360	2%	8,365	1%
Unclassified	18,563	1%	14,482	1%	11,700	1%	19,130	1%	32,451	2%
Total	1,407,514	100%	1,474,052	100%	1,412,042	100%	1,282,533	100%	1,444,888	100%

Source: NMFS unpublished dealer data.

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Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 24, 2022

To: Chris Moore, Executive Director

From: Jason Didden, Staff

Subject: Review of 2023 Blueline Tilefish Specifications

As part of the multi-year specification process for Blueline Tilefish, the Scientific and Statistical Committee (SSC) and Tilefish Monitoring Committee (MC) reviewed the most recent information available to determine whether modification of the 2023 specifications is warranted. No specifications changes were recommended by the SSC or MC.

The following materials are enclosed on this subject:

1) March 2022 SSC Report – See Committee Reports Tab

2) Report of the March 2022 Meeting of the MAFMC Tilefish MC – See Golden Tilefish Tab

3) Blueline Tilefish Advisory Panel Fishery Performance Report (February 2022)

4) Blueline Tilefish Fishery Information Document, Council Staff (February 2022)

5) Blueline Tilefish ABC Staff Recommendation Memo to Chris Moore (March 2022)

SSC Report is behind the Committee Reports tab.

Tilefish Monitoring Committee Report - See Golden Tilefish Tab

Blueline Tilefish Fishery Performance Report

February 2022

The Mid-Atlantic Fishery Management Council's (Council) Tilefish Advisory Panel (AP) met via webinar on February 24, 2022 to review the Blueline Tilefish Fishery Information Document and develop the following Fishery Performance Report. The primary purpose of this report is to contextualize catch histories by providing information about fishing effort, market trends, environmental changes, and other factors. The trigger questions listed below were posed to the AP to generate discussion of observations in the blueline tilefish fishery. Please note: Advisor comments described below are not necessarily consensus or majority statements.

Advisory Panel members present: Fred Akers (Private), Daniel Farnham Jr. (Commercial), Carl Forsberg (For-Hire/Commercial), Gregory Hueth (Private/For-hire), Michael Johnson (Commercial), and Laurie Nolan (Commercial).

Others present: Wes Townsend (Council), Paul Nitschke (NEFSC), Daniel Farnham Sr. (Council Member), Scott Lenox (Council Member), Joe Cimino (Council Member), Doug Potts (GARFO), Lee Anderson (SSC), Jason Didden (Council Staff), and José Montañez (Council Staff).

Trigger questions

1. What factors have influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

Factors Influencing Catch

Low quota and trip limits constrain effort/landings. Blueline trip limits generally discourage directed fishing.

Maryland landings – an advisor was aware of a vessel or two out of Ocean City, Maryland that target tilefish that could be responsible for the Maryland landings.

Recreational catch estimate volatility continues to be an issue – there's not much faith in the year to year catch estimates.

Staff needs to check the VTR gear-based table – does not appear to total correctly.

Market/Economic Conditions

Blueline price is sufficient to drive effort – but most activity is fill-in trips given limited quota/trip limits.

Some participants can put together a directed trip by mixing blueline, goldens, and other fish – but not worth it for a directed trip just for bluelines given costs.

Management Issues

See above catch factor - low quota and trip limits constrain effort/landings.

Blueline limit allows balancing of golden tilefish for some combined incidental golden tilefish fishing. Two advisors suggested there should be further analysis of directed fishing at the current blueline trip limit and golden incidental limits, which were generally designed to cover incidental landings but can be combined currently to create a directed trip.

The 3-fish private limit discourages private directed effort, at least in NJ.

NOAA should have a link or reference to the Tilefish permit requirement on their HMS permit renewal website. Almost every private vessel fishing deep enough to catch tilefish has an HMS permit. I have made this comment before. I renewed my HMS permit for this year, and there was no reference to the tilefish permit requirement. There have been recurring complaints that many private vessels are fishing for tilefish without the permit. NOAA and MAFMC are missing an important outreach opportunity by not putting a reference to the tilefish permit on the HMS permit shop website.

Research Priorities (no input provided)

Public Input

Direct to consumer businesses may be responsible for MD landings.

Blueline Tilefish Fishery Information Document

February 2022

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for blueline tilefish with an emphasis on 2021. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel trip report (VTR), permit, and Marine Recreational Information Program (MRIP) databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit http://www.mafmc.org/tilefish/.

Key Facts

- There has been no change to the unknown stock status since the 2017 assessment.
- Recreational permitting/reporting requirements are in place for private tilefish anglers.
- ABC = 100,520 pounds, Commercial ACL = 27,140 pounds, Recreational ACL = 73,380 pounds
- The commercial fishery is open year-round with a trip limit of 500 pounds gutted (heads and fins attached) weight that is reduced back to 300 pounds once 70% of the quota has been landed.
- The recreational fishery is open from May 1 – October 31. Bag limits are as follows: private vessels: 3-fish, for-hire vessel (no USCG inspection): 5-fish, for-hire vessel (with USCG inspection): 7-fish.
- Commercial landings decreased by ~21% from 2020 to 2021 (31,918 to 25,288 pounds) while the price per pound increased by ~12% from \$2.84 to \$3.19 from 2020 to 2021.
- Recreational catch exceeded the ACL – the amount of overage depends on whether MRIP estimates, VTRs, the Delphi ratio are used when estimating private recreational performance.
- In 2021, party/charter anglers reported a ~41% increase in catch compared to 2020 (9,670 to 13,610 fish).

Basic Biology

Blueline tilefish are primarily distributed from Campeche, Mexico northward through the Mid-Atlantic (Dooley 1978). Several recently completed studies suggest that blueline tilefish from the eastern Gulf of Mexico through the Mid-Atlantic are comprised of one genetic stock (SEDAR 50 Data Workshop). This homogenous stock inhabits the shelf edge and upper slope reefs at depths of 150-840 feet (46-256 m) and temperatures between 59-73°F (15-23°C) where they are considered opportunistic predators that feed on prey associated with substrate (crabs, shrimp, fish, echinoderms, polychaetes, etc.) (Sedberry et al. 2006 and Ross and Huntsman 1982)). They are sedentary in nature and burrow into sandy areas in close association with rocky outcroppings (SEDAR 2017).

Blueline tilefish are long-lived fish reaching sizes up to about 36 inches (91 cm) and exhibit dimorphic growth with males attaining larger size-at-age than females. Males are predominant in the size categories greater than 26 inches (66 cm) fork length. Blueline tilefish are classified as indeterminate spawners, with up to 110 spawns per individual based on the estimates of a spawning event every 2 days during a protracted spawning season from approximately February through November. Additionally, an aging workshop conducted to support the blueline tilefish assessment has called into question the ability to accurately age blueline tilefish, so previous age determinations may no longer be accurate (SEDAR 2017).

Status of the Stock

Prior to management of blueline tilefish in the Mid-Atlantic, NMFS listed blueline tilefish as overfished, but not overfishing from the Southeast Data, Assessment, and Review (SEDAR) 32 conducted in 2013 (SEDAR 2013). More recently, updated stock status information was identified through the 2017 benchmark assessment, SEDAR 50 (SEDAR 2017). Genetic work conducted for SEDAR 50 suggests a genetically homogenous population off the entire Atlantic coast yet does not suggest what catch may be appropriate off various parts of the coast. In SEDAR 50, the blueline tilefish stock was split in two, north and south of Cape Hatteras to allow each Council (Mid and South Atlantic) to set their own specifications. The stock south of Cape Hatteras was determined to be not overfished with overfishing not occurring. The assessment did not provide stock status information relevant to the Mid-Atlantic management area due to insufficient data. The next SEDAR operational stock assessment for blueline tilefish is tentatively scheduled for 2024. This operational assessment will be used to inform the next blueline tilefish specifications package for 2025 and beyond.

Management System and Fishery Performance

Management

The Mid-Atlantic Fishery Management Council (Council or MAFMC) established management of blueline tilefish north of the Virginia/North Carolina border through Amendment 6 to the Tilefish Fishery Management Plan. In 2016, initial measures were set using a data limited approach and the Delphi Method (Southwick and Associates 2016).

Following the 2017 SEDAR 50 assessment where no recommendations were made for the region north of Cape Hatteras, which extends beyond the Council management areas of the Virginia/North Carolina border, the MAFMC and South Atlantic Fishery Management Council (SAFMC) formed a joint blueline tilefish subcommittee. The subcommittee used the Data Limited Toolkit to develop acceptable biological catch (ABC) recommendations for the respective Scientific and Statistical Committees (SSC). This offered an opportunity to partition blueline tilefish ABCs that crossed the two management areas (north of Cape Hatteras). *The MAFMC SSC developed the 2019-2021 blueline tilefish ABC recommendation of 100,520 pounds at its March 2018 meeting*. The SAFMC's SSC proposed blueline tilefish ABCs of 233,968 pounds for 2020-2022 (Abbreviated Framework Amendment 3 to the FMP for the Snapper Grouper Fishery of the South Atlantic Region).

In the Mid-Atlantic, commercial vessels can fish year-round and are limited to 500 pounds gutted (heads and fins attached) weight until 70% of the quota (Commercial Total Allowable Landings = 26,869 pounds) has been landed, then the trip limit is reduced to 300 pounds gutted (heads and fins attached) weight.

The recreational blueline tilefish season is open from May 1 to October 31 and the possession limit depends on the type of vessel being used (Recreational Total Allowable Landings = 71,912 pounds). Anglers fishing from private vessels are allowed to keep up to three blueline tilefish per person per trip. Anglers fishing from a for-hire vessel that has been issued a valid federal Tilefish Party/Charter Permit but does not have a current U.S. Coast Guard safety inspection sticker can retain up to five blueline tilefish per person per trip. Finally, anglers on for-hire vessels that have both a valid federal Tilefish Party/Charter Permit and a current U.S. Coast Guard safety inspection sticker can retain up to seven blueline tilefish per person per trip.

Commercial Fishery

Commercial landings (Maine-Virginia) were generally very low (less than 20,000 pounds) throughout the time series except for 2013-2015, when regulations south of Virginia, the lack of regulations in federal waters from Virginia north, and the lack of state regulations in New Jersey drove effort northward and into New Jersey (Figure 1 and Table 1). Further breakdown by year/state may violate data confidentiality rules (especially for 2016 and 2017). In 2021, 1,897 individuals held federal commercial tilefish permits (valid for both golden and blueline tilefish) and landed 25,288 pounds (Tables 1 and 2). Discards are calculated as 1% of overall commercial landings resulting in 253 pounds for 2021. Thus, total commercial catch was 25,541, which ia approximately 6% under the 27,140-pound ACL.

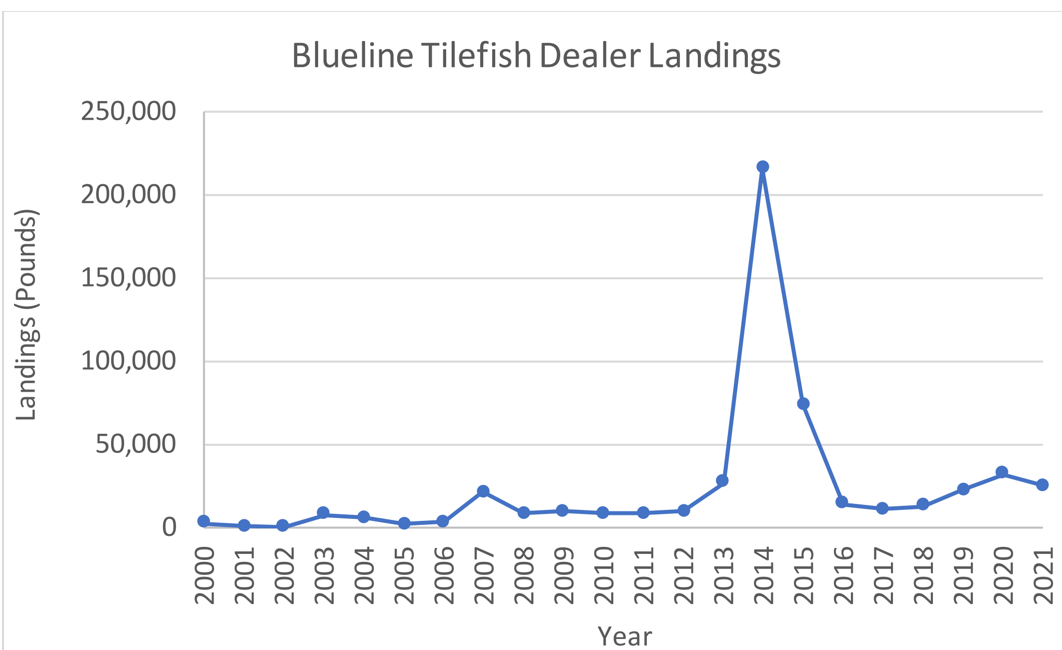

Figure 1. Commercial blueline tilefish landings (live weight) from Maine-Virginia, 2000-2021. Source: NMFS unpublished dealer data.

Table 1 and Table 2. Commercial blueline tilefish landings (live weight) from Maine-Virginia, 2000-2021 (Table 1) and 2021 by state (Table 2). Source: NMFS unpublished dealer data.

1.)

Year	Pounds
2000	2,446
2001	955
2002	269
2003	7,601
2004	5,827
2005	2,031
2006	3,039
2007	21,068
2008	8,495
2009	9,626
2010	8,388
2011	8,179
2012	9,624
2013	26,781
2014	215,928
2015	73,644
2016	14,235
2017	10,734
2018	13,068
2019	22,759
2020	31,918
2021	25,288

2.)

State	Pounds (2021)
MA	675
RI	1,176
NY	1,737
NJ	2,466
MD	14,906
VA	4,328
Total	25,288

Aggregate landings from the 2000-2021 time-series are approximately 66% from bottom longline, with most of the remaining landings coming from bottom trawl and handline. Over half of all landings in the time series were bottom longline into New Jersey in 2013-2015 prior to Mid-Atlantic management. Landings from all other gear types are low and variable from year to year. The breakdown of commercial landings by gear (based on VTRs) for 2021 are presented in Table 3. Furthermore, Table 4 presents landings by trip in pounds bins.

Table 3 and Table 4. Commercial blueline tilefish landings (live weight) in 2021 by gear (Table 3) and trip presented in pound bins (Table 4) from Maine-Virginia. Source: VTR database.

3.)

Gear	Pounds[1]	Percent
Handline	19,570	52.87
Longline	14,730	39.80
Trawl	2,697	7.29
Pots/Traps	17	0.05
Total	28,187	100

4.)

Pound Range	Trips (N)
500+	15
400 - 499	12
300 - 399	4
200 - 299	18
100 - 199	12
1 - 99	45
Total	106

Statistical areas 626, 622, 632, 616 and 621 accounts for the majority of catch for the 2000-2021 period (Figure 2 and Table 5) as well as the 2020 fishing year. A further breakdown by year/area may violate data confidentiality rules.

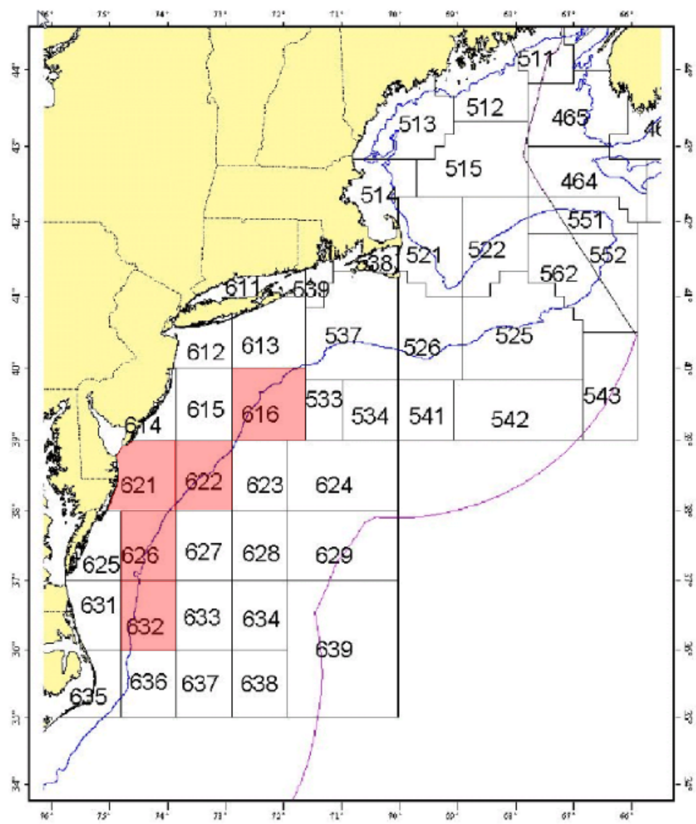

Figure 2. Top 5 NMFS statistical areas accounting for total 2021 blueline tilefish landings identified with commercial VTRs. Source: NMFS unpublished VTR data.

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[1] One VTR record indicated landings of 15,000 pounds. This report is being reviewed by the NMFS but is thought to be inaccurate. Therefore, this report was removed from the results presented in Table 3.

Table 5. Top 5 statistical areas summarizing blueline tilefish landings greater than 10,000 pounds from Maine-Virginia for 2000-2021. Source: NMFS unpublished VTR data.

Stat Area	2000-2021 Landings (Pounds)
626	246,596
622	53,456
632	49,789
616	42,323
621	33,431

Commercial blueline tilefish ex-vessel revenues (nominal) and price (inflation adjusted to 2020 dollars) are described in Figures 3 and 4. Since blueline tilefish have been managed by the Council (secretarial interim action in 2016), the ex-vessel value has averaged $54,519 at approximately $2.68 per pound. For 2021, the ex-vessel value was $80,623 at $3.19 per pound.

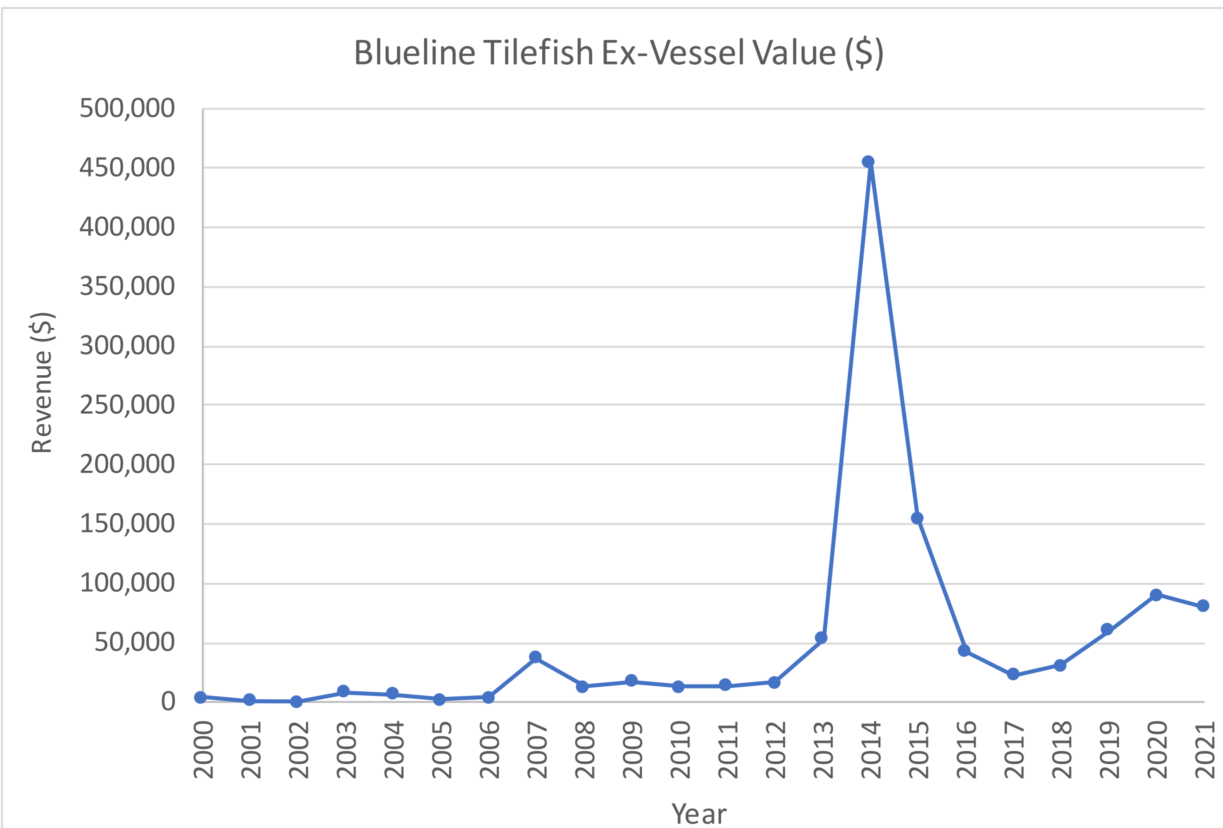

Figure 3. Ex-vessel revenues for blueline tilefish, Maine to Virginia combined, 2000-2021. Source: NMFS unpublished dealer data.

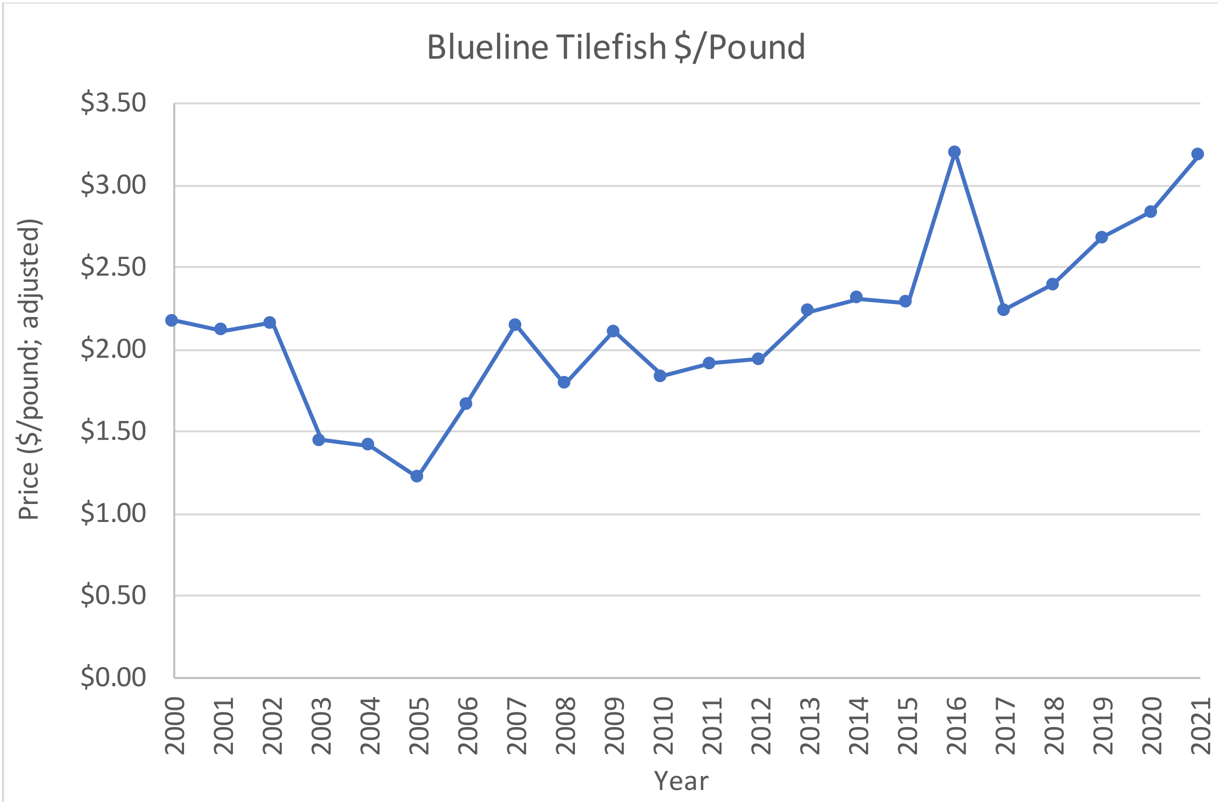

Figure 4. Price for blueline tilefish, Maine to Virginia combined, 2000-2021. Note: Price data have been adjusted by the GDP deflator indexed for 2020 (2021 – unadjusted). Source: NMFS unpublished dealer data.

Recreational Fishery

In 2021, 680 tilefish permits were issued to party/charter vessels within the relatively small recreational fishery. Stakeholders believe that VTR reporting compliance for blueline tilefish has been low, especially historically and for charter vessels. Table 6 provides the available VTR reports for blueline tilefish since 2012, when previous work with the advisors and other blueline tilefish recreational fishermen has suggested VTR reporting compliance began to encompass at least the primary head boats. For 2021, the for-hire sector landed 13,610 blueline tilefish. Recreational discards are calculated as 2% of overall landings resulting in 272 fish for 2021. Thus, total recreational catch was 13,882 fish. Until recently, blueline tilefish landings by private anglers were only estimated via MRIP, however intercepts in the MRIP are an exceedingly rare event (Table 7).

Table 6. Blueline tilefish party/charter VTR landings and reported discards from Maine-Virginia, 2012-2021. Source: NMFS unpublished VTR data.

Year	Number of Trips	Landings (Numbers of Fish)	Reported Discards (Numbers of Fish)	Estimated Discards[2] (Numbers of Fish)
2012	103	10,051	338	201
2013	120	11,838	128	237
2014	138	15,849	254	317
2015	170	14,391	292	288
2016	158	15,493	246	310
2017	129	10,164	115	203
2018	221	12,432	99	249
2019	167	10,711	176	214
2020	149	9,670	174	193
2021	222	13,610	69	272

Table 7. Recreational blueline tilefish MRIP catch estimates by mode. Source: NMFS unpublished MRIP data.

Year	MRIP Catch (Numbers of fish)	Mode
2015	4,663	Private/Rental
2016	1,222	Charter
2016	116,833	Private/Rental
2017	12,122	Private/Rental
2018	11	Party
2018	2,392	Charter
2018	2,989	Private/Rental
2019	7	Party
2019	2,294	Charter
2019	4,839	Private/Rental
2020	88	Party
2020	1,072	Charter
2020	481	Private/Rental
2021	2,339	Charter
2021	48,749	Private/Rental

Private Recreational Angler Permitting and Reporting

To improve tilefish management and reporting, the Greater Atlantic Regional Fisheries Office (GARFO) implemented mandatory private recreational permitting and reporting for tilefish anglers in August 2020. This action was approved in late 2017, but with delayed implementation.

[2] Recreational discards are calculated as 2% of overall landings.

Outreach materials and webinars were provided by GARFO and the Council leading up to the final rule and will continue to be circulated as these regulations become commonplace.

Under this rule, private recreational vessels (including for-hire operators using their vessels for non-charter, recreational trips) are required to obtain a federal vessel permit to target or retain blueline or golden tilefish north of the Virginia/North Carolina border. These vessel operators would also be required to submit VTRs electronically within 24 hours of returning to port for trips where tilefish were targeted or retained. For more information about the proposed requirements, check out the Recreational Tilefish Permitting and Reporting FAQs.

Permitting

Get your federal private recreational tilefish vessel permit through Fish Online. This new permit is required even if a vessel already holds a for-hire tilefish permit. Call the GARFO Permit Office at 978-282-8438 for questions about the permitting process.

Reporting

NOAA Fisheries is encouraging anglers not already using another electronic VTR system to utilize NOAA Fish Online, which is available through a mobile app or a web-based portal. Other systems that may be suitable for recreational anglers include SAFIS eTrips/mobile and SAFIS eTrips Online. You can access information about approved applications and other aspects of electronic reporting on the NOAA Fisheries website.

Additionally, a new app has been released to make the reporting process increasingly easy and convenient. Harbor Light Software's *eFin Logbook* has received certification from NOAA Fisheries as an approved application through which anglers can report their trips. Funded by the Council, *eFin Logbook* is a user-friendly application designed specifically for recreational tilefish anglers. The app is available for use on all Apple and Android mobile devices (iPhone, iPad, Android phone, and Android tablet).

At present, *eFin Logbook* can only be used by tilefish recreational anglers to satisfy reporting requirements. Future modifications may expand its capabilities to other reporting and personal fishing log applications. For-hire operators, many of whom have other reporting requirements, are encouraged to choose different software. To learn more about other electronic reporting options and decide which one is right for you, visit the NOAA Fisheries Greater Atlantic Region Electronic Reporting Web Page.

As of October 2021, 814 tilefish permits have been issued for private recreational anglers. This permit allows recreational anglers to land both blueline and golden tilefish. For the 2021 fishing year, 34 private recreational trips were reported by recreational anglers with landings equal to 319 fish.

Currently, there is no average weight that can be applied to blueline tilefish across the coast as average weights vary significantly. Thus, recreational catch is summarized in numbers of fish. For 2021, MRIP reported 48,749 blueline tilefish caught through the private/rental mode, however, only 343 fish were reported through the new private angler permitting/reporting requirements. VTRs presented 13,882 fish caught (including reported discards) via the for-hire fleet. Total recreational removals are then estimated to be 62,631 fish. Catch in pounds is then estimated using a range of accepted weights (3-6 pounds from NY to NC, as indicated by the tilefish advisors) across the coast (Table 8). For reference, an accepted average weight of 3.65 pounds was proposed in Amendment 1 to the Tilefish FMP.

Table 8. Coastwide recreational blueline tilefish catch using VTRs (party/charter: 2015-2021, private recreational: 2020 and 2021) and MRIP (private/rental: 2015-2019, 2021) with assumed weights.

Year	3 Pounds	4 Pounds	5 Pounds	6 Pounds
2015	58,305	77,740	97,175	116,610
2016	404,918	539,890	674,863	809,835
2017	68,195	90,927	113,659	136,390
2018	47,188	62,918	78,647	94,377
2019	47,583	63,444	79,305	95,166
2020[3]	29,633	39,511	49,388	59,266
2021 (MRIP as P/R)	187,893	250,524	313,155	375,786
2021 (Private VTR as P/R)	42,765	57,020	71,275	85,530

In 2021, Tilefish Monitoring Committee members questioned whether MRIP detectability issues for estimating blueline tilefish private recreational harvest have improved enough to warrant the use of the MRIP survey in monitoring the recreational component while private recreational reporting becomes more established. To monitor the recreational fishery, the MC recommended using the Delphi[4] percentage of 105.16% of charter vessel landings to estimate landings for the private angler. This is an interim fix to not having robust estimates of private recreational landings and will be used until more data is available or an improved method is developed. Private recreational catch is now also available through the VTRs, but the values differ substantially from those reported by MRIP. Party/charter landings will continue to be monitored using the most updated VTRs to assess the catch and landings in numbers of fish (Table 9).

[3] No MRIP estimates were available for 2020 private recreational landings, so the VTRs were used the first year by default.

[4] The Delphi method was utilized in 2016 and offered recreational landings for charter, headboat, and private anglers. The Delphi method was used to develop a recreational time series for blueline tilefish through extrapolation of survey results. A ratio was used to back calculate private recreational landings in relation to charter landings from vessel trip reports. This method had been peer reviewed and accepted as best available science by SEDAR 50 and further recommended by the MC through 2020.

Table 9. Recreational blueline tilefish catch (ME-VA) using VTRs (party/charter: 2015-2021, private rental: 2020) and MRIP (private/rental: 2015-2019, 2021), as well as estimates of private/rental catch using the Delphi method (Delphi – 105.16% of charter).

Year	Party (Numbers)	Charter (Numbers)	Private Rental (MRIP 2015-2019, VTR 2020 Numbers, 2021 MRIP and VTR)	Private Rental (Delphi - Numbers)
2015	12,381	2,298	4,663	2,417
2016	13,746	2,057	116,833	2,163
2017	8,735	1,632	12,122	1,716
2018	4,796	7,885	2,989	8,291
2019	3,247	7,679	4,839	8,075
2020	6,166	3,626	MRIP = 481 Private VTR = 84	3,813
2021	10,314	3,568	MRIP = 48,749 Private VTR = 343	3,752

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Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 3, 2022

To: Chris Moore, Executive Director

From: Jason Didden, staff

Subject: Blueline Tilefish ABC – Staff Recommendation

Blueline Tilefish

As part of the specification process, the Scientific and Statistical Committee (SSC) and Council will review the most recent information available to determine whether modification of the 2023 specifications is warranted. The Blueline Tilefish fishery is currently under multi-year specifications for 2022-2024 per a pending proposed rule. The current and to-be specified Acceptable Biological Catch (ABC) is 100,520 pounds (45.60 mt), based on the current Overfishing Limit (OFL) as parsed for the Mid-Atlantic area. After a review of the available information, staff recommends no changes to the previously-recommended 2023 ABC.

MID-ATLANTIC | FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 23, 2022

To: Chris Moore, Executive Director

From: Karson Coutre, Staff

Subject: Sea Turtle Bycatch in Trawl Fisheries

On Wednesday, April 6th, NOAA Protected Resources staff will provide an update and solicit Council feedback on their recent public outreach efforts related to sea turtle bycatch and gear research in trawl fisheries in the Greater Atlantic Region. NOAA Protected Resources staff conducted virtual stakeholder webinars and call-in days throughout February and March to gather information from the fishing industry and other stakeholder groups to inform any future bycatch mitigation measures. In addition, NMFS staff presented and sought feedback at a joint meeting of the Summer Flounder, Scup, Black Sea Bass and Mackerel, Squid, Butterfish Advisory Panels held via webinar on February 15, 2022.

Materials listed below are provide for the Council's discussion of this agenda item.

1) NOAA Protected Resources Overview of Sea Turtle Bycatch.

2) Summary of February 15, 2022 Joint Advisory Panel meeting.

3) AP comment received February 15, 2022, recirculating a relevant letter dated August, 10, 2009.

SEA TURTLE BYCATCH IN TRAWL FISHERIES

SUMMARY OF ISSUES
APRIL 2022

BACKGROUND: As we presented at the December Council meeting, fisheries bycatch is a primary threat to sea turtles in our region, and the highest trawl bycatch occurs in the Atlantic croaker, longfin squid, and summer flounder fisheries. We have tested gear (e.g., Turtle Excluder Devices (TEDs)) and operational (e.g., data loggers to monitor tow durations) modifications in these three fisheries. While there is still research to be completed, the results indicate that these modifications can be effective at reducing the severity of interactions with sea turtles and are operationally feasible.

UPDATES SINCE DECEMBER PRESENTATION: Decomposed sea turtles were removed from the numbers presented at the December Council meeting. As a result, the total number of observed sea turtle interactions in trawl gear from 2000 to 2019 was 264, with 95 occurring on croaker trips (identified by the top landed species by hail weight), 50 on longfin squid trips and 45 on summer flounder trips.

POTENTIAL MITIGATION: While final operational feasibility research is completed, NMFS is gathering early input and information from the public, fishing industry, and other stakeholder groups to inform any future measures. Given the results of previous research, we are considering:

1) Requiring TEDs with a large escape opening in trawls that target Atlantic croaker, weakfish, and longfin squid to reduce injury and mortality resulting from accidental capture in these fisheries;
2) Moving the current northern boundary of the TED requirements in the summer flounder fishery (i.e., the Summer Flounder Fishery-Sea Turtle Protection Area) to a point farther north to more comprehensively address capture in this fishery;
3) Amending the TED requirements for the summer flounder fishery to require a larger escape opening to allow the release of larger hard-shelled and leatherback sea turtles; and
4) Adding an option requiring limited tow durations, if feasible and enforceable, in lieu of TEDs in these fisheries to provide flexibility to the fisheries.

SUMMARY OF INFORMATION RECEIVED: Council/Commission meetings, public webinars, call in days, and additional public responses resulted in approximately 30 questions and 30 comments. Feedback consisted of questions on the sea turtle bycatch estimates, observer data, and research. Comments were received on the geographical range of the measures, tow duration issues, fishery definitions, and economic impacts. Several information needs were also identified related to additional data and research.

ADDITIONAL INFORMATION: Background information (including the latest trawl bycatch estimate), descriptions of TED designs, research results, type of information needed, recordings of the public webinars, and how to comment can be found at our website.

Summer Flounder, Scup, and Black Sea Bass & Mackerel, Squid, and Butterfish Advisory Panel Meeting Summary

Tuesday, February 15, 2022, 2:30 pm - 4:00 pm

Advisory Panel Members in Attendance: George Topping, Bonnie Brady, Eleanor Bochenek, Harvey Yenkinson, Kenny Hejducek, Greg DiDomenico, Katie Almeida, Meghan Lapp, Pam Lyons Gromen, Mike Waine, Gerry O'Neill, Jeff Kaelin, Bob Pride, Joseph DeVito, Mike Plaia, Daniel Farnham, Jr., Emerson Hasbrouck, Jeff Deem.

Other Attendees: Carrie Upite (NMFS Staff), Jeff Gearhart (NMFS Staff), Karson Coutre (Council Staff), Kiley Dancy (Council Staff), Peter Hughes (Council), Adam Nowalsky (Council), Sonny Gwin (Council), Chris Batsavage (Council), Carly Bari (NMFS Staff), Colleen Coogan (NMFS Staff), Henry Milliken (NMFS Staff), Emily Keiley (NMFS Staff), Jason Didden (Council Staff), Wes Townsend (Council), Dan Farnham (Council), Alissa Wilson, Nick, JB, JN.

Summary:

The Advisory Panels met via webinar and reviewed a presentation from Carrie Upite (NMFS Protected Resources Division) on sea turtle trawl bycatch issues and the ongoing research on mitigation measures in the Greater Atlantic Region. Advisors provided the following questions and comments; however, these do not represent consensus statements.

Several advisors asked clarifying questions regarding the sea turtle bycatch estimate including how the estimate was derived and how the estimate compares to the observed sea turtle interactions. NMFS staff described the estimation process and responded that they would share the bycatch estimate paper which describes the methodology and data in more detail.

Multiple advisors were interested in more information about how many turtles were released alive versus dead and details of the calculated mortality rate estimate. Advisors felt this information is important when determining the scale of the issue. An advisor added that the bycatch estimate of 571 interactions across all trawl fisheries is lower than the number of turtles that are found cold stunned each year and felt it was misleading to say that trawl fisheries are the largest threat to sea turtles. Because of this, they added that it is unfair to impose draconian measures on the trawl fleet.

Advisors also asked how fisheries were defined and commented that hail weight by species was not always the best way to define a fishery. One advisor asked whether different trawl net types were analyzed and if there were different turtle bycatch estimates depending on the net. NMFS staff responded that different net types within the bottom otter trawl category were not analyzed separately but this was something that could be explored further. Another advisor requested more specific regional information and the percent of trips where sea turtle takes have been observed, noting that in the past there had been an estimate of 5 takes for an area with no observed takes. NMFS staff noted that they would send this advisor the paper that provides regional information.

An advisor asked whether interactions with sea turtles were different during the day versus at night. This advisor also asked about sea turtle behavior when in front of the trawl net and whether sea turtles get herded in or try to escape. NMFS staff indicated day versus night interactions had not been looked at yet. Staff also noted that sea turtle behavior can differ based on the size of the net, for example with larger nets turtles are already in the back of the net when they realize it and therefore cannot escape. Furthermore, in lower visibility turtles will not react as quickly.

One advisor requested that more information be provided to the public about the health and regional status of the different sea turtle populations and how the TEDs have worked in fisheries where they have been required. They asked if there are success stories that can inform current decision making. This advisor also suggested that flexible TEDs may be the preferred modification out of the different TED options. They noted that they were not aware that there was a current croaker fishery, however linking summer flounder and squid for this analysis would make sense because often the same boats fish for both species. They added that getting the word out to commercial fishermen needed to be prioritized and felt that this issue was coming as a surprise after not being discussed for several years. Another advisor noted that comments to NMFS regarding sea turtle bycatch issues were sent in 2009 on behalf of the Garden State Seafood Association and they never received a response. While rulemaking never occurred at that time for a variety of reasons, it was discussed that this letter was sent to Council staff recently and would be sent to NMFS staff for their review since many of the comments are still relevant.

One advisor voiced concern over interactions with sea turtles in recreational fisheries due to vessel strikes or fishing hook and line injuries and asked whether these were monitored and mitigated. They noted that the large number of sport boats moving at high speeds in the summer may be a source of sea turtle interactions that needs to be documented. NMFS Staff responded that there are different reporting mechanisms for when these interactions occur; for example, stranding networks record information about the condition of turtles when they wash up on beaches. Watercraft injuries are a major concern and there are efforts underway to minimize those injuries and interactions.

An advisor asked whether cameras could be used on the gear so that if an operator sees a turtle go in the net they can tow for a shorter amount of time. NMFS staff responded that this had been looked at in the past. There were some water clarity issues and it is a high-cost monitoring system to obtain a live feed of the net camera. Another advisor commented that in the squid fishery there is no option to compensate for reductions in catch by targeting another species on the same trip using squid mesh, therefore reductions would be a direct economic loss.

Overall, several advisors agreed that in order to have meaningful solutions, more information needs to be provided to the public such as the number of strandings, other sources of mortality such as vessel strikes, observed takes by region, and population assessments for the sea turtle species of concern. Another advisor reiterated that the trawl data needs to be analyzed at a finer scale to determine if there are gear configurations or net types where turtle interactions are not occurring.

1636 DELAWARE AVENUE CAPE MAY, NEW JERSEY 08204
office (609) 898-1100 fax (609) 898-6070
gregdi@voicenet.com

August 10, 2009

Alexis Gutierrez
Office of Protected Resources
NMFS
1315 East-West Hwy
Silver Spring, MD 20910
Sent Via Fax (301-713-4060)

Comments on: Sea Turtle Strategy for Conservation (*See* NMFS Scoping Document 5/11/2009) and Intent to Prepare an Environmental Impact Statement (EIS) *See* 74 FR 21627 and 31411

Dear Ms. Gutierrez:

Please accept these comments on behalf of the Garden State Seafood Association (GSSA) regarding sea turtle conservation issues and the intent to prepare an environmental impact statement. *See* 74 FR 21627. The GSSA is comprised of commercial fishermen, shore-based seafood processors, commercial dock facilities, seafood markets and restaurants, and various NJ-based commercial fishing industry support businesses. The GSSA membership represents every major port in the State, harvesting approximately $125 million dollars worth of seafood products annually, supporting 2000 jobs, and contributing significantly to the coastal economy of the State of New Jersey.

The GSSA intends to evaluate the degree to which sea turtle gear mitigation measures are required in the Mid-Atlantic within the context of the NMFS' framework and evaluation process and the various mortality components in the most recent Biological Opinion ("BiOp") for the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (*See* Draft FLS/SCP/BSB BiOp, 12-06-01, NMFS). NMFS initiated the draft information framework and criteria for a sea turtle "Strategy" in 2004 (See 69 FR 30627). The criteria for evaluating gear types cited in the framework were to be used to develop future conservation measures. The Agency recognized back in 2004 that it "must gather and evaluate comprehensive information on gear types, fisheries practices, sea turtle bycatch, and existing management regulations." *See* 69 FR 30628

The Agency also denoted "first priority" characteristics for gear types that would be evaluated for sea turtle bycatch. These characteristics included but were not limited to frequent documented interactions, frequent and expected interactions, high rates of interactions and mortality, and lack of effective management measures that benefit sea turtles. *See* 69 FR 30631.

The 2001 BiOp conclusion that the 2002 FLS/SCP/BSB fisheries could adversely affect loggerhead sea turtles was based solely on the fact that 1,303 commercial permits were being afforded a total combined quota increase of 8.5 million pounds for a total harvest of 38.86 million pounds in 2002 (BiOp, pp.3-6). In addition, the BiOp indicated that sea turtle mortality attributed to boat strikes and ingestion of marine debris was considerably greater than the numbers involving entanglement in fishing gear (BiOp, p.44). It is unclear whether these numbers are for leatherback turtles only or if the numbers are similar for loggerheads. Each of these elements must be considered in the context of the Agency's current approach to developing gear-based mitigation measures in the Mid-Atlantic region.

In developing our comments on the DEIS Notice/Strategy Scoping Document the GSSA reviewed the agency's supporting documentation on the Estimated Average Annual Bycatch Estimate (NMFS 2008); Loggerhead 5-Year Review: Summary and Evaluation (NMFS 2007); the Assessment of the loggerhead Turtle Population conducted by the Turtle Expert Working Group (NMFS 2009); and all related FR notices dating back to 2004. All of these documents must be considered in the context of the analyses used to determine the need for gear mitigation measures in the Mid-Atlantic region.

The following comments are offered on behalf of the GSSA membership.

In NMFS 2008, the agency indicates (p.4) that "bycatch estimates are provided only for 1996-2004." The GSSA believes that more recent data (than 1996-1999) would more accurately reflect current fishing operations and the potential for turtle interactions. NERO requested that data from 2000-2004 be used to calculate the average annual bycatch of loggerhead turtles by FMP group versus the 1996-2004 data set (p.25). Despite the NERO request, it appears to the GSSA that while the 2000-2004 VTR data were used to estimate the commercial harvest – the actual bycatch rate applied to the current harvest level was generated from 1994-2004, if not 1996-2004 data (pp.26-28).

The Agency justifies including the old data by suggesting that pooling all years and averaging the estimated accounts for changes in the fishery. Unfortunately, this still assumes a consistent trend across 9-years. We do not agree this assumption is valid and recommend the agency utilize 2000-2004 data to estimate both the rate and harvest for purposes of extrapolation. We also note that the average percent observer coverage for Mid-Atlantic bottom otter trawl gear during 2000-2004 was 4 times higher compared to 1996-1999 (Table 1a; p.13).

We also remained very concerned about the grouping of categorical variables into two “latitude zone” categories. It is unclear exactly how these Temporal Alternatives were chosen to be where they are and how these lines relate to NMFS’ statistical area reporting in terms of effort and catch. Further, it is unclear how such broad groupings permit the agency to determine appropriate and specific time/area requirements.

Despite our misgivings regarding data periods and subjective latitude zones one thing is abundantly clear – the best scientific information indicates relatively few turtle interactions (8 total, and 12% of observed interactions, p.8) are observed north of 38 degrees North latitude. In fact, during 2000-2004 approximately just 3 interactions that occurred in the summer flounder fishery appear to have been observed north of this location (Table 3, p.17). The percentage of observed days fished in Lat 39.41 was 75.3%, fully 3 times higher than the percentage of days covered in Lat 34.38 (p.14).

The agency concluded in the 2001 BiOp that the projected 8.5 million pound quota increases from 30.36 to 38.86 million pounds for the 2002 FLS/SCP/BSB could adversely affect loggerhead sea turtles (BiOp 2001, pp.3-6). The quota increase and subsequent effort increase was the sole reason for concern and the updated Biological Opinion. Those same concerns do not reflect the current status of the fishery. In the 2008 fishing year the total FLS/SCP/BSB quota was 16.586 million pounds. The MAFMC preferred alternatives for the 2009 quota total 17.21 million pounds. These current quota levels (and the associated effort) are less than half of what they were in 2002 when the agency raised concerns regarding bottom trawl gear and sea turtles.

The Agency is contemplating trawl gear mitigation measures and time/area requirements but has yet to put the trawl interactions in the context of other sources of interactions and mortality such as boat strikes, disease and interactions in recreational fisheries. In NMFS 2007, the agency indicates as many as 20.5% of loggerhead strandings show signs of vessel interactions.

In Florida during some years the State reports as much as 60% of strandings show signs of vessel interaction. A long term monitoring program coordinated by the Florida Fish and Wildlife Commission reported that during 1980-2005 over 4,000 stranded sea turtles were documented (500 live; 3,500 dead) with propeller wounds accounting for 30% of all known strandings during the period.

Disease is also causing turtle mortality. In NMFS 2009 the agency reported increased numbers of disease-related strandings during 1995 through 2005, especially in years 1995, 1996, 2000, 2001, 2002, 2003 and 2005 (pp. 81-82). In northeast Florida during 2006 about 100 loggerheads were impacted by a single epizootic event.

Recent data (2000-2008) on sea turtle interactions (strandings and MRFSS data) and annual take estimates related to recreational fishing have not been provided to the MAFMC or the public by the NMFS. The agency was required pursuant to the 2005 Biological Opinion (See BiOp 2005, pp.96-97) to implement a survey by 2006 in the recreational and charterboat sectors to evaluate and estimate takes in recreational fisheries. Strandings data for the same period should also be available. Before accepting sole responsibility for gear-based mitigation changes in commercial fisheries, especially summer flounder, the GSSA requests the agency produce the annual and total estimates for recreational fishing gear.

The sea turtle sightings from aerial and shipboard surveys contained in NMFS 2009 (pp. 43-46) indicate a paucity of loggerhead sea turtles north of the VA-NC border during the fall and winter seasons, but especially during the winter (January-March). Therefore we do not support additional TED regulations north of the VA-NC border.

The following recommendations are offered on behalf of the GSSA.

1) The scoping document (p.5) contains the statement that "NMFS is responsible for in-water conservation of sea turtles. The principal anthropogenic in-water threat to sea turtles is bycatch in fisheries." NMFS makes this statement and proposes to regulate only commercial trawl gear without any regard or quantification of other in-water sources of mortality for which they are also responsible -- namely vessel and sport/charter fishing interactions. These interactions are known to occur, NMFS is required to log this information in the stranding database, and NMFS is required to evaluate and estimate takes in the sport/charter fishing sectors. None of this information has been made available or considered in the context of relative sources of mortality. This information must be made available and thoroughly considered before the agency can justify moving ahead with only commercial gear-based regulations.

2) NMFS provides trawl gear bycatch estimates for 2000-2004 using a rate estimated from data collected during 1996-2004. The GSSA believes that more recent data (younger than 1999) would more accurately reflect current fishing operations and the potential for turtle interactions in the fishery as it now exists. We recommend the Agency utilize the most recently available scientific information (2000-2004) to estimate both the rate and harvest for purposes of extrapolation. We also note that the average percent observer coverage for Mid-Atlantic bottom otter trawl gear during 2000-2004 was 4 times higher compared to 1996-1999.

3) Based on the bycatch model's predictive limitations, changes in fishing effort and quotas, and using the most current data to apply a commonsense measure of what is reasonable and prudent to the alternatives from a cost/benefit perspective -- we recommend the summer flounder fishery be addressed only. We also recommend abandoning Trawl Phases Two and Three. We do not support any of the Fisheries Alternatives offered in the Options Document and request the Agency conduct bycatch percentages analysis by directed fishery and not by Fishery Management Plan.

4) Regarding the summer flounder trawl fishery, before the agency initiates rulemaking we request a re-examination of the relevant catch and rate estimate using 2000-2004 data; a more precise latitudinal explanation of where takes have occurred and are predicted to occur (rather than "subjective latitude zones") vis a vis the current Summer Flounder Fishery Sea Turtle Protection Area and the proposed latitude time frame designations. We do not support any of the Temporal Alternatives and believe an additional analysis should be conducted. The Agency should consider a different set of spatial and temporal options for the current TED regulations already in place in the summer flounder fishery. We feel strongly that an expansion of the current TED temporal requirements already in place in the Sea Turtle Protection Area (STPA), would address known incidental takes. Furthermore, an adjustment of the current northern boundary of the STPA could easily reduce the risk to sea turtle entanglements by moving that boundary to the VA/ NC border.

5) For all trawl fisheries other than shrimp and summer flounder, it is unclear what type of TED testing has been conducted. We note that relatively extensive work was conducted in the shrimp and flounder fisheries. The GSSA is very concerned that "generic" trawl gear TED requirements for these other fisheries that have not experimented with TEDs during normal fishing operations could lead to catch reductions and problems with no little/benefit to turtles. We request an accurate accounting of the results of all on-the-water research that NMFS has conducted in these other fisheries that are targeted for TED requirements in the various phases of the Scoping Document.

6) Finally, we question the justification for this entire action. NMFS's own assumptions are the existence of a constant 9-year trend in both effort and sea turtle bycatch, and that the primary reason for the 2001 BiOp was due to a substantial quota and subsequent trawl gear effort increase to 38.86 million pounds in 2002 combined summer flounder, scup and black sea bass quotas. Based on these NMFS assumptions, how does NMFS justify requiring TED's in all Mid-Atlantic bottom trawl fisheries if the 2008 quotas were 16.586 million pounds?

On behalf of the GSSA I thank you for the opportunity to comment on the Sea Turtle Scoping Document and Strategy for fisheries in the Mid-Atlantic region. We look forward to continuing our participation in this process.

Sincerely,

Gregory DiDomenico
Executive Director
Garden State Seafood Association

Rick Marks
Hoffman, Silver, Gilman & Blasco

cc: James Lecky, Chief, Office of Protected Resources
Dan Furlong, Executive Director, MAFMC
Rick Robbins, Chairman, MAFMC

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Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 24, 2022

To: Chris Moore, Executive Director

From: Jason Didden, Staff

Subject: Review of **2022** *Illex* Specifications

The Scientific and Statistical Committee (SSC) and Mackerel, Squid, and Butterfish (MSB) Monitoring Committee (MC) reviewed the most recent information available to determine whether modification of the 2022 specifications is warranted. An increase to the Acceptable Biological Catch (ABC) and associated specifications was recommended, as discussed in the SSC and MC reports. Based on recent years, the in-season adjustment process in the MSB Fishery Management Plan (FMP) should be able to accommodate a change for the 2022 *Illex* fishery. 2023 *Illex* Specifications will be considered later in the year pending the results of the research and/or management track assessments for *Illex.*

The following materials are enclosed on this subject:

1) March 2022 SSC Report – See Committee Reports Tab

2) MSB MC Report

3) MSB Advisory Panel Fishery Performance Report

4) *Illex* Fishery Information Document, Council Staff (February 2022)

5) *Illex* ABC Staff Recommendation Memo to Chris Moore (March 2022

MSB Monitoring Committee Meeting Summary - *Illex*

March 18, 2022
Webinar

The Mid-Atlantic Fishery Management Council's (Council) Mackerel, Squid, and Butterfish (MSB) Monitoring Committee met on March 18, 2022 at 1:30 pm. The purposes of this meeting were to develop recommendations regarding 2022 *Illex* Specifications and Mackerel Rebuilding. Given the different topics, two summaries were created – this summary is for *Illex*.

Monitoring Committee Attendees: Jason Didden, Carly Bari, Lisa Hendrickson, Kiersten Curti, Daniel Hocking, and Julia Beaty.

Other Attendees: Greg DiDomenico, Aly Pitts, Meghan Lapp, Pam Lyons Gromen, Katie Almeida, Sonny Gwin, Zachary Greenberg, Kelly Whitmore, Purcie Bennett-Nickerson, Dan Farnham, Melanie Griffin, Megan Ware, and Will Poston.

The MSB Monitoring Committee discussed 2022 *Illex* Specifications in light of the Scientific and Statistical Committee (SSC) increasing the 2022 *Illex* Acceptable Biological Catch (ABC) from 33,000 metric tons (MT) to 40,000 MT. The Monitoring Committee agreed that maintaining the current 4.61% deduction for expected discards seemed appropriate (the average of the 2017-2019 discard rates; range was 3.66%-5.51%). This would yield a commercial quota of 38,156 MT (i.e. for 2022 *Illex* specifications, ABC = 40,000 MT, IOY = DAH = DAP = 38,156 MT).

The Monitoring Committee discussed two options for the closure threshold: either staying with a 94% of quota closure threshold, which would increase the closure buffer to 2,289.4 MT or maintaining the same buffer size as 2021: 1,889 MT. Staff noted that the full quota was not harvested in 2020 or 2021, but there were overages in 2018 and 2019. Discussion noted that improved projection approaches and reporting have both been in place since July 2021 but that it would take a number of years to know if a 94% closure threshold will consistently under-achieve the quota.

With the improved projections (accounting for reporting lag) and improved reporting (48-hour dealer reporting after July 15), a 1,889 MT buffer might be sufficient, but it will be more likely to result in a quota overage than the current 94% closure threshold. If we had a 1,889 MT buffer, and went 3,693 MT above the buffer (worst case in last 5 years), that could lead to a 4.5% ABC overage in 2022 if our discard set-aside is precise.

Remaining catch reporting and closure implementation lags in this high volume fishery, coupled with uncertainty/variability regarding annual productivity, are likely to cause *Illex* to be continue to be difficult to monitor. Daily landings can be as high as 998 MT per day based on recent fishery performance. Given the race to fish before the quota closes, an ABC overage could occur with the higher 94% closure threshold if circumstances were similar to 2019. Given the charge to the Monitoring Committee to make recommendations that ensure specifications are not exceeded, the Monitoring Committee found no strong rationale to recommend a change from the current 94% closure threshold until more years' closure performance with the recently improved projecting and reporting circumstances can be evaluated.

Public comment summary:

-Industry is committed to adhere to the 48-hour reporting requirements in order to just access 100% of the quota, which supports jobs and economic activity.

-A request was made for similar treatment as black sea bass, in terms of concern (or rather lack thereof) about potential overages in a productive stock - plus *Illex* appears lightly exploited.

-There's a risk of going over or under but less than the full quota has been caught the last two years.

-Closure performance in recent years has been better than other fisheries, and the strengths of the current monitoring need to be understood as well as any potential monitoring challenges (e.g. the successful closures the last two years). The concerns voiced by the Monitoring Committee as justifying setting aside additional quota for a closure buffer are unnecessary.

Illex and Atlantic Mackerel
Fishery Performance Reports
February 2022

The Mid-Atlantic Fishery Management Council's (Council) Mackerel-Squid-Butterfish (MSB) Advisory Panel (AP) met via webinar on February 22, 2022 to review the *Illex* squid and Atlantic mackerel Fishery Information Documents and develop the following Fishery Performance Reports. The primary purpose of these reports is to contextualize catch histories for the Scientific and Statistical Committee (SSC) by providing information about fishing effort, market trends, environmental changes, and other factors. The trigger questions below were posed to the AP to generate discussion. The AP comments summarized below are not necessarily consensus or majority statements.

Advisory Panel members present: Eleanor Bochenek, Katie Almeida, Emerson Hasbrouck, Gerry O' Neill, Meghan Lapp, Pam Lyons Gromen, Sam Martin, Zack Greenberg, Dan Farnham Jr, and Greg DiDomenico.

Others present: Jason Didden, Mark Holliday, Will Poston, Purcie Bennett-Nickerson, Mary Beth Tooley, Peter Hughes, Alan Bianchi, Carly Bari, Alissa Wilson, Mike Waine, Tom Miller, and Dave Secor.

Trigger questions:

1. What factors have influenced recent catch (markets, environment, regulations, etc.)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

For organizational purposes, the summary is broken down by species. Each species discussion began by reviewing the species' "fishery information document."

1.2 *Illex* Squid

Market/Economic Conditions

Market conditions/prices seemed relatively similar in 2021 as 2020 - "stable." Staff noted price increase in 2021 was 7% - an AP member noted that can be just a few cents per pound difference. Seafood in general has seen recent price increases or at least stability.

U.S. suppliers continue to invest in infrastructure to regularly produce quality product. Steady supply from U.S. producers has helped with marketing. Can also get price increases through season as squid get bigger (higher prices for bigger squid) if fishery stays open.

U.S. *Illex* catches do not drive the price of *Illex* – Argentinian *Illex* and Japanese flying squid affect prices. Argentinian *Illex* are in international waters and Chinese fleet catches high volumes – world market dominates price. U.S. landings are a small component. Mark Holliday noted could be useful to have information on scale of other squid species to put U.S. fishery into more definitive context. After the meeting staff queried FAO databases and the 2019 catch of Argentine shortfin squid was listed as about 250,000 metric tons with an "E" noted by Chinese catch, possibly indicating that it is more of an estimate than others.

Environmental Conditions

Work is ongoing to understand environmental drivers – high availably persists. Fishery participants have been working with scientists to better understand how environmental conditions are affecting availability/abundance – it is critical to continue to involve fishermen in related work to understand environmental linkages.

Management Issues

Management should consider ways to achieve 100% of the quota – reconsider the 95% closure threshold. The reporting that exists will not allow substantial overages. The availability/abundance of *Illex* should be taken into account, as abundance appears to be considered when dealing with potential overages in other fisheries such as black sea bass. *Illex* should not be treated differently.

Other Issues

An advisor highlighted the HMS diet study looking at chub mackerel identified *Illex* as important HMS prey in recent years – SSC/Council should be mindful of those results and role of *Illex* in the food web as related to the strategic plan and Ecosystem Approaches to Fishery Management Guidance Document – need to be aware of how prey are, and are not, taken into account. Other advisors opposed delving further into the forage issue as relates to *Illex* and consumption by predators especially given lack of control over those predators' fisheries. It was noted that for the HMS fisheries that were looked at, they are overfished with overfishing occurring. The low impacts of the fishery on the stock per working group findings, including that the fishery operates on a small part of the *Illex* stock, should make this a non-issue

Research Priorities

See environmental considerations section above.

Additional Public Input - NA

1.3 Mackerel

Market/Economic Conditions

Demand has been strong for years – markets have not been a limiting factor. U.S. mackerel have been filling a reliable niche – generally smaller sized fish than European mackerel. U.S. fishery is a small part of overall mackerel trade, but persistent inability to supply will eventually lead to market problems – overseas participants would laugh at our mackerel quantities. After the meeting staff queried FAO databases and the 2019 European catch of Atlantic mackerel was listed as about 825,000 metric tons.

Environmental Conditions

Nothing particularly unusual observed. Few reports of fish from more southern areas.

Management Issues

Early 2021 catches were good near-shore, but once the buffer zone (mid-water trawl/herring) went into effect February 10, 2021 we lost access to those fish. Near-shore fish were also historically helpful given poor winter weather. Would have likely caught the quota in 2021 if access had remained.

There are fish near-shore now (early 2022) also, but again can't access them in 2022. The majority of areas where limited access participants landing with Gerry O'Neill have fished in last 5 years are no longer accessible due to 12-mile herring mid-water trawl restrictions. Herring restrictions affect mackerel. Would like to get more info across the fleet to confirm, but general sense that in 2021/2022 management (buffers) is severely curtailing landings.

Lack of herring RSA inhibits fall mackerel landings in Area 1A.

Horsepower restrictions, and resulting speed limitations, may be affecting the size of the fish that the commercial fishery can catch. Larger fish are faster. Could be an issue to further investigate.

Other Issues/Rebuilding

Need to consider the impact of recreational catch on rebuilding especially given some of the options being considered – can't have unrestricted recreational fishing when there's no commercial quota.

Given management constraints and data collection, need to make sure that sampling (that feeds into the assessment in terms of ages) that is occurring will be representative – across fishery sectors and components of each sector. Also may extend to selectivity assumptions.

Discussion with SSC members attending and AP members highlighted additional uncertainties that may be introduced by how management constraints and data collection may be affecting the fishery-dependent data used by the assessment. How will we know if we are rebuilding given lack of fishery access from management and thus lack of data?

Worth re-considering about whether size-limit measures (like Canada) could benefit mackerel rebuilding. Worth additionally considering how the two (Canada and U.S.) rebuilding approaches may complement each other (or not).

Research Priorities

Refer to above issues identified with rebuilding.

Additional Public Input - NA

Illex Fishery Information Document

February 2022

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for *Illex* squid with an emphasis on 2021. Data sources for Fishery Information Documents include unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel trip report (VTR), permit, and Marine Recreational Information Program (MRIP) databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit http://www.mafmc.org/msb.

Key Facts

- 2021 was the fifth banner year in a row for *Illex*. 2017-2021 represent a unique sequence in the history of the fishery of consecutive "boom" *Illex* years.
- Price and landings, and therefore revenues, were up in 2021 compared to 2020.
- Substantial variability is to be expected with any squid species.
- A soon-to-be-reviewed stock assessment should provide guidance for 2023 – in March 2022 the SSC will be considering if any adjustments are appropriate for just 2022, based on previous analyses but with an expanded range.

Basic Biology

Illex is a semi-pelagic/semi-demersal schooling cephalopod species distributed between Newfoundland and the Florida Straits, and lives less than one year. *Illex* is a semelparous, terminal spawner whereby spawning and death occur within several days of mating. The northern stock component, located north of the USA-Canada border in NAFO Subareas 3 and 4, is assessed annually and is managed by the Northwest Atlantic Fisheries Organization (NAFO), though landings have been relatively low in recent years and staff has questioned the usefulness of the recent NAFO assessments (https://www.mafmc.org/s/g_NAFO_Didden.pdf). The southern/U.S. stock component is located in NAFO Subareas 5 and 6 between the Gulf of Maine and Cape Hatteras, NC and is managed by the Mid-Atlantic Fishery Management Council (the Council or MAFMC). Additional life history information is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Status of the Stock

The status of *Illex* is unknown with respect to being overfished or not, and unknown with respect to experiencing overfishing or not. Results from the NEFSC Trawl surveys are highly variable and without apparent long-term trend. Analysis reviewed by the Council's SSC have supported quota increases in recent years, in 2021 finding: "Based on evidence presented to it, including patterns that suggest an increase in abundance, low levels of exploitation, and catches that have been constrained by existing ABCs for the last four years, the SSC continues to believe that the *Illex* stock is at a high level of abundance and experiencing a low exploitation rate." https://www.mafmc.org/ssc-meetings/2021/may-11-12

An *Illex* research track assessment is pending review and may provide additional guidance for setting quotas in 2023 and beyond.

Management System and Fishery Performance

Management

The Council established management of *Illex* in 1978 and the management unit includes all federal East Coast waters.

Access is limited with moratorium permits. Trip limits are triggered when the quota is approached. Incidental permits are limited to 10,000 pounds per trip. Additional summary regulatory information is available at https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/resources-fishing-greater-atlantic-region. A 2020 action to change *Illex* permitting is in the rulemaking process and a proposed rule is expected in 2022 – see https://www.mafmc.org/newsfeed/2020/council-approves-changes-to-management-of-illex-fishery.

The current quota is 31,478 MT, based on a 33,000 MT Acceptable Biological Catch (ABC) and a 4.52% discard rate (the mean plus one standard deviation of the most recent 10 years of observed discard rates in the last assessment). Recent SBRM discard rates have been similar, though are not based on calendar years. The fishery closes when 95% of the quota is projected to be landed and in 2021 closed effective 0001 hour August 30, 2021. In 2021 97.6% of the quota was landed.

Recreational catch of *Illex* is believed to be negligible. There are no recreational regulations except for party/charter vessel permits and reporting.

Commercial Fishery

Figure 1, from a previous Science Center data update, describes *Illex* catch 1963-2019 and highlights the early foreign fishery and then domestication of the fishery. Figures 2-3 describe domestic landings, ex-vessel revenues, and prices (inflation adjusted) since 1996. Figure 4 illustrates preliminary weekly 2020 (yellow-orange) and 2021 (blue) landings through the year.

Table 1 describes 2021 *Illex* landings by state, and Table 2 describes 2021 *Illex* landings by gear type. Table 3 provides preliminary information on *Illex* landings by statistical area for 2021. Table 4 describes vessel participation over time.

The Gross Domestic Product Implicit Price Deflator was used to report revenues/prices as "2021 dollars."

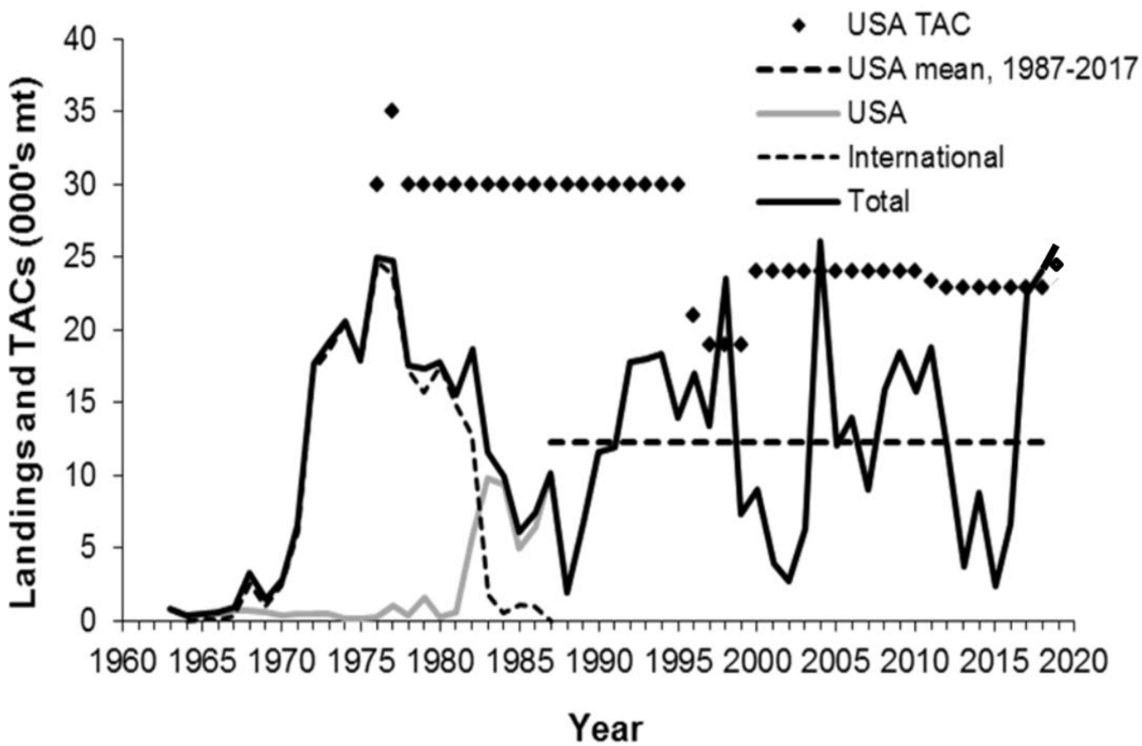

Figure 1. Total annual *Illex* landings (mt) by the U.S. and other countries for 1963-2019. Sources: NEFSC *Illex* Data update, available at http://www.mafmc.org/ssc-meetings/2018/may-8-9 and NMFS unpublished dealer data.

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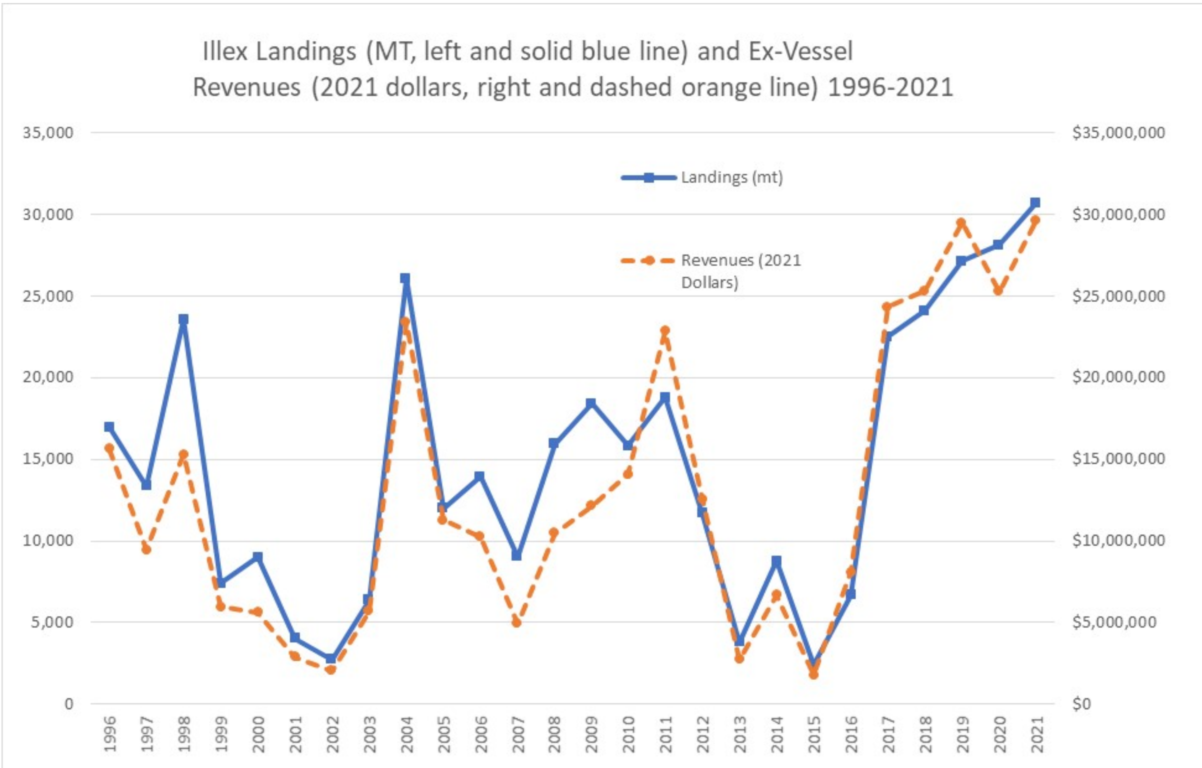

Figure 2. U.S. *Illex* Landings and Ex-Vessel Values 1996-2021. Source: NMFS unpublished dealer data.

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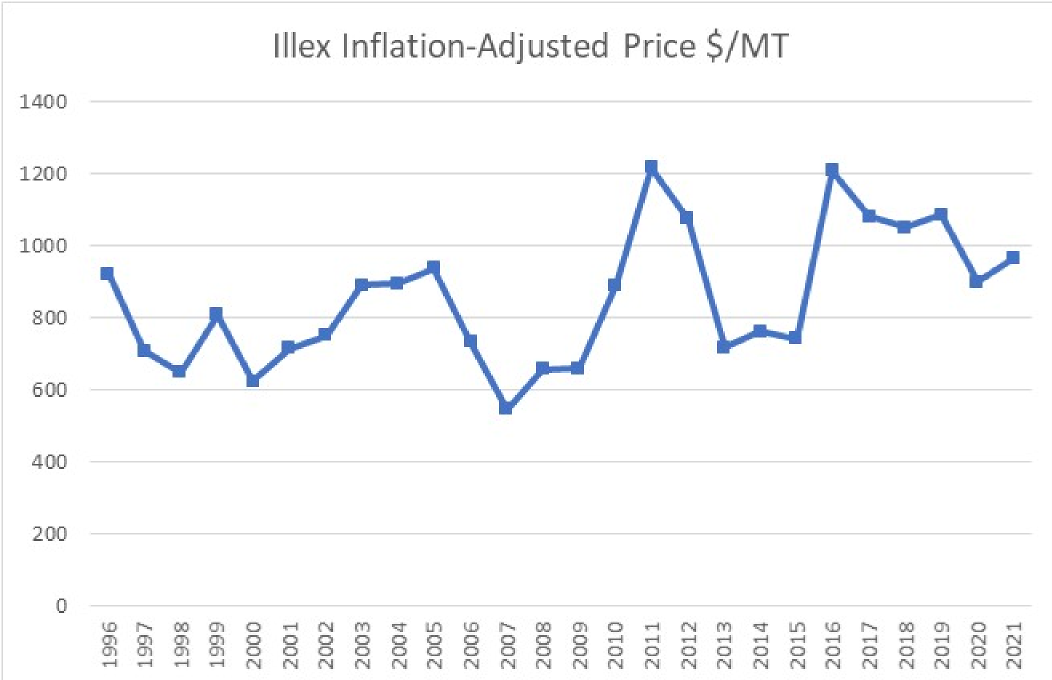

Figure 3. Ex-Vessel *Illex* Prices 1996-2021 Adjusted to 2021 Dollars Source: NMFS unpublished dealer data.

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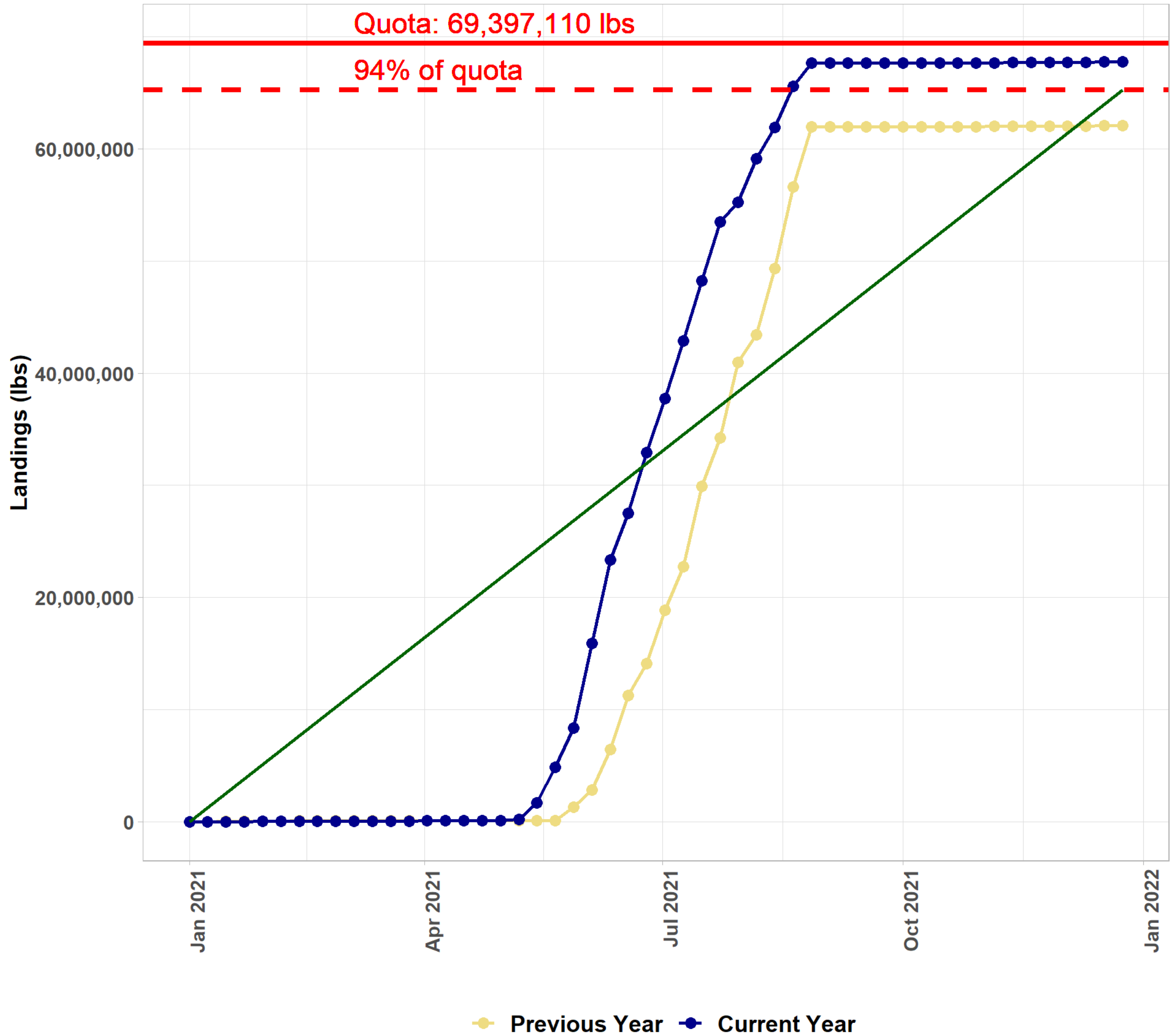

Figure 4. U.S. Preliminary *Illex* landings; 2021 in blue, 2020 in yellow-orange. Source: https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/quota-monitoring-greater-atlantic-region

Table 1. Commercial *Illex* landings (live weight) by state in 2021. Source: NMFS unpublished dealer data.

Most 2021 *Illex* landings occurred in RI, NJ, and MA (in that order), but further breakdown may violate data confidentiality rules (in spirit if not to the letter).

Table 2. Commercial *Illex* landings (live weight) by gear in 2021. Source: NMFS unpublished dealer data.

GEAR	Metric_Tons
Otter Trawl	29,383
Midwater Trawl	1,063
UNKNOWN	266
Other	3
Total	30,714

Table 3. Commercial *Illex* landings by statistical area in 2021. Source: NMFS unpublished VTR data.

NEMAREA	MT
622	17,988
526	3,714
537	2,852
616	1,710
626	1,504
623	920
632	543
636	269
621	193
627	134
Other	265
Total	30,091

Table 4. Vessel participation over time in the *Illex* Fishery based on annual landings (pounds)

YEAR	Vessels 500,000+	Vessels 100,000 - 500,000	Vessels 50,000 - 100,000	Vessels 10,000 - 50,000	Total
1982	7	7	0	10	24
1983	1	8	7	11	27
1984	4	15	4	6	29
1985	2	6	4	3	15
1986	8	6	4	3	21
1987	7	10	2	1	20
1988	3	3	1	2	9
1989	8	5	1	3	17
1990	12	3	0	1	16
1991	12	1	1	0	14
1992	16	1	0	1	18
1993	19	3	1	3	26
1994	21	7	5	8	41
1995	24	5	2	7	38
1996	24	5	6	4	39
1997	13	9	2	0	24
1998	25	4	1	3	33
1999	6	9	2	10	27
2000	7	7	0	2	16
2001	3	4	1	2	10
2002	2	3	1	1	7
2003	5	6	1	2	14
2004	23	5	2	0	30
2005	10	10	2	2	24
2006	9	8	1	2	20
2007	8	2	1	0	11
2008	12	5	0	0	17
2009	10	3	1	1	15
2010	13	5	0	4	22
2011	17	4	2	0	23
2012	8	3	2	2	15
2013	5	4	3	5	17
2014	5	3	2	2	12
2015	3	0	1	1	5
2016	4	3	3	2	12
2017	14	6	0	0	20
2018	19	7	0	5	31
2019	26	6	0	3	35
2020	25	4	2	1	32
2021	23	8	0	2	33

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MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 9, 2022

To: Chris Moore, Executive Director

From: Jason Didden, staff

Subject: *Illex* ABC – Staff Recommendation

As part of the specification process for *Illex* squid, the Scientific and Statistical Committee (SSC) and Council will review the most recent information available to determine whether modifications of the 2022 *Illex* Acceptable Biological Catch (ABC) and other/or specifications are warranted. 2023 specifications will be considered later in the year after a management track assessment is completed. A research track assessment for *Illex* was being reviewed at the same time this memo was created, but the research track assessment process is not generally designed to immediately inform management.

The *Illex* squid fishery is currently under single-year specifications for 2022, and the current ABC is 33,000 metric tons (MT). The current ABC was set in 2021 after review and SSC endorsement of a 10% ABC increase. Analyses conducted by Dr. Paul Rago under contract with the Council supported that 10% increase. Dr. Rago recently updated those analyses with a wider range of potential ABC modifications for this meeting, which the SSC was consulted about, as requested (12/14/2021 email).

2021 *Illex* landings totaled approximately 30,714 MT, a record high for this fishery in U.S. waters. The 2021 fishery closed August 30, 2021, at a time of high weekly landings. 2021 *Illex* landings ran about 2-3 weeks ahead of 2020 landings, and the increased ABC/quota allowed the 2021 fishery to close on nearly the same date as the 2020 fishery (the 2020 fishery was similar to the 2019 fishery). The Mackerel, Squid, and Butterfish (MSB) Advisory Panel reported that 2021 market conditions appeared stable relative to 2020.

The Council's risk policy per the current regulations states:

> (d) Stock without an OFL or OFL proxy.
>
> (1) If an OFL cannot be determined from the stock assessment, or if a proxy is not provided by the SSC during the ABC recommendation process, ABC levels may not be increased until such time that an OFL has been identified.
>
> (2) The SSC may deviate from paragraph (d)(1) of this section, provided that the following two criteria are met: Biomass-based reference points indicate that the stock is greater than BMSY and stock biomass is stable or increasing, or if biomass based reference points are not available, best available science indicates that stock biomass is stable or increasing; and the SSC provides a determination that, based on best available science, the recommended increase to the ABC is not expected to result in overfishing. Any such deviation must include a description of why the increase is warranted, description of the methods used to derive the alternative ABC, and a certification that the ABC is not likely to result in overfishing on the stock.

Dr. Rago's analysis suggests that if a 50% escapement target is appropriate and the stock is at or above Bmsy, then quotas up to 60,000 MT would be consistent with the Council's risk policy, while if the stock is at 50% of Bmsy, then the maximum quota consistent with the Council's risk policy is 47,000 MT. Dr. Rago's analysis also found that if a F=2/3 M threshold is appropriate and the stock is at 50% of Bmsy, then the maximum quota would be 40,000 MT to be consistent with the Council's risk policy.

Given these findings and the current uncertainty (as of 3/9/2022) about the outcome of the *Illex* research track assessment, staff recommends an additional 10% ABC increase to 36,300 MT for 2022 as unlikely to result in overfishing of the stock, and as an incremental approach that reduces the chance of inducing large changes in fishing mortality.

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: March 24, 2022

To: Council

From: Jason Didden, Staff

Subject: Mackerel Rebuilding

The Council is scheduled to hold public hearings on the second iteration of Atlantic mackerel rebuilding in late April 2022. A draft public hearing document is included for review, and the Council staff will update it with any Council recommendations before the public hearings.

The Mackerel, Squid, and Butterfish (MSB) Committee will be reviewing these materials during a meeting on March 28, 2022 and any outcomes of that meeting will be posted to the Council meeting website as supplementary materials.

There are no recreational closure provisions in the document currently, but they could be added if so determined by the Council.

The following materials are enclosed on this subject:

1) MSB Monitoring Committee Report

2) March 2022 SSC Report – See Committee Reports Tab

3) 2022 MSB Advisory Panel Fishery Performance Report - See *Illex* Tab

4) 2022 Atlantic Mackerel Fishery Information Document

5) States' letter on Atlantic mackerel rebuilding.

6) Draft Public Hearing Document

MSB Monitoring Committee Meeting Summary – Atlantic Mackerel Rebuilding

March 18, 2022
Webinar

The Mid-Atlantic Fishery Management Council's (Council) Mackerel, Squid, and Butterfish (MSB) Monitoring Committee (MC) met on March 18, 2022 at 1:30 pm. The purposes of this meeting were to develop recommendations regarding 2022 *Illex* Specifications and Atlantic mackerel (just "mackerel" hereafter) rebuilding. Given the different topics, two summaries were created – this summary is for mackerel rebuilding topics.

Monitoring Committee Attendees: Jason Didden, Carly Bari, Lisa Hendrickson, Kiersten Curti, Daniel Hocking, and Julia Beaty.

Other Attendees: Greg DiDomenico, Aly Pitts, Meghan Lapp, Pam Lyons Gromen, Katie Almeida, Sonny Gwin, Zachary Greenberg, Kelly Whitmore, Purcie Bennett-Nickerson, Dan Farnham, Melanie Griffin, Megan Ware, and Will Poston.

The Monitoring Committee discussed a variety of topics related to mackerel rebuilding. The results of those discussions have largely been incorporated into the current draft mackerel rebuilding public hearing document, but additional editing of that document will occur before hearings. MC Meeting highlights included:

-With a mackerel Management Track Assessment planned for 2023, which would inform 2024 specifications, it makes sense to only set specifications through 2023. Given the demonstrated imprecision of previous projections, setting now for 2024 is likely to convey an inappropriate sense of what 2024 specifications will actually be. If there is some unexpected delay, 2023 specifications would roll over into 2024 until any associated rulemaking takes effect.

-The plan for Canadian landings is to describe likely specifications outcomes of assuming either 4,395 MT for Canada for 2023 or half of that, 2,197 MT, and then the Council can make a decision in June 2022 after hopefully knowing at least the 2022 Canadian quota. Canadian catch predictions for 2023 may be imprecise because Canada will base its 2023 quota on their assessment update in early 2023. The wording of their 2022 quota announcement should be considered when making an assumption about 2023.

-Given the uncertainty about recreational responses to bag limits (or any other measures), and the uncertainty about state actions, it is reasonable to just continue deducting the recent 5-year average recreational catch of 2,582 MT. Another reasonable approach would be to deduct half of the theoretical reduction from any bag limit. The effect of this would be to assume some reduction from a bag limit, but also assume that angler behavior adapts in response to a bag limit to still optimize their catches. The Monitoring Committee shared state concerns about the complexity and enforceability of different bag limits for private/shore/for-hire modes.

-There is still some ambiguity regarding permitting and reporting. The regulations state that:

> "The owner of any party or charter boat that fishes for, possesses, or retains Atlantic mackerel, Illex squid, longfin squid, or butterfish in or from the EEZ or Atlantic chub mackerel in or from the EEZ portion of the Atlantic Chub Mackerel Management Unit, while carrying passengers for hire must have been issued and carry on board a valid Federal vessel permit…"

> "Mackerel, squid, and butterfish vessels. Any vessel of the United States, including party and charter vessels, that fishes for, possesses, or lands Atlantic mackerel, Illex squid, longfin squid, or butterfish in or from the EEZ or Atlantic chub mackerel in or from the EEZ portion of the Atlantic Chub Mackerel Management Unit must have been issued and carry on board a valid Federal mackerel, squid, or butterfish vessel permit…"

> "Vessel and operator permits. It is unlawful for any person to do any of the following: (1) Fish for, take, catch, harvest or land any species of fish regulated by this part in or from the EEZ, unless the vessel has a valid and appropriate permit issued under this part and the permit is on board the vessel and has not been surrendered, revoked, or suspended." (*Under Prohibitions Section*)

The tricky aspect is that since the word "possess" is not in the prohibition section, one could apparently argue that a mackerel on board was caught in state waters, though there is generally a presumption that fish on board in the EEZ were caught in the EEZ. To completely close this possible permitting and reporting loophole, the Council could consider adding that <u>possession</u> of any Atlantic mackerel in the EEZ, including as bait acquired through any means, by any commercial or for-hire vessel, requires a mackerel permit. Pre-purchased bait would <u>not</u> have to be reported but <u>would</u> trigger permitting (open access permits are available). Once a vessel has **any** NMFS GARFO permit requiring vessel trip reports (VTRs), all catch of all species must be reported via electronic vessel trip reports (including on any private trips). NMFS GARFO may have additional input on this topic.

-There is minimal information to evaluate a 3-inch mesh for mackerel. The general literature on selectivity would support that some additional escapement of small mackerel should occur. Most Atlantic mackerel catch observations (raw data) in the observer data in the last 10 years occur from 48mm (1.9 inches) to 60mm (2.5 inches), with less than 10% of observations by weight occurring with mesh over 60mm (2.5 inches), making the observer data of limited usefulness for exploring an increase to a 3-inch mesh. Staff will further evaluate observer data to see if any additional information can be developed.

-For Alternatives 1 and 2, given the extremely low ABCs, even completely closing the U.S. EEZ would not achieve the ABCs, but would come closest.

-For the P* Option, Alternative 3 in the draft public hearing document, refer to SSC summary for why the SSC recommended the P* approach. With likely assumed Canadian catch and recreational catch, catch for the U.S. commercial fishery may still be negative with P*. Starting with a commercial fishery closure (20,000 pounds for directed limited access permits and 5,000 pounds for open access permits) and a 5-fish recreational bag limit could be placeholder measures, but would still not hold to the resulting ABCs. The question becomes if even these measures would not hold to an ABC, does this option become infeasible. The MC discussed whether going to a 5-fish bag limit might reduce “other” catch to where enough quota could cover incidental commercial mackerel catches. Calculations in the draft hearing document indicate that even at a 5-fish bag limit, there would still be minimal commercial quota.

Public comment summary:

-Given the status of mackerel, how are we going to monitor and manage the other fisheries? Recreational and bait especially.

-Ecological and socioeconomic concerns need to be fully considered by the Council.

-The Council should consider alternatives that rebuild mackerel by 10 years from the original rebuilding date.

SSC Report is behind the Committee Reports tab.

2022 MSB Advisory Panel Fishery Performance Report - See *Illex* Tab

Atlantic Mackerel Fishery Information Document

February 2022

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for Atlantic mackerel ("mackerel" hereafter), with an emphasis on 2021. Data sources for Fishery Information Documents include unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel trip report (VTR), permit, and Marine Recreational Information Program (MRIP) databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit http://www.mafmc.org/msb.

Key Facts

- Mackerel began a rebuilding program on November 29, 2019, which was designed to rebuild the stock by 2023. Based on the 2021 Management Track Assessment (MTA), the stock appears to have almost tripled from 2014 to 2019 (to 24% of rebuilt), but also appears unlikely to complete rebuilding by 2023. A revised rebuilding plan is under development.
- The 2017 recruitment estimate was the lowest in the time series and recruitment has been below the long term median since 2008 except for one year (the 2015 year class).
- In the new MTA, the estimated proxy for Maximum Sustainable Yield declined by 17% (to 34,103 metric tons (MT) annually) compared to the previous assessment.
- The new MTA's conclusions are consistent with the 2021 Canadian assessment.
- The SSB estimates from the range-wide egg survey, a key index in the assessment, reached a minimum in 2010 and have been below the median since 2005.
- The fishery was not constrained by the river herring and shad (RH/S) cap in 2021, but NMFS closed the fishery based on the assessment results and Council request effective October 15, 2021.

Basic Biology

Mackerel is a semi-pelagic/semi-demersal (may be found near the bottom or higher in the water column) schooling species primarily distributed historically between Labrador (Newfoundland, Canada) and North Carolina. The stock is considered to comprise two spawning contingents: a northern contingent spawning primarily in the southern Gulf of St. Lawrence and a southern contingent spawning in the Mid-Atlantic Bight, Southern New England and the western Gulf of Maine. The two contingents mix during winter months on the Northeast U.S. shelf. The

Canadian fishery likely primarily catches the northern contingent while the U.S. fishery appears to catch both contingents.

Mackerel spawning occurs during spring and summer and progresses from south to north as surface waters warm. Atlantic mackerel are serial, or batch spawners. Eggs are pelagic. Post-larvae gradually transform from planktonic to swimming and schooling behavior at about 30-50 mm. Almost all fish are mature by age 3 in most years. Age 2 maturity appears to vary between around 50% to nearly 100%. Atlantic mackerel are opportunistic feeders that can ingest prey either by individual selection of prey organisms or by passive filter feeding. See https://www.nefsc.noaa.gov/nefsc/habitat/efh/ for more life history information.

Status of the Stock

Based on the 2018 assessment (NEFSC 2018, available at http://www.mafmc.org/ssc-meetings/2018/may-8-9), the mackerel stock was declared overfished, with overfishing occurring in 2016. A new 2021 management track assessment (MTA) indicates that while trends since 2014 are positive, the stock is only 24% of the biomass rebuilding target. The productivity of the stock appears to have declined. In the recent MTA, the estimated proxy for Maximum Sustainable Yield declined by 17% to 34,103 metric tons (MT) compared to the previous assessment. Past assessments (which used different methods and data) appear to have been overly optimistic about the stock's productivity.[1]

Management System and Fishery Performance

Management

The Mid-Atlantic Fishery Management Council (the Council or MAFMC) established management of mackerel in 1978 and the management unit includes all federal East Coast waters. Expected Canadian landings are deducted from the total Acceptable Biological Catch (ABC) that is recommended by the Council's Scientific and Statistical Committee (SSC).

Access is limited with several tiers having different trip limits. Stricter trip limits are triggered when the quota is approached. Additional summary regulatory information is available at https://www.fisheries.noaa.gov/region/new-england-mid-atlantic.

At its May 2019 meeting, the SSC considered preliminary results from the 2019 Canadian Atlantic mackerel assessment, which indicated lower than expected recruitment in 2016-2018. The SSC determined that it would not be appropriate to recommend the original higher 2020 rebuilding ABC levels and the ABC has been 29,184 mt since. NMFS closed the primary directed fishery based on the assessment results and Council request effective October 15, 2021. An emergency rule should keep 2022 catches to around 2021 catches, about 12,000 MT. This would include about 4,200 MT for Canadian landings, 5000 MT for U.S. commercial landings, 2,600 MT for

[1] Referencing 1997 Federal Register publications, the 1997 mackerel allowable biological **catch** was specified about **ten times higher than** what we now think the **total SSB** was in that year.

recreational catch, and small set-asides for commercial discards and management uncertainty. A revised rebuilding plan is under development, targeting January 1, 2023 for implementation.

Fisheries

Figure 1 describes mackerel catches (all known sources) 1960-2019. Figures 2-3 describe domestic landings, ex-vessel revenues, and prices (inflation adjusted) since 1996. Figure 4 illustrates preliminary weekly landings throughout the year for 2021 and 2020.

Table 1 describes 2021 mackerel landings by state, and Table 2 describes 2021 mackerel landings by gear type. Table 3 describes 2021 mackerel landings by NMFS statistical area. Table 4 shows vessel participation over time in the mackerel fishery

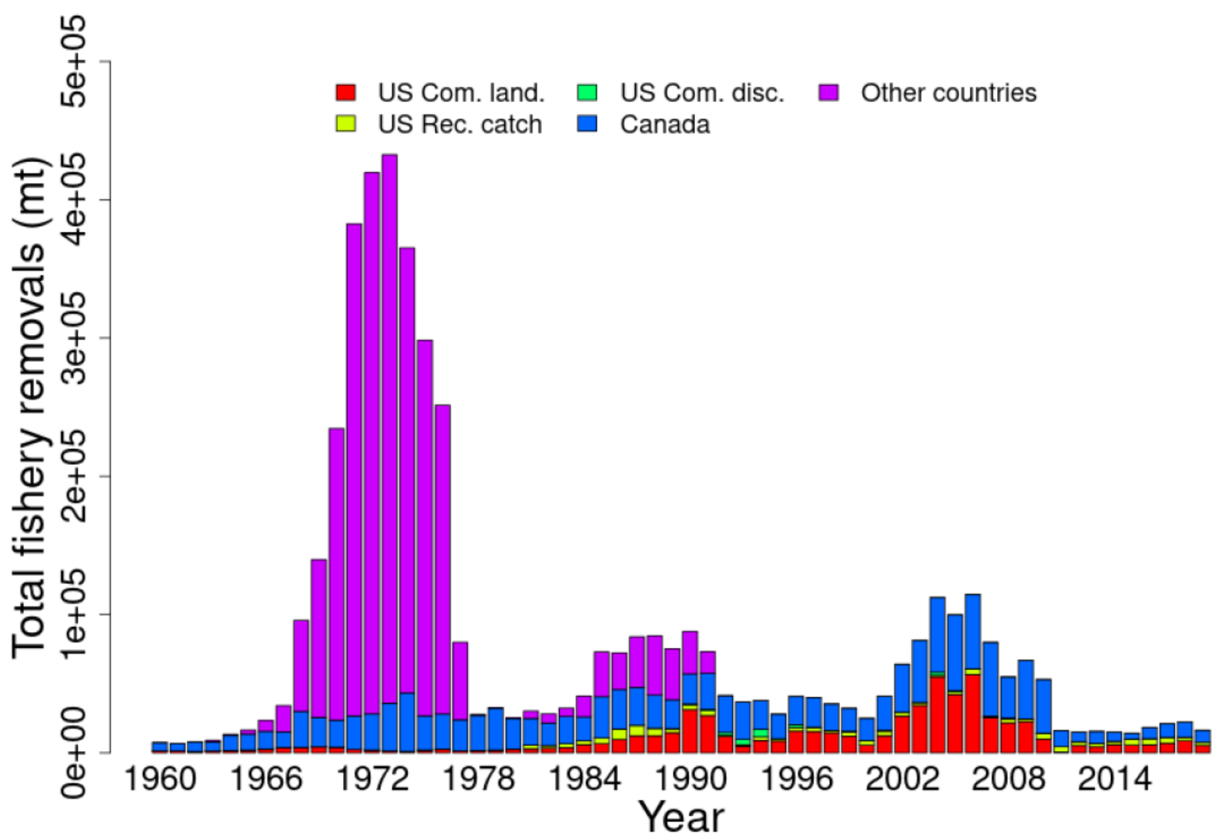

Figure 1. Total catch of northwest Atlantic mackerel between 1960 and 2019 by all known sources. U.S. recreational catch represents recreational landings plus discards, Canada represents Canadian landings (discards are not available), and other countries represents landings by all other countries.

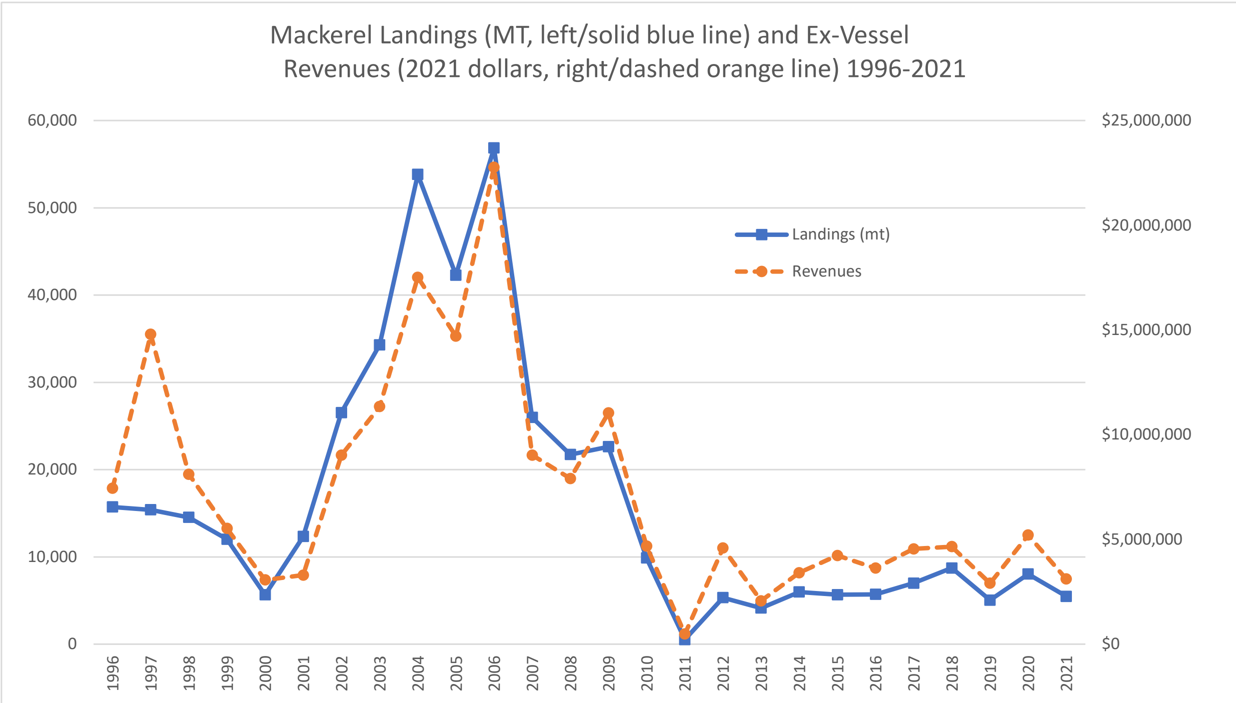

Figure 2. U.S. Mackerel Landings and Mackerel Ex-Vessel Values 1996-2021. Source: NMFS unpublished dealer data. [PRELIMINARY]

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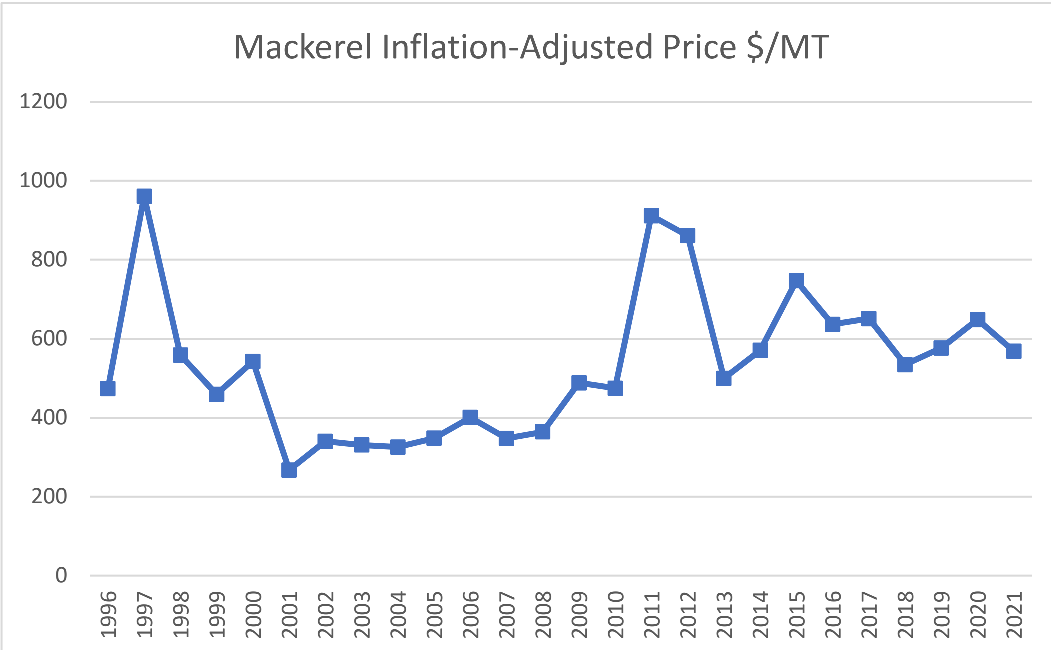

Figure 3. Ex-Vessel Mackerel Prices 1996-2021 Adjusted to 2021 Dollars Source: NMFS unpublished dealer data. [PRELIMINARY]

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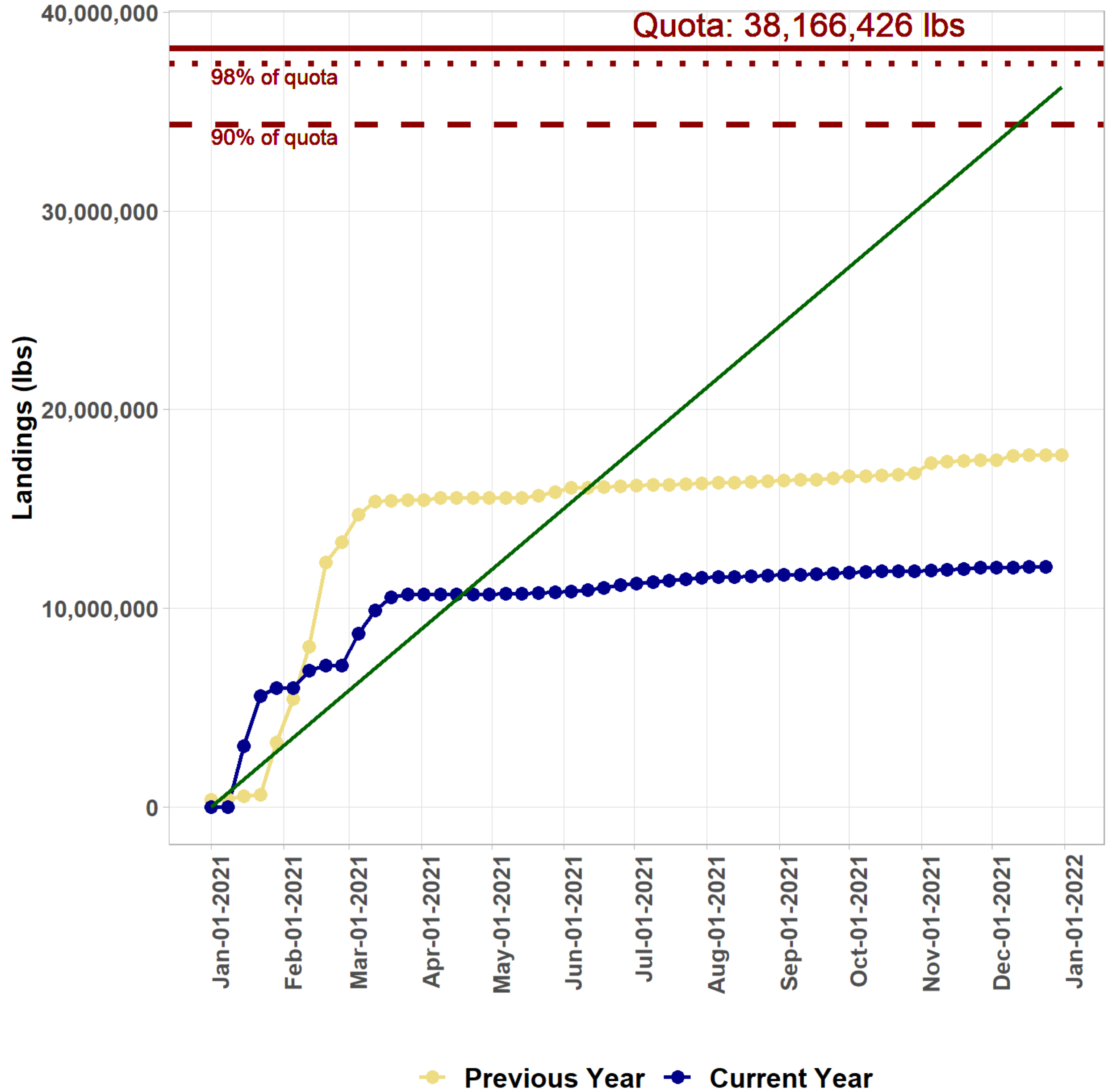

Figure 4. U.S. Preliminary Mackerel landings; 2021 in blue, 2020 in yellow-orange. Source: https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/quota-monitoring-greater-atlantic-region.

Table 1. Commercial Mackerel landings (live weight) by state in 2021. Source: NMFS unpublished dealer data.

State	Metric Tons
MA	4,287
ME	546
NJ	534
Other	110
Total	5,476

Table 2. Commercial Mackerel landings (live weight) by gear in 2021. Source: NMFS unpublished dealer data.

GEAR	MT
TRAWL,OTTER,MIDWATER	2,555
TRAWL,OTTER,MIDWATER PAIRED	1,595
TRAWL,OTTER,BOTTOM,FISH	730
LONGLINE, BOTTOM	233
GILL NET,SINK, OTHER	228
HAND LINE, OTHER	96
Other	40
Total	5,476

Table 3. Commercial mackerel landings by statistical area in 2021. Source: NMFS unpublished VTR data.

Stat Area	Metric Tons
522	2,023
521	1,854
612	992
514	450
Other/CI	332
Total	5,652

Table 4. Vessel participation over time in the Mackerel Fishery based on annual landings (pounds)

YEAR	Vessels 1 mil +	Vessels 100,000 - 1mil	Vessels 50,000 - 100,000	Vessels 10,000 - 50,000	Total
1982	0	10	10	43	63
1983	0	10	5	26	41
1984	0	11	14	29	54
1985	0	12	10	28	50
1986	1	10	5	37	53
1987	1	15	8	31	55
1988	2	20	8	40	70
1989	6	17	8	27	58
1990	6	16	7	39	68
1991	13	18	1	38	70
1992	9	17	13	48	87
1993	0	16	11	55	82
1994	2	27	14	44	87
1995	4	24	11	50	89
1996	7	45	15	53	120
1997	6	30	20	46	102
1998	9	16	6	39	70
1999	6	15	9	37	67
2000	5	3	0	26	34
2001	5	3	2	20	30
2002	12	3	1	22	38
2003	14	6	5	23	48
2004	18	6	1	14	39
2005	15	11	4	17	47
2006	20	12	5	10	47
2007	16	12	2	20	50
2008	15	5	1	17	38
2009	15	6	6	18	45
2010	10	9	2	14	35
2011	0	3	3	17	23
2012	3	9	1	9	22
2013	4	3	3	13	23
2014	6	5	1	13	25
2015	5	9	10	12	36
2016	3	16	7	26	52
2017	6	7	14	27	54
2018	8	6	3	24	41
2019	3	11	4	38	56
2020	7	9	1	10	27
2021	4	9	3	6	22

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March 11, 2022

Dr. Christopher M. Moore
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

Re: Atlantic mackerel recreational measures

Dear Dr. Moore:

Since the States of Maine, Massachusetts and New Hampshire last wrote to you in December 2021, we have continued to advance analyses in support of Atlantic mackerel recreational fishing rulemaking. The Mid-Atlantic Fishery Management Council's Mackerel, Squid, and Butterfish Committee took up feedback from recent public informational webinars on March 2nd and we too have reflected on those comments. In the vein of collaborative, sustainable management we are writing to provide both insight on the states' next steps and feedback on potential regulatory action by the Mid-Atlantic Council.

Recreational Bag Limit vs. Seasonal Closure

As noted in our December 2021 letter, the states do not support a seasonal closure as an effective option for reducing recreational catch of Atlantic mackerel. We understand that the Mid-Atlantic Council will consider a tabled motion to remove this option at its next Mackerel, Squid, and Butterfish Committee meeting in March 2022 and we support the removal of this management tool from consideration. The intricacies of the fishery, especially as used for bait, create complex connections between subsistence, recreational and commercial fishing activity that, along with the use of frozen bait and other practical considerations, make a seasonal closure an inappropriate tool. The Mid-Atlantic Mackerel, Squid, and Butterfish Committee's tasking of staff to analyze compliance gaps in Atlantic mackerel permitting and reporting reflect such intricacies; we fully support gaining clearer insight into the fishery and improving compliance.

The Mid-Atlantic Mackerel, Squid, and Butterfish Committee's tasking of staff to develop a range of recreational Atlantic mackerel trip limit options dovetails with the intent of the states to propose Atlantic mackerel recreational bag limits for public comment in the summer of 2022. We heard support during the Mid-Atlantic's informational webinars for a bag limit approach to reducing catch. The Mid-Atlantic Committee's tasking to analyze various recreational bag limits provides an opportunity for the management approach for Atlantic mackerel recreational fishing to be consistent between state and federal waters, a boon to anglers, regulators, and enforcement, alike.

Split Modes

Based on discussion by the Mid-Atlantic Mackerel, Squid, and Butterfish Committee, it appears the Mid-Atlantic Council may consider disparate trip limits between private and for-hire recreational fishing modes (i.e., split modes). The states generally disagree with split mode regulation of individual, recreational anglers depending on whether they fish aboard a private or for-hire vessel. Disparate rules among recreational anglers are not a best practice in support of recreational surveys and collection of best scientific information available. The Marine Recreational Information Program (MRIP) is not designed for such parsing, neither in terms of gathering reliable information on a sub-set of actors nor in terms of providing guidance on potential catch by such sub-sets. Split mode can also undermine effective enforcement, reduce compliance, and blur the lines between recreational and commercial fishing. As a result, the states are passing along our concerns regarding a split mode approach for the Council's consideration.

Regulatory Timeline
It remains our understanding that the Mid-Atlantic Council will take final action in June 2022 for implementation by January 1, 2023. This aligns with the three states' rulemaking timelines; effective public process will require several months but should allow for a January 2023 implementation date of any new state Atlantic mackerel recreational rules.

We look forward to continued work with you. As always, please reach out with any questions to Melanie Griffin of the Massachusetts Division of Marine Fisheries (melanie.griffin@mass.gov; 978.853.1196), Megan Ware of the Maine Department of Marine Resources (megan.ware@maine.gov; 207.446.0932) and Cheri Patterson of the New Hampshire Fish and Game Department (cheri.patterson@wildlife.nh.gov; 603.868.1095).

Sincerely,

Daniel J McKiernan   Pat C Keliher   Cheri Patterson

Dan McKiernan	Pat Keliher	Cheri Patterson
Director	Commissioner	Chief, Marine Division
MA DMF	ME DMR	NH FGD

cc: Robert Beal, ASMFC
Jason Didden, MAFMC
Tom Nies, NEFMC
Eric Reid, NEFMC
Michael Pentony, GARFO

Mackerel Rebuilding Version 2

Amendment to the

MACKEREL, SQUID, AND BUTTERFISH

FISHERY MANAGEMENT PLAN

Measures to Rebuild the Atlantic Mackerel Stock, Including 2023 Specifications and the River Herring and Shad (RH/S) Cap

Public Hearing Document

Feb 24, 2022 DRAFT

Atlantic Mackerel
Scomber scrombus

Prepared by the

Mid-Atlantic Fishery Management Council (Council) in collaboration with the

National Marine Fisheries Service (NMFS)

Council Address

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

NMFS Address

NMFS Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

1.0 EXECUTIVE SUMMARY AND TABLE OF CONTENTS

This action considers measures to rebuild the Atlantic mackerel ("mackerel" hereafter) stock with an Amendment to the Mackerel, Squid, and Butterfish Fishery Management Plan (MSB FMP). This action includes 2023 mackerel specifications and related management measures, including the mackerel fishery's river herring and shad (RH/S) cap. This action was originally going to set 2023-2024 specifications, but now proposes to only set 2023 specifications given a Mackerel Management Track Assessment (MTA) is expected in 2023, which should use data through 2022 and could better inform 2024 specifications. Using the 2023 MTA to set 2024 specifications would only involve a two-year data lag (2022 to 2024). Using the 2021 MTA to set 2024 specifications would involve a five-year data lag (2019 to 2024). If the assessment or subsequent specifications were delayed, then the 2023 specifications would roll-over into 2024 until new specifications were published. The MSB Monitoring Committee recommended this approach given the high degree of uncertainty involved in setting 2024 specifications based on 2019 data and five years of projections. Setting 2024 specifications now would suggest too much stability for 2023/2024 catches given the scale of changes observed in the 2021 Mackerel MTA versus initial rebuilding plan projections (which spanned 3 years and where off by about a factor of four).

The purpose of this action is to rebuild the mackerel stock with appropriate measures so that Optimum Yield (OY) can be achieved on an ongoing basis. The action is needed because the recent 2021 Mackerel Management Track Assessment (MTA) found the mackerel stock to still be overfished, with overfishing still occurring through 2019 (NEFSC 2021). The 2021 Mackerel MTA determined that when implemented (11/29/2019), the original rebuilding plan was already out of date and did not provide a realistic rebuilding approach. The stock is estimated to have tripled in size from 2014 to 2019 (from 8% to 24% of rebuild), but fully rebuilding on the original schedule (by 2023) appears impossible – the stock is expected to be less than half rebuilt by 2023. This action incorporates the 2021 Mackerel MTA findings to continue rebuilding the mackerel stock.

Because none of the preferred alternatives are anticipated to be associated with significant impacts to the biological, social, economic, or physical environment, an Environmental Assessment (EA) documenting a "Finding of No Significant Impact" (FONSI) is planned, but this plan could change based on public comments.

Summary of the Alternatives

The alternatives are based on rebuilding plans that all have at least a 50% chance of rebuilding mackerel within ten years, which is the maximum time typically allowed under the Magnuson–Stevens Fishery Conservation and Management Act (MSA). The alternatives focus on the probability of rebuilding by 2032 (ten years) due to the Scientific and Statistical Committee's (SSC) July 2021 Meeting advice that "Preliminary rebuilding scenarios indicate long-term rebuilding will be required for this stock" and that higher rebuilding probabilities "are associated with shorter rebuilding time and greater catch stability" (MAFMC SSC 2021). Additional management measures are paired with each rebuilding plan.

Summary of Impacts

Target Species Impact Summary

The alternatives should allow the mackerel stock to rebuild within 10 years. Changes in mackerel fishing should not impact other FMP species due to low catch of those species in the mackerel fishery, and separate management measures control catch of those species. While Atlantic herring and mackerel are often caught together, separate management measures in the Atlantic herring fishery should ensure that overfishing does not occur on the Atlantic herring stock.

Non-Target Species Impact Summary

Non-target interactions are relatively low in the mackerel fishery, and all of the action alternatives would reduce catch from the status quo, thereby limiting effort. The RH/S cap should continue to limit interactions between the mackerel fishery and RH/S, which have been the primary non-target species of concern for the mackerel fishery.

Habitat Impact Summary

All of the alternatives would reduce catch from the status quo thereby limiting effort, so no additional negative habitat impacts would be expected.

Protected Resources Impact Summary

All of the alternatives would reduce catch from the status quo, thereby limiting effort, so no additional negative protected resource impacts would be expected.

Human Communities Impact Summary

Human communities may have negative impacts in the short term due to lower catches/revenues from mackerel, but in the long term rebuilding should lead to higher catches/revenues.

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2.0 LIST OF COMMON ACRONYMS AND ABBREVIATIONS

ABC	**Acceptable Biological Catch**
ACL	**Annual Catch Limit**
ACT	**Annual Catch Target**
ASMFC	**Atlantic States Marine Fisheries Commission or Commission**
B	**Biomass**
CFR	**Code of Federal Regulations**
CPH	**Confirmation of Permit History**
CV	**coefficient of variation**
DAH	**Domestic Annual Harvest**
DAP	**Domestic Annual Processing**
EA	**Environmental Assessment**
EEZ	**Exclusive Economic Zone**
EFH	**Essential Fish Habitat**
EIS	**Environmental Impact Statement**
ESA	**Endangered Species Act of 1973**
F	**Fishing Mortality Rate**
FMAT	**Fishery Management Action Team**
FMP	**Fishery Management Plan**
FR	**Federal Register**
GB	**Georges Bank**
GOM	**Gulf of Maine**
M	**Natural Mortality Rate**
MAFMC	**Mid-Atlantic Fishery Management Council**
MMPA	**Marine Mammal Protection Act**
MSA	**Magnuson-Stevens Fishery Conservation and Management Act**
MSB	**Atlantic Mackerel, Squid, Butterfish**
MSY	**Maximum Sustainable Yield**
MT (or mt)	**Metric Tons (1 mt equals about 2,204.62 pounds)**
NE	**Northeast**
NEFMC	**New England Fishery Management Council**
NEFSC	**Northeast Fisheries Science Center**
NEPA	**National Environmental Policy Act**
NMFS	**National Marine Fisheries Service (NOAA Fisheries)**
NOAA	**National Oceanic and Atmospheric Administration**
OFL	**Overfishing Level**
OY	**Optimum Yield**
PBR	**Potential Biological Removal**
SNE	**Southern New England**
SSB	**Spawning Stock Biomass**
SSC	**Scientific and Statistical Committee**
U.S.	**United States**
VTR	**Vessel Trip Report**

Notes: "Mackerel" refers to "Atlantic mackerel" unless otherwise noted. Likewise “herring” alone refers to Atlantic herring.

3.0 LISTS OF TABLES, AND FIGURES

3.1 List of Tables

3.2 List of Figures

4.0 INTRODUCTION, BACKGROUND, AND PROCESS

4.1 Introduction and Background

Section 4.1 reviews several critical background topics including the 2021 Mackerel Management Track Assessment (MTA), the 2021 Canadian Mackerel Assessment, Current Management and Recent Catches, Rules on Rebuilding, the Council's Ecosystem Approach to Fisheries Management (EAFM), and the Council's P* Risk Policy.

The 2021 Mackerel Management Track Assessment (MTA)

Reference Points

"F" refers to fishing mortality, i.e. the rate at which fish die, expressed as the portion of the stock dying within a small amount of time. The rebuilding goal is based on F40% as the proxy for FMSY (MSY = "maximum sustainable yield") and was estimated to be F = 0.24[1], (dashed line in Figure 1) down from 0.26 in the previous mackerel assessment. So productivity of the stock has apparently declined. F40% was selected as a proxy for FMSY due to consistency with the Canadian reference point and ability to prevent stock collapse for stocks with similar life histories. F40% produces 40% of the "spawning stock biomass (SSB) per recruit" (equivalent to lifetime egg production) relative to that produced by an unfished stock. F in 2019 was estimated to be 0.46[2], overfishing was occurring in 2019 and has been for 30 years (but 2019 was the lowest F in 15 years – see Figure 1). Past assessments (which used different methods and data) appear to have been overly optimistic about the stock's productivity, and too many fish were caught over a long period of time. The rebuilding biomass target is the SSB associated with the FMSY proxy or "SSBmsyproxy," and is estimated to be 181,090 MT. The 2019 spawning stock biomass (SSB) was estimated to be 42,862 metric tons (MT), or 24% of the SSB target so mackerel is "overfished" (below 50% of the target – see Figure 2). Once rebuilt, the MSYproxy (i.e. the proxy for maximum sustainable yield) is estimated to be 34,103 MT (total catch, U.S. plus Canada), which is lower than estimated in the previous assessment, reflecting the apparent reduced productivity of the stock.

Projection Performance

Based on the recent 2021 Mackerel Management Track Assessment (MTA) (NEFSC 2021), the mackerel stock (measured by Spawning Stock Biomass - "SSB") will not rebuild as quickly as previously projected. The 2021 MTA found the mackerel stock to be overfished, with overfishing occurring through 2019 (NEFSC 2021) (see Figures 1 and 2 next pages). While the

[1] F = 0.24 equates to removing about 1/5 of the stock in a given year.
[2] F = 0.46 equates to removing slightly over 1/3 of the stock in a given year.

stock is estimated to have tripled in size from 2014 to 2019 (from 8% to 24% of rebuilt), rebuilding on the original schedule (by 2023) appears impossible – the stock is now expected to be less than half rebuilt by 2023. In addition, while both the 2018 and 2021 assessments concluded the stock reached a low point around 2011-2014 before starting to recover, the current assessment found that the stock was about 10% smaller at the low point. In the terminal year of the previous assessment (2016) the stock, while still recovering, is now estimated to have been 29% smaller in 2016 than estimated for that same year in the previous assessment. While nearly all of the data in the 2021 assessment (data through 2019) represents the time period before the initial rebuilding plan took effect, the current assessment indicates we started rebuilding in 2019 at a stock size about 74% lower than anticipated (just 42,862 MT estimated in 2019 vs 162,796 MT projected). While not completely understood, factors contributing to this over-projection for 2019 include:

-starting from a lower low point in 2014 (retrospective pattern apparent but not strong enough to adjust for),
-summed 2014-2018 recruitment was 24% lower than anticipated (2017 year class lowest in time series),
-overfishing persisting,
-decreased maturity-at-age and SSB weight-at-age for some ages.

The scale of error observed in the previous three-year projection (2016 to 2019) provides some perspective for the four-year projection required to now set specifications for 2023 as the first year of the new rebuilding plan. This was part of the reason why the MSB Monitoring Committee recommended setting only a one year specification at this time, until the 2023 Mackerel MTA can be used to set 2024 specifications. The 2023 Mackerel MTA should include data through 2022, requiring only a two year projection for 2024 (2022 to 2024), versus the five-year projection required to set 2024 specifications at this time (2019 to 2024). While the lower recruitment inputs now being used in short term projections (until stock size is above 50% of rebuilt) should help avoid as large of an over-projection, any potential improvement in projections will not be known until mid-2023 when then the 2023 Mackerel MTA is completed.

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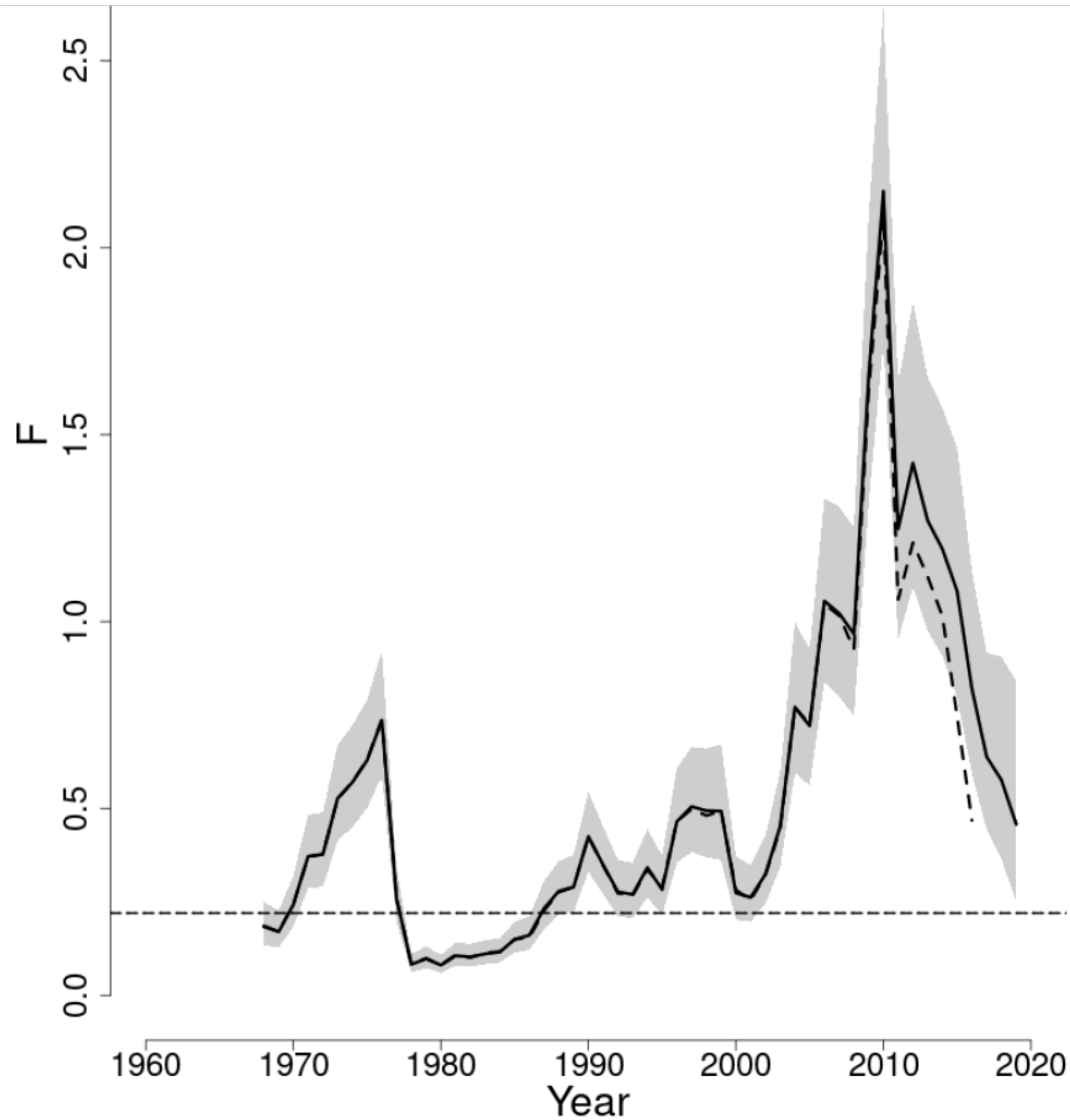

Figure 1. Trends in the fully selected fishing mortality (F) of northwest Atlantic mackerel between 1968 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding FThreshold (FMSY proxy=0.22; horizontal dashed line). The approximate 90% lognormal confidence intervals are shown.

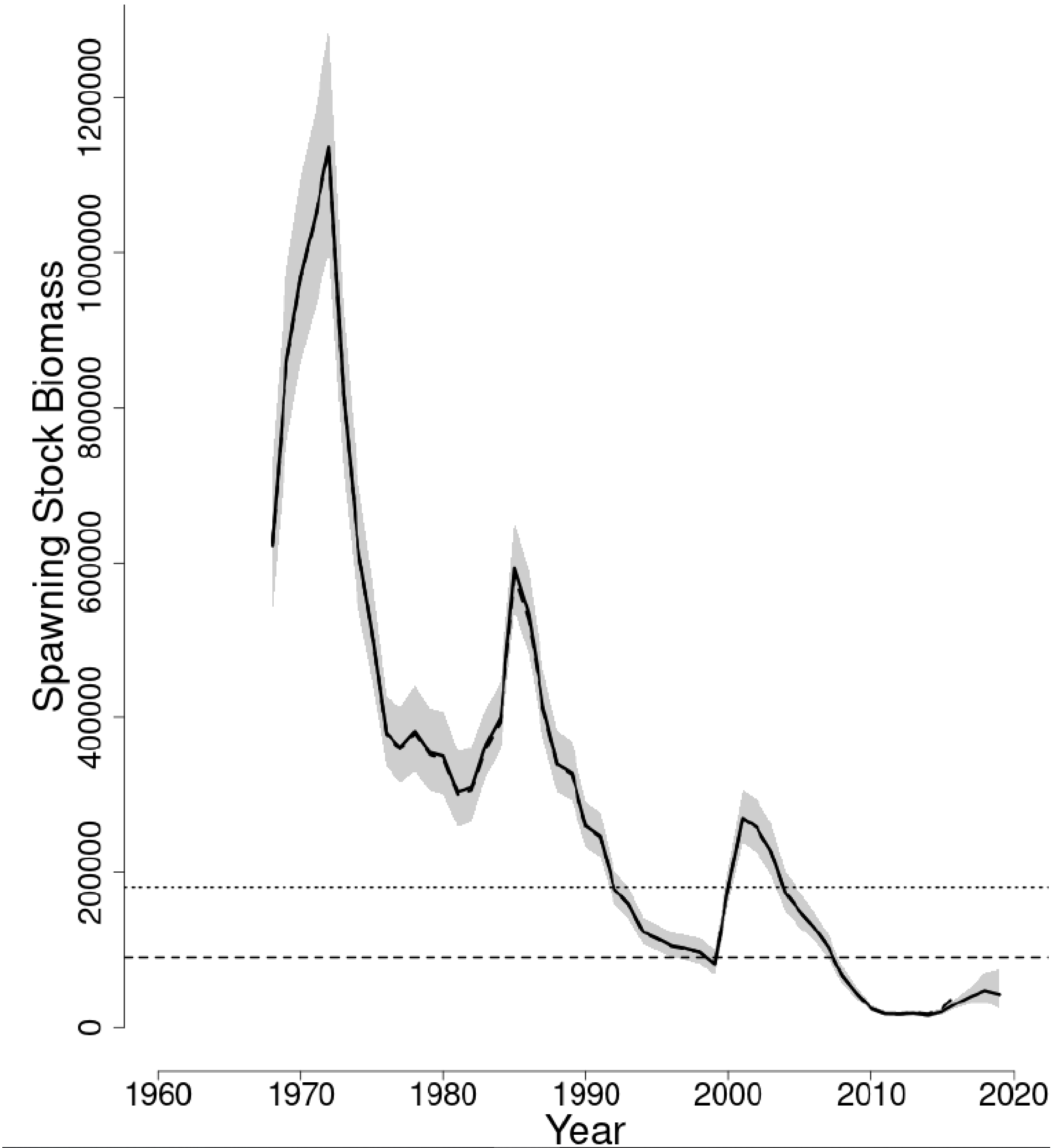

Figure 2. Trends in spawning stock biomass (MT) of northwest Atlantic mackerel between 1968 and 2019 from the 2021 MTA (solid line) and previous (dashed line, mostly the same) assessment and the corresponding SSBThreshold (1/2 SSBMSY proxy; horizontal dashed line) as well as SSBTarget (SSBMSY proxy; higher horizontal dotted line). The approximate 90% lognormal confidence intervals are shown.

The 2021 Canadian Mackerel Assessment and Quotas

The Canadian stock assessment only assesses the northern mackerel contingent, unlike the stock-wide U.S. assessment. Excerpting from their summary and assessment:

- 2017-2020 Canadian landings occurred primarily in the Gulf of Saint Lawrence (NAFO 4RST) and off the northeast coast of Newfoundland (NAFO 3K).
- Recent genetic analyses confirmed previous studies that the Northwest Atlantic mackerel stock is distinct from the Northeast Atlantic stock. These analyses also supported the previously established distinction between the northern and southern spawning contingents of the Northwest Atlantic stock. Genetic results showed some mixing of southern contingent mackerel in Canadian waters as well as northern contingent mackerel in U.S. waters.
- A fine-scale analysis of recruitment variability showed that a spatio-temporal match between mackerel larvae and their preferred food as well as optimal population structure and dynamics (maternal condition, SSB, age-structure) benefits recruitment.
- The annual egg survey did not occur in 2020 due to restrictions incurred by the global Covid pandemic. The stock assessment model was still run (without a 2020 data point for the egg survey) to estimate stock status.
- The last notable recruitment event was in 2015. There has been no sign of any notable recruitment event in recent years. There are currently very few fish older than 5 years old (<1%) - The age structure of the population in 2020 was relatively evenly spread among individuals between 1 and 5 years, old with no single dominant cohort (the 2015 cohort represented about 7% of the SSB in 2020).
- The estimated fully selected exploitation rate (fish aged 5-10+) in 2020 was 74%, above the reference level of 51% (F40%). The fishery was concentrated on fish aged 2-5 (exploitation rate of 56%).
- The SSB in 2020 was the lowest ever estimated (58% of the Limit Reference Point - LRP). and has been in or near the Critical Zone for over 10 years. Rebuilding the stock will also require rebuilding the age structure of the stock which has been eroded by overexploitation.

The 2021 Canadian mackerel quota was set at 4,000 MT – landings at this level were estimated to have between a 2 in 3 chance and a 3 in 4 chance of facilitating at least some stock growth from 2021 to 2023. 2021 Canadian landings (preliminary) were 4,395 MT. A determination of 2022 Canadian quotas has not been made. A determination regarding 2023 Canadian quotas will likely not be made until early 2023, after their next assessment update.

Current Management and Recent Catches

The commercial mackerel fishery is currently managed with an annual quota, in-season proactive accountability measures, and reactive accountability measures requiring paybacks of catches that exceed the Annual Catch Limit (ACL). Canadian landings, U.S. recreational catch, and U.S.

commercial discards are deducted off the total Acceptable Biological Catch (ABC) to derive the commercial quota. There are currently no recreational management measures. In 2022, based on an emergency rule by NMFS, total catch is expected to be 12,055 MT, with 4,395 MT deducted for assumed Canadian landings, 2,582 MT deducted for assumed recreational catch, and 115 MT deducted for assumed commercial discards. This leaves 4,963 MT for a commercial quota. When 90% of the quota is projected to be landed, trip limits of 40,000 pounds are implemented for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits[3]. When 98% of the quota is projected to be landed, a 5,000 pound trip limit is implemented for all permits for the rest of the fishing year to cover remaining incidental catches. The emergency rule will expire in early January 2023, at which point the previous specifications, with a much higher quota, would apply (see Alternatives Section below for details).

The 2022 emergency measures described above were designed to mirror 2021 catches while a new rebuilding plan is developed, but some differences exist due to projection approaches. 2021 catches are estimated to have been 12,220 MT, including 4,395 MT Canadian landings, 2,222 MT recreational catch, 127 MT commercial discards, and 5,476 MT commercial landings. See Section 6 for additional fishery descriptive information.

The mackerel fishery also operates under a river herring and shad catch cap (RH/S), which closes the directed mackerel fishery and implements a 20,000 pound trip limit for all permits once 129 MT of RH/S has been projected to be caught in the directed mackerel fishery. 129 MT was the amount of RH/S if the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was about 0.53% and the mackerel quota was 17,371 MT (or 0.74% applied to just the mackerel quota). Given the challenges with monitoring a very small cap, including potentially closing the fishery based on a few observed trips, the Council has kept the cap at 129 MT at the current lower mackerel quotas. This action proposes to either scale the RH/S cap with the mackerel quota or keep the RH/S cap at 129 MT if the mackerel quota is below 17,371 MT.

Rules on Rebuilding

Section 304(e)(4) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) states:

> “For a fishery that is overfished, any fishery management plan, amendment, or proposed regulations…shall…specify a time period for rebuilding the fishery that shall--

[3] When the fishery starts each year, the various commercial mackerel permit categories start with different trip limits. Tier 1 has an unlimited trip limit, Tier 2 has a 135,000 pound trip limit, and Tier 3 has a 100,000 pound trip limit.

> (i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities,…and the interaction of the overfished stock of fish within the marine ecosystem; and
>
> (ii) not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions…dictate otherwise;
>
> …allocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery…"

The Council's SSC advised the Council that "Preliminary rebuilding scenarios indicate long-term rebuilding will be required for this stock" and that higher rebuilding probabilities "are associated with shorter rebuilding time and greater catch stability." (MAFMC SSC 2021)

All options currently under consideration are projected to rebuild mackerel in 10 or less years so (ii) is addressed. Recreational catches have been relatively low in this fishery historically, but will be a higher percentage of total catch especially in the early part of the new rebuilding timeline, which is why recreational measures are being considered in this action.

The primary rebuilding considerations are to rebuild in a time period as short as possible, taking into account 1) the status and biology of any overfished stocks, 2) the needs of fishing communities, and 3) the interaction of mackerel within the marine ecosystem. Information on the status and biology of mackerel and interactions within the marine ecosystem (e.g. predation) is provided in Section 6.1.

Council's Ecosystem Approach to Fisheries Management (EAFM)

The alternatives in this document seek to rebuild mackerel to the SSBmsyproxy as defined in the recent mackerel assessment, i.e. to 181,090 MT of spawning stock biomass (SSB). The Council's Ecosystem Approach to Fisheries Management (EAFM) Guidance Document states "It shall be the policy of the Council to support the maintenance of an adequate forage base in the Mid-Atlantic to ensure ecosystem productivity, structure and function and to support sustainable fishing communities" and "the Council could adopt biological reference points (overfishing levels or OFL) for forage stocks that are more conservative than the required MSA standard of FMSY." Acknowledging that the science to evaluate the biological and socioeconomic tradeoffs of more precautionary management is lacking, the Council has adopted a policy that it would promote data collection and development of analyses to get to the point where the Council could evaluate the relevant tradeoffs and "establish an optimal forage fish harvest policy."

Views vary on the precaution inherent in using the recommended F40% as a proxy for FMSY (and for the resulting SSBmsyproxy target). Clark 1993, Mace 1994, Gabriel and Mace 1999, and Legault and Brooks 2013 generally recommended F40% for typical stocks. Clark 2002 notes that for typical stocks, fishing at F40% would be expected to result in a target biomass that is 20%-35% of an unfished biomass. Pikitch et al 2012 recommended more conservative approaches for forage species to support predators, and this has spawned ongoing debate (e.g.

Hilborn et al 2017 to the contrary). The Council's P* risk policy, by reducing catch to account for scientific uncertainty, should lead to biomass being maintained above the reference point target in the long run.

While not a complete picture of forage, the 2021 State of the Ecosystem reports for New England and the Mid-Atlantic indicate that for the Planktivore group that includes mackerel, long term (30-year) trends in the Mid-Atlantic Bight, Georges Bank, and Gulf of Maine are all either steady or increasing for both the Spring and Fall survey aggregate biomasses[4] (NEFSC 2022a, NEFSC 2022b). The 2018 mackerel assessment examined predator consumption and determined that the presence of mackerel in fish stomachs collected during the NEFSC bottom trawl surveys was generally low from 1973-2016, with spiny dogfish being responsible for 67% of all mackerel as prey occurrences in the NEFSC Food Habits Database. Mackerel were found in only 1% of sampled spiny dogfish however. Additional potentially important predators of mackerel are not sampled in the NEFSC trawl surveys, including highly migratory species, marine mammals, and seabirds. For the 17 analyzed mackerel predators from the NEFSC Food Habits Database, while mackerel did not appear to be an important contribution to their diet, there was a marked decline in consumption from 2000-2016, the terminal year of that analysis, matching the trend in mackerel abundance for that time period. The 2021 Mackerel MTA found that from 2014 to 2019 mackerel biomass had tripled, so substantially more mackerel should already be available as forage by 2019. The mackerel assessment uses a constant natural mortality rate, so as mackerel biomass grows, more predation on mackerel is assumed to occur.

Council's P* Risk Policy

The Council's standard risk policy states that the Scientific and Statistical Committee (SSC) should provide Acceptable Biological Catches (ABCs) that are the lesser of rebuilding ABCs or standard risk policy (P*) ABCs. The P* risk policy requires higher confidence that overfishing will be avoided when biomass is lower, which results in lower catches. At the projected 2023 biomass, Because it would only be 32% of rebuilt, the Council's risk policy requires an 85.5% confidence in avoiding overfishing in 2023. For a stock 100% rebuild, the P* risk policy requires a 55% chance of avoiding overfishing. Some alternatives being considered by the Council would result in a 2023 rebuilding catch higher than what would be the standard P*-adjusted ABC. In these cases, the alternatives note this fact, and represent a temporary adjustment of the Council's standard risk policy that apply to this particular decision – future decisions would need to re-evaluate any diversion from the Council's standard P* approach (Alternative 3 uses the current, unmodified P* risk policy). The risk policy adjustment would only apply to this instance of initiating rebuilding for mackerel to consider the effects of different rebuilding timelines and would not apply to management decisions regarding future ABCs once the stock is rebuilt.

[4] Planktivore Group includes Atlantic mackerel, butterfish, Atlantic herring, alewife, American shad, blackbelly rosefsh, blueback herring, cusk, longhorn sculpin, lumpfsh, menhaden, northern sand lance, northern searobin, and unclassified sculpin.

4.2 Process

The Council initiated a framework adjustment action in 2021 upon receiving the 2021 Mackerel MTA results. This action was later converted into an amendment due to the consideration of recreational bag limits and/or closures, which had not been previously considered in detail, and it was uncertain whether such measures could be considered via a framework adjustment action. The Council intends to take final action at its June 2022 meeting, after public hearings in late April 2022. An emergency rule currently limiting mackerel landings expires in early January 2023, necessitating rapid progress on this action to implement new measures before the emergency rule expires.

4.3 Purpose and Need

The purposes and needs addressed by this action are described in the table below.

Table 1. Purposes and Needs

Need	Corresponding Purpose
Prevent overfishing, rebuild the Atlantic mackerel stock, and achieve optimum yield in the mackerel fishery.	Implement measures to specify levels of catch of Atlantic mackerel consistent with the MSA and the objectives of the FMP, including ending overfishing and rebuilding the stock.
Achieve the Domestic Annual Harvest ("quota") allocation in the mackerel fishery without exceeding it or closing the fishery in a manner that creates avoidable discarding issues.	Implement in-season management measures, including management uncertainty buffers, triggers, and post-closure trip limits.
Minimize bycatch of river herring and shad in the mackerel fishery to the extent practicable.	Implement catch caps for river herring and shad.

4.4 Regulatory Authority

The MSA states that Fishery Management Plans (FMPs) shall "contain the conservation and management measures… necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery." As discretionary provisions of Fishery Management Plans (FMPs), the MSA also allows restriction of fishing by gear/area/time/season. Seasonal management based on attainment of quotas has been previously incorporated into the MSB FMP and this action could modify the existing provisions regarding how the fishery closes due to attainment of the DAH or a portion of the DAH. The RH/S cap was previously implemented under the discretionary MSA provisions providing for conservation of non-target species.

The Council's risk policy was initially implemented via Amendment 13 to the MSB FMP (http://www.mafmc.org/msb/), which stated that the system would need to be "adaptive" and that "Flexibility is imperative and must allow for timely modifications given the dynamic nature of fisheries and the environment." Changing the desired probabilities of overfishing was contemplated as something that could be accomplished through even the annual specifications process. Major departures from the original risk policy were contemplated as needing to go through either an FMP framework adjustment or FMP amendment. Risk policy adjustments were explicitly provided for and anticipated by Amendment 13. See also implementing regulations at Title 50, Chapter VI, Part 648, Subpart B, §648.25(a)(1)(ii).

4.5 FMP History and Management Objectives

Management of the MSB fisheries began through the implementation of three separate FMPs (one each for mackerel, squid, and butterfish) in 1978. The plans were merged in 1983. Over time a wide variety of management issues have been addressed including stock rebuilding, habitat conservation, bycatch minimization, and limiting participation in the fisheries. The history of the plan and its amendments can be found at http://www.mafmc.org/fisheries/fmp/msb.

The MSA defines Optimum Yield (OY) generally as the amount of fish which A) "will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems"; B) "is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor;" and C) "in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery." The Omnibus ACL/AM Amendment (Amendment 13 to the MSB FMP) defined OY specifically for mackerel as: "The long-term average amount of desired yield from a stock or fishery. OY cannot exceed MSY. For Atlantic Mackerel, OY is the quantity of catch that is less than or equal to the ABC in U.S. waters."

The management goals and objectives, as described in the current FMP are listed below.

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.
2. Promote the growth of the U.S. commercial fishery, including the fishery for export.
3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.
4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.
5. Increase understanding of the conditions of the stocks and fisheries.
6. Minimize harvesting conflicts among U.S. commercial, U.S. recreational, and foreign fishermen.

The Council recently updated the goals and objectives of the FMP through another action but that action has not yet been implemented:

<u>The updated MSB FMP objectives will be:</u>

Goal 1: Maintain sustainable MSB stocks.

> Objective 1.1: Prevent overfishing and maintain sustainable biomass levels that achieve optimum yield in the MSB fisheries.
>
> Objective 1.2: Consider and, to the extent practicable, account for the roles of MSB species/fisheries in the ecosystem.

Goal 2: Acknowledging the difficulty in quantifying all costs and benefits, achieve the greatest overall net benefit to the Nation, balancing the needs and priorities of different user groups and effects of management on fishing communities.

> Objective 2.1: Provide the greatest degree of freedom and flexibility to harvesters and processors (including shoreside infrastructure) of MSB resources consistent with attainment of the other objectives of this FMP, including minimizing additional restrictions.
>
> Objective 2.2: Allow opportunities for commercial and recreational MSB fishing, considering the opportunistic nature of the fisheries, changes in availability that may result from changes in climate and other factors, and the need for operational flexibility.
>
> Objective 2.3: Consider and strive to balance the social and economic needs of various sectors of the MSB fisheries (commercial including shoreside infrastructure and recreational) as well as other fisheries or concerns that may be ecologically linked to MSB fisheries.
>
> Objective 2.4: Investigate opportunities to access international/shared resources of MSB species.

Goal 3: Support science, monitoring, and data collection to enhance effective management of MSB fisheries.

> Objective 3.1: Improve data collection to better understand the status of MSB stocks, the role of MSB species in the ecosystem, and the biological, ecological, and socioeconomic impacts of management measures, including impacts to other fisheries.
>
> Objective 3.2: Promote opportunities for industry collaboration on research.
>
> Objective 3.3: Encourage research that may lead to practicable opportunities to further reduce bycatch in the MSB fisheries.

4.6 Management Unit and Geographic Scope

The management unit (fish stock definition) in the MSB FMP for Atlantic mackerel (*Scomber scombrus*) includes all mackerel under U.S. jurisdiction in the Northwest Atlantic, with a core fishery management area from Maine to North Carolina. The FMP also includes a deduction for mackerel caught by Canada - the assessment provides catch advice for the entire mackerel stock in the Northwest Atlantic (including Canadian waters), which is considered one unit stock.

5.0 WHAT ALTERNATIVES ARE CONSIDERED IN THIS DOCUMENT?

Notes: All of the rebuilding alternatives in this document utilize the peer reviewed and accepted 2021 Management Track Assessment (MTA) benchmark assessment and associated projection methods. The Council's SSC also reviewed these specific projections in March 2022 and endorsed them as constituting the best available scientific information (https://www.mafmc.org/ssc-meetings/2022/march-15-16). A summary from their report providing advice about the rebuilding alternatives will be added and their report included as Appendix 1. All specifications will be reviewed and potentially revised annually and a MTA should be available in 2023 to set 2024-2025 specifications. The first alternative uses only 2009-2019 recruitments so it requires very low catches to rebuild. Options 2-5 utilize recruitment draws constrained to lower 2009-2019 estimates unless spawning stock biomass is above 50% of the target (then 1975-2019 recruitments, which the reference points are based on, are used). The SSC identified these two recruitment approaches as "defensible and supported by the data" at its September 2021 SSC Meeting (MAFMC SSC 2021). The results of each rebuilding scenario are contingent on the assumed recruitment dynamics for the projection time period, which makes it difficult to compare Alternative 1 to the other alternatives. All alternatives assume less recruitment than the original mackerel rebuilding plan.

There will be Mackerel MTAs in 2023 and 2025 that both could result in revised rebuilding plans (they will be the new best available scientific information). Because the 2025 Mackerel MTA should consider catch through 2024, one way to compare across all alternatives in terms of relative probability of leading to stock growth by the 2025 Mackerel MTA is to just consider 2023-2024 combined catch. The higher the combined 2023 and 2024 combined catch, the relatively less likely stock growth will occur. The Action Alternatives 1-5 have been ordered from least to most 2023-2024 combined catch to facilitate comparison ("no-action" would result in the highest catch however, as described below). Conversely, the near-term socioeconomic affects would be most severe with Alternative 1 and least severe with Alternative 5. Longer terms considerations are also discussed in the impacts section.

This action would only set specifications for 2023 given an MTA is expected in 2023, which should use data through 2022. Using the 2023 MTA to set 2024 specifications would only involve a two-year data lag from the 2023 MTA data (2022 to 2024). Using the 2021 MTA to set 2024 specifications would involve a five-year data lag (2019 to 2024). If the assessment or subsequent

specifications were delayed, then the 2023 specifications would roll-over into 2024 until new specifications were published. The MSB Monitoring Committee recommended this approach given the high degree of uncertainty involved in setting 2024 specifications based on 2019 data. Setting 2024 specifications now is likely to convey more stability about 2023/2024 than warranted given the scale of changes observed in the 2021 Mackerel MTA versus the initial rebuilding plan projections.

NO ACTION ALTERNATIVE

For comparison purposes, "no action" would result in a return to the 2021/2022 published specifications for 2023 given the roll-over provisions in the regulations. Tied to the original rebuilding plan, these specifications would have a total catch of 29,184 MT, which would now result in overfishing in 2023 and fail to rebuild the mackerel stock in 10 years if maintained. While the stock is estimated to have tripled in size from 2014 to 2019 (from 8% of rebuilt to 24% of rebuilt), it has not increased enough to support the projected catch levels from the initial rebuilding plan. Due to the early January 2023 expiration of the current emergency rule, this is a rare case for MSB fisheries where no action does not equal status quo. The status quo catch (2022) is expected to be about 12,055 MT, but that would not be continued once the emergency rule expires in early January 2023. The no-action specifications that would re-commence in early January 2023 are detailed in the table below.

Table 2. No Action Specifications

Specification	Mackerel 2021-2022 (MT)
(a) Overfishing Limit (OFL)	Not available
(b) Acceptable Biological Catch (ABC)	29,184
(c) Canadian Deduction (10,000 MT)	10,000
(d) U.S. ABC = ACL (Canadian catch deducted)	19,184
(e) Recreational Allocation	1,270
(f) Commercial Allocation (rest of ACL)	17,914
(g) Management Uncertainty Buffer = 3%	537
(h) Commercial ACT (97% of allocation)	17,377
(i) DAH (0.37% set aside for discards)	17,312
(j) River Herring and Shad (RH/S) Cap	129

The mackerel fishery also operates under a river herring and shad catch cap (RH/S), which closes the directed mackerel fishery and implements a 20,000 pound trip limit for all permits once 129 MT of RH/S has been projected to be caught in the directed mackerel fishery. 129 MT was the amount of RH/S if the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was about 0.53% and the mackerel quota was 17,371 MT (or 0.74% applied to just the mackerel quota). Given the challenges with monitoring a very small cap, including potentially closing the fishery based on a few observed trips, the Council has kept the cap at 129 MT at the current lower mackerel quotas.

5.1 ALTERNATIVE 1 – 10-year Rebuilding with Persistent Low Recruitment.

Alternative 1 assumes lower, post-2009 recruitment persists, which makes it nearly impossible to rebuild because the reference point "goal" rebuilding target is based on higher, typical recruitment (post-1975). The SSC identified this as one of two recruitment approaches that are "defensible and supported by the data" at its September 2021 SSC Meeting. With the low recruitment entering the population for the entire rebuilding period, only minimal catches allow rebuilding, based on a fishing mortality rate ("F") of 0.01. While one could argue this Alternative could be outright rejected given Canadian catches, incidental U.S. commercial catches, and state-waters recreational catches will easily exceed the proposed rebuilding catches, it illustrates the dependence on actually getting typical recruitment when trying to rebuild to a target that is based on typical recruitment. With the catches in this projection, and if lower recruitment persists, the probability of rebuilding by 2032 would be 57%, and the median probability is for rebuilding to occur in 2031. Because this probability is conditional on recruitment being similar to 2009+ recruitment, it is not directly comparable to the other alternatives, but because its catches are so low, Alternative 1 would have the highest overall probability of rebuilding regardless of the recruitments that actually end up occurring. This alternative would also have the highest probability of increasing stock size by the 2025 Mackerel MTA Because it leads to the lowest 2023-2024 catches.

The projected rebuilding period catches (which would be the Acceptable Biological Catches - ABCs) and biomasses under Alternative 1 are described in the table below.

Table 3. Rebuilding Alternative 1 ABCs and Biomass

	Catch (MT)	Biomass (MT)
2023	703	83,692
2024	865	101,492
2025	1,025	118,979
2026	1,169	133,914
2027	1,296	146,932
2028	1,406	158,172
2029	1,497	167,354
2030	1,574	175,260
2031	1,639	181,670
2032	1,692	187,093

In terms of setting specifications for 2023, Alternative 1 appears impracticable given the existing management framework. With a 2023 ABC of 703 MT, the U.S. ABC would be negative given just likely Canadian catches (see additional discussion regarding Canada catches in Alternatives 4 and 5).

5.2 ALTERNATIVE 2 – P* deduction applied to 50% Rebuilding Probability

Alternatives 2-5 utilize recruitment draws constrained to lower 2009-2019 estimates unless spawning stock biomass during the rebuilding period is above 50% of the target (then the higher 1975-2019 recruitments, which the rebuilding goal is based on, are used). The SSC identified this as one of two recruitment approaches that are "defensible and supported by the data" at its September 2021 SSC Meeting (see Alternative 1 for the other approach). Because the projection model selects the lower or higher recruitment stanza based on biomass in each year of each of 2000 runs, there is a transition toward higher median recruitment through the rebuilding period depending on the exact trajectory of each run.

Alternative 2 uses the Council's standard P* risk policy deduction applied to the rebuilding F from the 50% probability rebuilding plan, effectively treating a rebuilding F of 0.14 as an overfishing mortality rate (and then imposing a risk-policy deduction). The P* risk policy requires higher certainty in avoiding overfishing at lower biomasses. For example in 2023 the P* risk policy requires an 85.5% probability of not overfishing (or in this case of not exceeding F = 0.14) due to the low projected 2023 stock size, and catch is lowered accordingly. Higher certainty about avoiding exceeding even the rebuilding F means lower catches, which allows rebuilding by 2029 in this alternative. F starts at 0.04 and as biomass nears the rebuilding target, higher fishing mortality is allowed, but never rises above F = 0.13. The 10-year rebuilding probability for Alternative 2 given all 10 years of catches is 62.3% given the recruitments used. This alternative would also have the 2nd highest probability of increasing stock size by the 2025 Mackerel MTA because it leads to the 2nd lowest 2023-2024 catches.

The projected rebuilding period catches (which would be the Acceptable Biological Catches - ABCs) and biomasses under Alternative 3 are described in the table below.

Table 4. Rebuilding Alternative 2 ABCs and Biomass

	Catch (MT)	Biomass (MT)
2023	2,976	82,832
2024	4,168	98,752
2025	5,879	116,414
2026	8,127	134,870
2027	10,978	154,147
2028	14,519	172,753
2029	18,487	188,964
2030	21,394	202,302
2031	23,034	213,674
2032	24,459	222,817

In terms of setting specifications for 2023, Alternative 2 appears impracticable given the existing management framework. With a 2023 ABC of 2,976 MT, the U.S. ABC would be near zero, and the commercial quota would be negative given likely recreational catches (see additional discussion regarding Canada and recreational catches in Alternatives 4 and 5).

5.3 ALTERNATIVE 3 – P* approach with return to normal recruitment.

Alternatives 2-5 utilize recruitment draws constrained to lower 2009-2019 estimates unless spawning stock biomass during the rebuilding period is above 50% of the target (then the higher 1975-2019 recruitments, which the rebuilding goal is based on, are used). The SSC identified this as one of two recruitment approaches that are "defensible and supported by the data" at its September 2021 SSC Meeting (see Alternative 1 for the other approach). Because the projection model selects the lower or higher recruitment stanza based on biomass in each year of each of 2000 runs, there is a transition toward higher median recruitment through the rebuilding period depending on the exact trajectory of each run.

Alternative 3 uses the Council's standard P* risk policy as a rebuilding plan. The P* risk policy requires higher certainty in avoiding overfishing at lower biomasses. For example in 2023 the P* risk policy requires an 85.5% probability of not overfishing due to the low projected 2023 stock size, and catch is lowered accordingly. For a fully rebuilt stock, the risk policy requires a 55% probability of not overfishing, which causes the stock size to stabilize above the rebuilding target. Higher certainty about avoiding overfishing means lower catches (especially initially), which allows rebuilding by 2031 in this alternative. As biomass nears the rebuilding target, higher fishing mortality is allowed (slowing stock growth). The 10-year rebuilding probability given all 10 years of catches for Alternative 3 is 51.5% given the recruitments used. This alternative would also have the 3rd highest probability of increasing stock size by the 2025 Mackerel MTA because it leads to the 3rd lowest 2023-2024 catches.

The projected rebuilding period catches (which would be the Acceptable Biological Catches - ABCs) and biomasses under Alternative 3 are described in the table below.

Table 5. Rebuilding Alternative 3 ABCs and Biomass

	Catch (MT)	Biomass (MT)
2023	4,539	82,205
2024	6,207	96,378
2025	8,455	111,512
2026	11,245	126,811
2027	14,558	142,214
2028	18,391	156,433
2029	22,337	168,344
2030	25,981	177,517
2031	29,014	183,446
2032	30,564	186,886

As detailed above, this action would only set specifications for 2023 given a Mackerel MTA is expected in 2023, which can inform 2024-2025 specifications.

The SSC has recommended this P* rebuilding approach for several reasons (see SSC report for additional details):

-increases catch the fastest once stock size is recovering.
-More responsive to available information.
-No need to re-calculate Frebuild, allows “natural” rebuilding.
-No shift in approaches once stock recovers.
-Gives highest cumulative catch

The SSC also noted that this alternative provides lower initial catches (ABCs) than some other alternatives. In terms of setting specifications for 2023, Alternative 3 may be impracticable given the existing management framework. With a 2023 ABC of 4,539 MT, the U.S. ABC would range from 144 MT if 2021 Canadian catch is deducted to 2,342 MT if Canada were to substantially reduce its current 4,000 MT quota in 2022 and that reduction was assumed to persist for 2023 (see additional discussion regarding Canada in Alternatives 4 and 5). With 1,975 MT being the smallest reduction for recreational catch recommended by the Monitoring Committee (see additional discussion regarding recreational deductions in Alternatives 4 and 5), there is near zero to negative quota available for the US fishery, even for incidental catch. Accordingly, the P* approach does not appear practicable for 2023. However, at slightly higher stock sizes and ABCs the P* approach could be practicable, and is worth revisiting after the next Mackerel MTA, given the advantages noted by the SSC.

5.4 ALTERNATIVE 4 – 62% Rebuilding Probability in 10 Years

Alternatives 2-5 utilize recruitment draws constrained to lower 2009-2019 estimates unless spawning stock biomass during the rebuilding period is above 50% of the target (then the higher 1975-2019 recruitments, which the rebuilding goal is based on, are used). The SSC identified this as one of two recruitment approaches that are “defensible and supported by the data” at its September 2021 SSC Meeting (see Alternative 1 for the other approach). Because the projection model selects the lower or higher recruitment stanza based on biomass in each year of each of 2000 runs, there is a transition toward higher median recruitment through the rebuilding period depending on the exact trajectory of each run.

Alternative 4 uses an F of 0.12, which would be predicted to have a 62.3% probability of rebuilding the mackerel stock in 10 years given the recruitments used. The median rebuilt year is 2031. F stays the same for all 10 years, and as biomass increases, so does catch. This alternative would also have the 4th highest probability of increasing stock size by the 2025 Mackerel MTA Because it leads to the 4th lowest 2023-2024 catches.

The projected rebuilding period catches (which would be the Acceptable Biological Catches - ABCs) and biomasses under Alternative 4 are described in the table below.

Table 6. Rebuilding Alternative 4 ABCs and Biomass

	Catch (MT)	Biomass (MT)
2023	8,094	80,745
2024	9,274	91,738
2025	10,540	103,756
2026	11,906	116,857
2027	13,408	131,291
2028	15,004	146,553
2029	16,631	162,239
2030	18,261	177,731
2031	19,814	192,045
2032	21,215	204,796

As detailed above, this action would only set specifications for 2023 given a Mackerel MTA is expected in 2023, which can inform 2024-2025 specifications. Selecting this alternative would also modify the Council's risk policy for the purposes of beginning this rebuilding plan. The existing risk policy would otherwise cap the 2023 ABC at the standard P* catch calculation (4,539 MT).

The FMP accounts for Canadian landings, recreational catch, and commercial discards by deductions from the total ABC, with options described below.

Canadian Landings

A Canadian quota for 2022 has not yet been set but should be set before final Council action in June 2022. Given the Canadian assessment will be updated next in 2023, substantial changes seem unlikely for 2022, but 2023 is harder to predict. This action explores two options for deducting Canadian landings in 2023: Deducting their 2021 landings (4,395 MT) or half that amount (2,197 MT). If Canada maintains their 4,000 MT quota for 2022, 4,395 MT would be deducted for 2023. If Canada reduces their quota, the reduced quota would be deducted but at least 2,197 MT would be deducted given the uncertainty about Canada monitoring a quota lower than 2,197 MT. Whenever the Canadian quota is announced, this document will be updated accordingly.

Recreational Catch Restriction Alternatives

For 2022, 2,582 MT of recreational catch was deducted, the 2017-2021 average. 2017 was included to capture some of the historically-observed variability. Analysis of Marine Recreational Information Program (MRIP) and Vessel Trip Report (VTR) data suggest that replacing trips that caught higher bag limits with the following bag limits could result in the following catch reductions, based on pooled available 2018-2021 MRIP/VTR data (2021 preliminary).

Table 7. Theoretical Bag Limit Reductions by Mode

	% Catch Reduction		
Bag Limit	Private	Shore	For-Hire
5 fish	60%	46%	56%
10 fish	39%	27%	35%
15 fish	28%	19%	22%

Accounting for the proportion of each mode's harvest (77% private, 20% shore, 3% for hire), and that harvest is 83% of catch, then the calculated reductions in recreational catch would be (assuming that Maine, New Hampshire, and Massachusetts mirrored the Federal regulations):

Table 8. Theoretical Combined Bag Limit Reductions

	% Catch Reduction
Bag Limit	Combined
5 fish	47%
10 fish	30%
15 fish	22%

These bag limits appear to represent a reasonable range of initial restriction alternatives for the recreational sector for 2023. There have not been recreational limits for mackerel before, so angler responses may be difficult to predict. To avoid under-accounting for recreational catch the MSB Monitoring Committee recommended either maintaining 2022's 2,582 MT deduction for recreational catch, or only taking half credit for any calculated theoretical savings, which would result in deducting the following for recreational catch in each scenario:

Table 9. Theoretical Alternative Recreational Catch Deductions and Savings

	Recreational Deduction	
Bag Limit	Combined (MT)	Savings (MT)
5 fish	1,975	607
10 fish	2,195	387
15 fish	2,298	284

The following specifications calculations assume that either 2,582 MT of recreational catch is deducted, i.e. potential savings from recreational bag limits would not be assumed in 2023 or

2,195 MT is deducted based on a 10 fish bag limit. Staying with 2,582 MT could help account for the variability that can occur with recreational catch estimates – recreational catch (numbers of fish) has been stable from 2018-2021, but has varied substantially year to year in the past. Depending on any bag limit ultimately chosen by the Council, the commercial quota could be adjusted accordingly, adding up to 220 MT commercial quota for the 5-fish limit or deducting 103 MT for a 15-fish limit. It must be reiterated that these estimates are rough approximations given there is no history of bag limits in this fishery. Staff explored using a log regression to consider different increments given the apparent digit bias (at 5 and 10 fish increments) in the reported harvest data. While a log regression fit the data quite well, there did not appear reason to investigate further given there is already limited certainty about potential angler responses to a new bag limit for mackerel and subsequent effects on overall catch.

Commercial Discards

No changes are proposed to the averaging approach used by the NEFSC for 2022 projected catch – 115 MT is assumed for 2023 commercial mackerel discards.

Closure Approach

Averaging 2018-2021, the fishery landed 805 MT after April 1, and these were times when the directed limited access fishery was not active (range was 618 MT to 1,037 MT). As such, this time period should represent landings rates that could occur during a closure of the directed fishery. The proposed "first" closure approach is to buffer this performance by 10% and one month, so that before May 1 the directed fishery would close with 886 MT left in the quota, and from May 1 on, the directed fishery would close with 443 MT left in the quota. NMFS would also have the discretion to not close the fishery in November and December if performance suggests that a quota overage is unlikely. While it is possible that an early closure in January could result in more than 886 MT in additional landings, and it is possible that a closure in late April could result in unused quota remaining, this proposed system likely strikes a reasonable balance between achieving OY and regulatory simplicity. At this threshold for the "first" closure, additional trip limits would be implemented: 40,000 pounds for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits. There would be a final closure with 100 MT left in the quota where all permits were subject to a 5,000 pound trip limit to minimize any potential overages. With these trip limits any possible overages should be minimal, and would be deducted from subsequent years' quotas if an overall ACL overage occurs.

Specifications Summary

Based on the above proposed approaches to handle Canadian landings, recreational catch, commercial discards, and quota closures, the following specifications are possible for Alternative

4 – at the time of final action, the Council would need to identify the recommended Canadian landings and recreational catch deductions to determine the final quotas.

Table 10. Alternative 4 2023 Specifications Summary

Alterntaive 4 - 2023 Specifications (MT)				
ABC	8,094			
Canadian Catch Options	2,197		4,395	
Rec Catch Options	2,195	2,582	2,195	2,582
Commercial Discards	115	115	115	115
Commercial Quota	3,587	3,200	1,389	1,002
Before May 1 First Closure Threshold (-886 MT)	2,701	2,314	Insufficient quota for directed fishing - begin closed	
May 1/after First Closure Threshold (-443 MT)	3,144	2,757		
Final Closure Threshold (-100 MT)	3,487	3,934	2,123	1,736

Commercial Minimum Mesh Add-On Alternative

The Council has also requested inclusion of a 3-inch minimum mesh requirement that mirrors a similar requirement in the butterfish fishery. The regulatory wording would be: "Owners or operators of trawl vessels possessing more than 5,000 lb (2.27 mt) of mackerel harvested in or from the EEZ may only fish with nets having a minimum codend mesh of 3 inches (7.62 cm) diamond or square mesh, as measured by methods specified in § 648.80(f), applied throughout the codend for at least 100 continuous meshes forward of the terminus of the net, or for codends with less than 100 meshes, the minimum mesh size codend shall be a minimum of one-third of the net, measured from the terminus of the codend to the headrope.

Unfortunately there are not gear selectivity studies for Atlantic mackerel that allow quantitative analysis of this alternative. Casey et al 1992 examined an experimental midwater trawl codend of 60 mm polypropylene knotless square netting fished against a similar trawl fitted with a codend constructed from 40 mm knotted nylon mesh rigged in the conventional diamond configuration in the western English Channel. The size composition of the mackerel caught ranged from 18 to 37 cm (roughly almost age 1s to age 7s in our fishery) and a comparison of the length-frequency distributions indicated that there was no difference in the size composition, and hence selection, of fish taken by the two gears. Various studies on horse mackerel, a jack species of roughly similar size and shape of Atlantic mackerel have shown expected selectivity patterns. For example Campos and Fonseca 2003 saw small but significant effects on size selectivity across 65mm (2.6 inches) to 70mm (2.8 inches) and 80 mm (3.1 inches) meshes. The direct applicability to Atlantic mackerel would be uncertain, but the general literature on selectivity would support that some additional escapement of small mackerel should occur (e.g. https://www.conservationevidence.com/actions/2697#). Most Atlantic mackerel catch observations (raw data) in the observer data in the last 10 years occur from 48mm (1.9 inches) to

60mm (2.5 inches), with less then 10% of observations by weight occurring with mesh over 60mm (2.5 inches), making the observer data of limited usefulness for exploring an increase to a 3-inch mesh.

River Herring and Shad Cap

Sub-Option 1

Given the small 2023 directed fishery, the Council could simply retain the current 129 MT river herring and shad (RH/S) catch cap, which closes the directed mackerel fishery and implements a 20,000 pound trip limit for all permits once 129 MT of RH/S has been projected to be caught in the directed mackerel fishery. 129 MT was the amount of RH/S if the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was about 0.53% and the mackerel quota was 17,371 MT (or 0.74% applied to just the mackerel quota). Given the challenges with estimating and monitoring a very small cap, including potentially closing the fishery based on a few observed trips, the Council has kept the cap at 129 MT at the current lower mackerel quotas.

Sub-Option 2

The Council could also scale the RH/S cap with the quota selected in this Alternative, which would range the RH/S cap from 27 MT to 7 MT.

Permitting Option

There is some ambiguity in the current regulations regarding possession of Atlantic mackerel. If the prohibitions list is modified to include possession by commercial and for-hire vessels without an appropriate mackerel permit, any reporting loopholes would be closed, especially if including possession of previously-caught or purchased mackerel bait as triggering a permit requirement (purchased bait would not need to be reported, but all catch on all trips must be reported on vessel trip reports (VTRs) once in possession of a mackerel permit regardless of the target species on a particular trip).

5.5 ALTERNATIVE 5 – 53% Rebuilding Probability in 10 Years

Alternatives 2-5 utilize recruitment draws constrained to lower 2009-2019 estimates unless spawning stock biomass during the rebuilding period is above 50% of the target (then the higher 1975-2019 recruitments, which the rebuilding goal is based on, are used). The SSC identified this as one of two recruitment approaches that are "defensible and supported by the data" at its September 2021 SSC Meeting (see Alternative 1 for the other approach). Because the projection model selects the lower or higher recruitment stanza based on biomass in each year of each of 2000 runs, there is a transition toward higher median recruitment through the rebuilding period depending on the exact trajectory of each 2000 model runs.

Alternative 5 uses an F of 0.14, which would be predicted to have a 53.4 % probability of rebuilding the mackerel stock in 10 years given the recruitments used. The median rebuilt year is 2032. F stays the same for all 10 years, and as biomass increases, so does catch. Other than no action, this alternative would also have the lowest probability of increasing stock size by the 2025 Mackerel MTA Because it leads to the highest 2023-2024 catches.

The projected rebuilding period catches (which would be the Acceptable Biological Catches - ABCs) and biomasses under Alternative 5 are described in the table below.

Table 11. Rebuilding Alternative 5 ABCs and Biomass

	Catch (MT)	Biomass (MT)
2023	9,371	80,215
2024	10,591	89,949
2025	11,883	100,486
2026	13,252	111,737
2027	14,764	124,305
2028	16,365	137,457
2029	18,001	151,050
2030	19,665	164,694
2031	21,257	177,355
2032	22,672	188,731

As detailed above, this action would only set specifications for 2023 given a Mackerel MTA is expected in 2023, which can inform 2024-2025 specifications. Selecting this alternative would also modify the Council's risk policy for the purposes of beginning this rebuilding plan. The existing risk policy would otherwise cap the 2023 ABC at the standard P* catch calculation (4,539 MT).

The FMP accounts for Canadian landings, recreational catch, and commercial discards by deductions from the total ABC, with options described below.

Canadian Landings

A Canadian quota for 2022 has not yet been set but should be set before final Council action in June 2022. Given the Canadian assessment will be updated next in 2023, substantial changes seem unlikely for 2022, but 2023 is harder to predict. This action explores two options for deducting Canadian landings in 2023: Deducting their 2021 landings (4,395 MT) or half that amount (2,197 MT). If Canada maintains their 4,000 MT quota for 2022, 4,395 MT would be deducted for 2023. If Canada reduces their quota, the reduced quota would be deducted but at least 2,197 MT would be deducted given the uncertainty about Canada monitoring a quota lower than 2,197 MT. Whenever the Canadian quota is announced, this document will be updated accordingly.

Recreational Catch Restriction Alternatives

For 2022, 2,582 MT of recreational catch was deducted, the 2017-2021 average. 2017 was included to capture some of the historically-observed variability. Analysis of Marine Recreational Information Program (MRIP) and Vessel Trip Report (VTR) data suggest that replacing trips that caught higher bag limits with the following bag limits could result in the following catch reductions, based on pooled available 2018-2021 MRIP/VTR data (2021 preliminary).

Table 12. Theoretical Bag Limit Reductions by Mode

	% Catch Reduction		
Bag Limit	Private	Shore	For-Hire
5 fish	60%	46%	56%
10 fish	39%	27%	35%
15 fish	28%	19%	22%

Accounting for the proportion of each mode's harvest (77% private, 20% shore, 3% for hire), and that harvest is 83% of catch, then the calculated reductions in recreational catch would be (assuming that Maine, New Hampshire, and Massachusetts mirrored the Federal regulations):

Table 13. Theoretical Combined Bag Limit Reductions

	% Catch Reduction
Bag Limit	Combined
5 fish	47%
10 fish	30%
15 fish	22%

These bag limits appear to represent a reasonable range of initial restriction alternatives for the recreational sector for 2023. There have not been recreational limits for mackerel before, so angler responses may be difficult to predict. To avoid under-accounting for recreational catch the MSB Monitoring Committee recommended either maintaining 2022's 2,582 MT deduction for recreational catch, or only taking half credit for any calculated theoretical savings, which would result in deducting the following for recreational catch in each scenario:

Table 14. Theoretical Alternative Recreational Catch Deductions and Savings

Bag Limit	Recreational Deduction Combined (MT)	Savings (MT)
5 fish	1,975	607
10 fish	2,195	387
15 fish	2,298	284

The following specifications calculations assume that either 2,582 MT of recreational catch is deducted, i.e. potential savings from recreational bag limits would not be assumed in 2023 or 2,195 MT is deducted based on a 10 fish bag limit. Staying with 2,582 MT could help account for the variability that can occur with recreational catch estimates – recreational catch (numbers of fish) has been stable from 2018-2021, but has varied substantially year to year in the past. Depending on any bag limit ultimately chosen by the Council, the commercial quota could be adjusted accordingly, adding up to 220 MT commercial quota for the 5-fish limit or deducting 103 MT for a 15-fish limit. It must be reiterated that these estimates are rough approximations given there is no history of bag limits in this fishery. Staff explored using a log regression to consider different increments given the apparent digit bias (at 5 and 10 fish increments) in the reported harvest data. While a log regression fit the data quite well, there did not appear reason to investigate further given there is already limited certainty about potential angler responses to a new bag limit for mackerel and subsequent effects on overall catch.

Commercial Discards

No changes are proposed to the averaging approach used by the NEFSC for 2022 projected catch – 115 MT is assumed for 2023 commercial mackerel discards.

Closure Approach

Averaging 2018-2021, the fishery landed 805 MT after April 1, and these were times when the directed limited access fishery was inactive (range was 618 MT to 1,037 MT). As such, this time period should represent landings rates that could occur during a closure of the directed fishery.

The proposed "first" closure approach is to buffer this performance by 10% and one month, so that before May 1 the directed fishery would close with 886 MT left in the quota, and from May 1 on, the directed fishery would close with 443 MT left in the quota. NMFS would also have the discretion to not close the fishery in November and December if performance suggests that a quota overage is unlikely. While it is possible that an early closure in January could result in more than 886 MT in additional landings, and it is possible that a closure in late April could result in unused quota remaining, this proposed system likely strikes a reasonable balance between achieving OY and regulatory simplicity. At this threshold for the "first" closure, additional trip limits would be implemented: 40,000 pounds for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits. There would be a final closure with 100 MT left in the quota where all permits were subject to a 5,000 pound trip limit to minimize any potential overages. With these trip limits any possible overages should be minimal, and would be deducted from subsequent years' quotas if an overall ACL overage occurs.

Specifications Summary

Based on the above proposed approaches to handle Canadian landings, recreational catch, commercial discards, and quota closures, the following specifications are possible for Alternative 5 – at the time of final action, the Council would need to identify the recommended Canadian landings and recreational catch deductions to determine the final quotas.

Table 15. Alternative 5 2023 Specifications Summary

Alterntaive 5 - 2023 Specifications (MT)				
ABC	9,371			
Canadian Catch Options	2,197		4,395	
Rec Catch Options	2,195	2,582	2,195	2,582
Commercial Discards	115	115	115	115
Commercial Quota	4,864	4,477	2,666	2,279
Before May 1 First Closure Threshold (-886 MT)	3,978	3,591	1,780	1,393
May 1/after First Closure Threshold (-443 MT)	4,421	4,034	2,223	1,836
Final Closure Threshold (-100 MT)	4,764	4,377	2,566	2,179

Commercial Minimum Mesh Add-On Alternative

The Council has also requested inclusion of a 3-inch minimum mesh requirement that mirrors a similar requirement in the butterfish fishery. The regulatory wording would be: "Owners or operators of trawl vessels possessing more than 5,000 lb (2.27 mt) of mackerel harvested in or from the EEZ may only fish with nets having a minimum codend mesh of 3 inches (7.62 cm) diamond or square mesh, as measured by methods specified in § 648.80(f), applied throughout the codend for at least 100 continuous meshes forward of the terminus of the net, or for codends with less than 100 meshes, the minimum mesh size codend shall be a minimum of one-third of the net, measured from the terminus of the codend to the headrope.

Unfortunately there are not gear selectivity studies for Atlantic mackerel that allow quantitative analysis of this alternative. Casey et al 1992 examined an experimental midwater trawl codend of 60 mm polypropylene knotless square netting fished against a similar trawl fitted with a codend constructed from 40 mm knotted nylon mesh rigged in the conventional diamond configuration in the western English Channel. The size composition of the mackerel caught ranged from 18 to 37 cm (roughly almost age 1s to age 7s in our fishery) and a comparison of the length-frequency distributions indicated that there was no difference in the size composition, and hence selection, of fish taken by the two gears. Various studies on horse mackerel, a jack species of roughly similar size and shape of Atlantic mackerel have shown expected selectivity patterns. For example Campos and Fonseca 2003 saw small but significant effects on size selectivity across 65mm (2.6 inches) to 70mm (2.8 inches) and 80 mm (3.1 inches) meshes. The direct applicability to Atlantic mackerel would be uncertain, but the general literature on selectivity would support that some additional escapement of small mackerel should occur (e.g. https://www.conservationevidence.com/actions/2697#). Most Atlantic mackerel catch observations (raw data) in the observer data in the last 10 years occur from 48mm (1.9 inches) to 60mm (2.5 inches), with less then 10% of observations by weight occurring with mesh over 60mm (2.5 inches), making the observer data of limited usefulness for exploring an increase to a 3-inch mesh.

River Herring and Shad Cap

Sub-Option 1

Given the small 2023 directed fishery, the Council could simply retain the current 129 MT river herring and shad (RH/S) catch cap, which closes the directed mackerel fishery and implements a 20,000 pound trip limit for all permits once 129 MT of RH/S has been projected to be caught in the directed mackerel fishery. 129 MT was the amount of RH/S if the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was about 0.53% and the mackerel quota was 17,371 MT (or 0.74% applied to just the mackerel quota). Given the challenges with estimating and monitoring a very small cap, including potentially closing the fishery based on a few observed trips, the Council has kept the cap at 129 MT at the current lower mackerel quotas.

Sub-Option 2

The Council could also scale the RH/S cap with the quota selected in this Alternative, which would range the RH/S cap from 36 MT to 17 MT.

Permitting Option

There is some ambiguity in the current regulations regarding possession of Atlantic mackerel. If the prohibitions list is modified to include possession by commercial and for-hire vessels without an appropriate mackerel permit, any reporting loopholes would be closed, especially if including possession of previously-caught or purchased mackerel bait as triggering a permit requirement (purchased bait would not need to be reported, but all catch on all trips must be reported on vessel trip reports (VTRs) once in possession of a mackerel permit regardless of the target species on a particular trip).

5.6 Considered by Rejected Alternatives

Given the extremely low catches required for even a 50% probability of rebuilding when lower recruitment is assumed for the whole rebuilding period (i.e. #1 above), higher probability options combined with the persistent low recruitment appeared redundant.

Even with the two phase recruitment scenario, achieving a 75% probability of rebuilding would require very low catches, and appeared redundant with remaining options that also required very low catches.

Given the unknown discard mortality, and potential enforcement issues related to chub mackerel mis-identification, minimum size options were "Considered but Rejected."

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6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

6.1 Description of the Managed Resource and Non-Target Species

Mackerel

Unless otherwise indicated, the information in this section is taken from the mackerel EFH source document at http://www.nefsc.noaa.gov/nefsc/habitat/efh/ and the recent assessment at https://www.nefsc.noaa.gov/saw/reports.html.

Atlantic mackerel is a semi-pelagic/semi-demersal (may be found near the bottom or higher in the water column) schooling fish species primarily distributed between Labrador (Newfoundland, Canada) and North Carolina. Based on the work of Sette (1943, 1950) and confirmed in the recent assessment, the stock is considered to comprise two spawning contingents: a northern contingent spawning primarily in the southern Gulf of St. Lawrence and a southern contingent spawning in the Mid-Atlantic Bight, Southern New England and the western Gulf of Maine. The two contingents mix during winter months on the Northeast U.S. shelf; however, the degree of mixing and natal homing is unknown. Mackerel in the northwest Atlantic were modeled as one stock for the recent assessment. The Canadian fishery likely primarily catches the northern contingent while the U.S. fishery likely catches both contingents.

Mackerel spawning occurs during spring and summer and progresses from south to north as the surface waters warm. Atlantic mackerel are serial, or batch spawners. Eggs are pelagic. Post-larvae gradually transform from planktonic to swimming and schooling behavior at about 30-50 mm. Approximately 50% of fish are mature at age 2 and about 99% were mature at age 3 from 2007-2016 according to the recent benchmark assessment.

Atlantic mackerel are opportunistic feeders that can ingest prey either by individual selection of organisms or by passive filter feeding.

A wide variety of fish and other animals are predators of mackerel. Predator food habits on the Northeast US Shelf have been systematically sampled during the NEFSC bottom trawl surveys since 1973. In the recent benchmark assessment, these food habits data were evaluated for the top 17 mackerel predators based on the percent occurrence of mackerel in predator diets (NEFSC 2018, Appendix A4). The presence of Atlantic mackerel in fish stomachs was generally low from 1973-2016. A total of 1,284 out of 619,637 stomachs (~0.2%) contained mackerel, including unidentified mackerel Scombridae and Scomber spp. Spiny dogfish was the most dominant mackerel predator sampled by the trawl surveys, but the frequency of occurrence for mackerel in spiny dogfish diets only average 1%.

Additional potentially important predators of mackerel are not sampled in the NEFSC trawl surveys, including highly migratory species, marine mammals, and seabirds. Consumption from these predators is more difficult to estimate due to incomplete information on population levels and annual diet information. Furthermore, predator food habits were not available for the months the northern contingent was outside of the area sampled by the NEFSC trawl survey. Given this incomplete sampling, the low occurrence of mackerel in predator stomachs, and the resulting interannual variability in consumption estimates, the final model did not incorporate predator diets as an index of abundance. The temporal trends in consumption were consistent with trends from the range-wide egg index as well as abundance estimates.

Additional life history information is detailed in the Essential Fish Habitat (EFH) document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

The 2021 Mackerel MTA found mackerel to be overfished with overfishing occurring, as described above.

Mackerel Non-Target Species

There have been very few recent observed directed mackerel trips due to the low directed effort toward mackerel in recent years. Various species will be caught incidentally to any mackerel fishing and will be impacted to some degree by the prosecution of the fishery. On the mackerel trips identified in this analysis, the 2017-2019 overall discard rate was 1%. For non-target species that are managed under their own FMP, incidental catch/discards are also considered as part of the management of that fishery. Data beyond 2019 was not analyzed due to potential Covid-19 impacts.

The primary database used to assess discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. One critical aspect of using this database to describe discards is to correctly define the trips that constitute a given directed fishery. A flexible criteria of what captains initially intend to target, how they may adjust targeting over the course of a trip, and what they actually catch would be ideal but is impracticable. The case with mackerel is further complicated by the small size of the fishery recently and the few observed trips. However from 2017-2019 there were on average 7 observed trips annually where mackerel accounted for at least 50% of retained catch, and those trips form the basis of the following analysis. These trips made 65 hauls of which 89% were observed. Hauls may be unobserved for a variety of reasons, for example transfer to another vessel without an observer, observer not on station, haul slipped (dumped) in the water before observing, etc.

The observed mackerel kept on these trips accounted for approximately 7% of the total mackerel landed (this is the overall coverage rate based on weight). While a very rough estimate, especially given non-accounting for spatial and temporal trends, one can use the information in the table immediately following and the fact that about 6,920 mt of mackerel were caught annually 2017-2019 to roughly estimate annual incidental catch and discards for the species in the table. Readers are strongly cautioned that while this is a reasonable approach for a quick, rough, and relative estimate given the available data, it is highly imprecise and does not follow the protocol used for official discard estimates. As a minimum threshold, only species estimated to be caught at a level more than 10,000 pounds per year are included (captures 95% of all discards). Species with a "*" are overfished, subject to overfishing, or otherwise considered depleted.

Table 16. Incidental Catch and Discards in the Mackerel Fishery

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	Of all discards observed, percent that comes from given species	Percent of given species that was discarded	Pounds of given species caught per mt mackerel Kept	Pounds of given species discarded per mt mackerel Kept	Rough Annual Catch (pounds) based on 3-year (2017-2019) average of mackerel landings (6,920 mt)	Rough Annual Discards (pounds) based on 3-year (2017-2019) average of mackerel landings (6,920 mt)
MACKEREL, ATLANTIC *	3,207,485	585	1%	0%	2,205	0	15,258,755	2,785
HERRING, ATLANTIC *	626,320	4,639	9%	1%	431	3	2,979,549	22,068
HERRING, BLUEBACK *	28,805	9,570	19%	33%	20	7	137,031	45,529
FISH, NK	22,101	22,101	43%	100%	15	15	105,137	105,137
DOGFISH, SPINY	13,912	10,048	20%	72%	10	7	66,181	47,799
ALEWIFE *	7,580	1,793	3%	24%	5	1	36,061	8,531
HAKE, SILVER (WHITING	2,187	23	0%	1%	2	0	10,402	108

The observer program creates individual animal records for some fish species of interest, mostly larger pelagics and/or elasmobranchs, as well as tagged fish. There was only one such record for these trips, an unknown shark species.

6.2 Human Communities and Economic Environment

This section describes the performance of the mackerel fishery to allow the reader to understand the socio-economic importance of the mackerel fishery. The recent squid and butterfish specifications EA (MAFMC 2021) can be consulted for information on those species, but those fisheries are not expected to be impacted by this action. Recent Amendments to the MSB FMP contain additional information about the MSB fisheries, especially demographic information on ports that land MSB species. See Amendments 11 and 14 at http://www.mafmc.org/msb/ for more information or visit NMFS' communities page at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/. In general, the MSB fisheries saw high foreign landings in the 1970s followed by a domestication of the fishery, and domestic landings have been variable, but lower than the peak foreign landings. The current regulations for the MSB fisheries are summarized by NMFS at https://www.fisheries.noaa.gov/species/atlantic-mackerel#commercial, and detailed in the Federal Register at https://www.ecfr.gov/current/title-50/chapter-VI/part-648.

The most obvious way that human communities are affected by the MSB fisheries are from the revenues generated by the fisheries, and the jobs created. The affected communities include both individuals directly involved in harvesting and processing as well as indirect support services (e.g. vessel maintenance, insurance, ice, etc.). While the direct data points that are most available are landings and revenues, it is important to keep in mind that by contributing to the overall functioning of and employment in coastal communities, the MSB fisheries have indirect social impacts as well. Social impacts are strongly aligned with changes to fishing opportunities and while difficult to measure can include impacts to families from income changes/volatility, safety-at-sea (related to changes in fishery operations due to regulation changes), job satisfaction, and general frustration by individuals due to management's impacts especially if they perceive management actions to be unreasonable or ill-informed.

Descriptive information on the fisheries is included, and where possible, quantitative commercial fishery and economic information is presented. This section establishes a descriptive baseline for the fishery with which to compare actual and predicted future socio-economic changes that result from management actions.

Commercial Fishery

There are four categories of mackerel permits. When the fishery starts each year, the various commercial mackerel permit categories start with different trip limits. Tier 1 has an unlimited trip limit, Tier 2 has a 135,000 pound trip limit, and Tier 3 has a 100,000 pound trip limit. An open access/incidental permit has a 20,000 pound trip limit. When 90% of the DAH is projected to be landed, trip limits of 40,000 pounds are implemented for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits. When 98% of the DAH is projected to be landed, a 5,000 pound trip limit would be implemented for all permits for the rest of the fishing year to cover remaining incidental catches.

Foreign catches dominated the fishery during the 1960s and 1970s, with total catch peaking at over 430,000 MT in 1973. Foreign catches declined and then were eliminated by the MSA, though there was also some joint venture activity from the mid-1980s through 1991. From 1992 through 2001, total catches (including Canada) averaged only 36,104 MT before increasing to peaks of just over 110,000 MT in 2004 and 2006. Total catch then declined and from 2011-2021 averaged 16,698 MT per year. Not on the figure below, 2020 total catch was near 18,000 MT and 2021 total catch was near 12,000 MT (the 2019 terminal year value in the figure below was 16,322 MT.

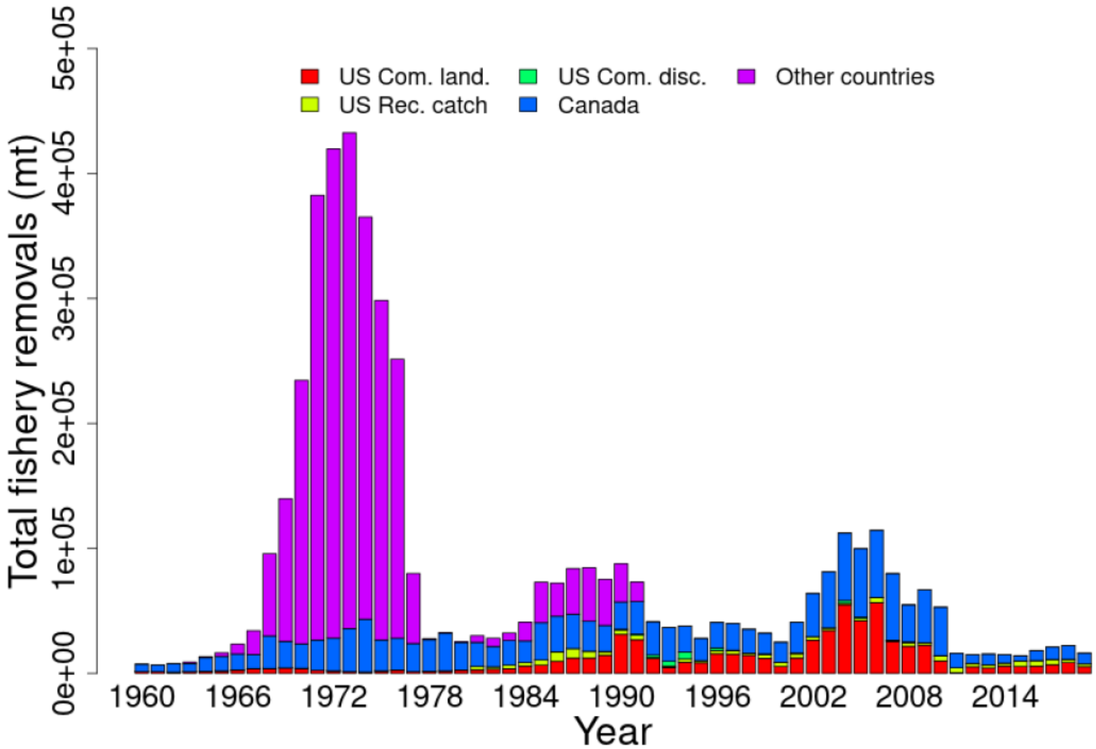

Figure 3. Total annual mackerel catch (mt) by the U.S., Canada and other countries for 1960-2019.

The figure below provides more detail on U.S. Commercial landings and ex-vessel revenues (in 2021 inflation-adjusted dollars) since 1996, when reporting was improved. Mackerel prices were variable from 1996-2001 and have been in trending upward overall since 2001.

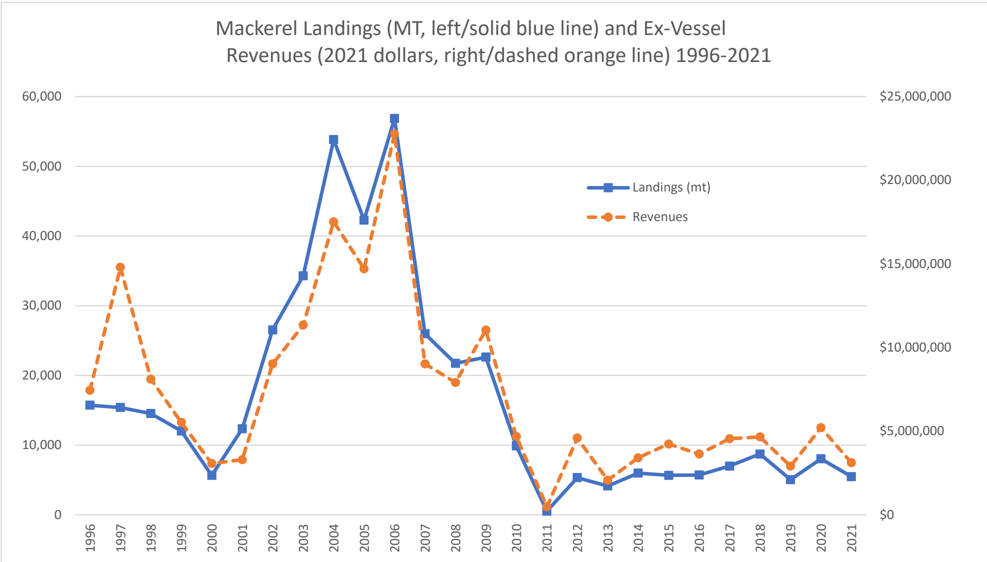

Figure 4. U.S. Commercial Landings and Ex-Vessel Revenues 1996-2021 Adjusted to 2021 Dollars Source: NMFS unpublished dealer data.

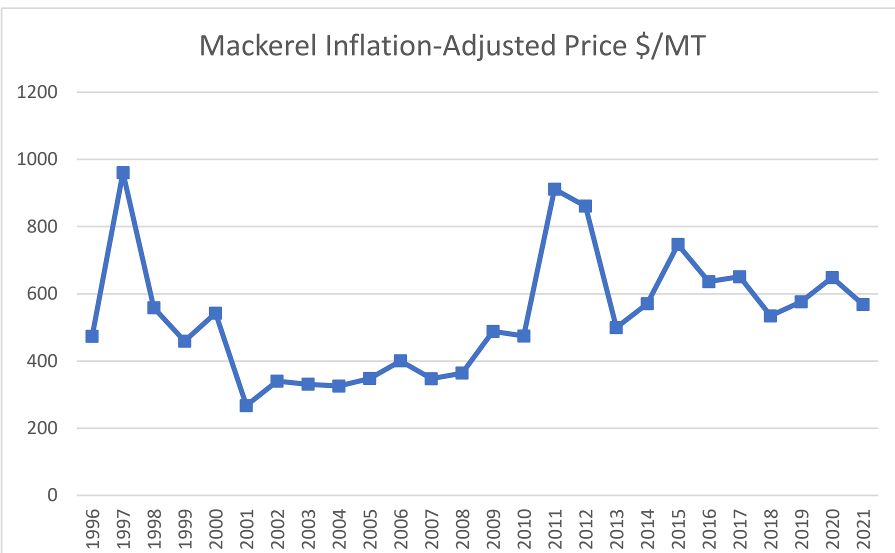

Figure 5. Ex-Vessel Mackerel Prices 1996-2021 Adjusted to 2021 Dollars Source: NMFS unpublished dealer data. [PRELIMINARY]

The mackerel fishery takes place in shelf waters as in the figures below. Landings were reported via dealer reports matched to a vessel trip report (VTR) when possible. From 2007-2011 80% of landings had location data, from 2012-2016 84% of landings had location information, and more recent years have also had a high percentage of landings with location information.

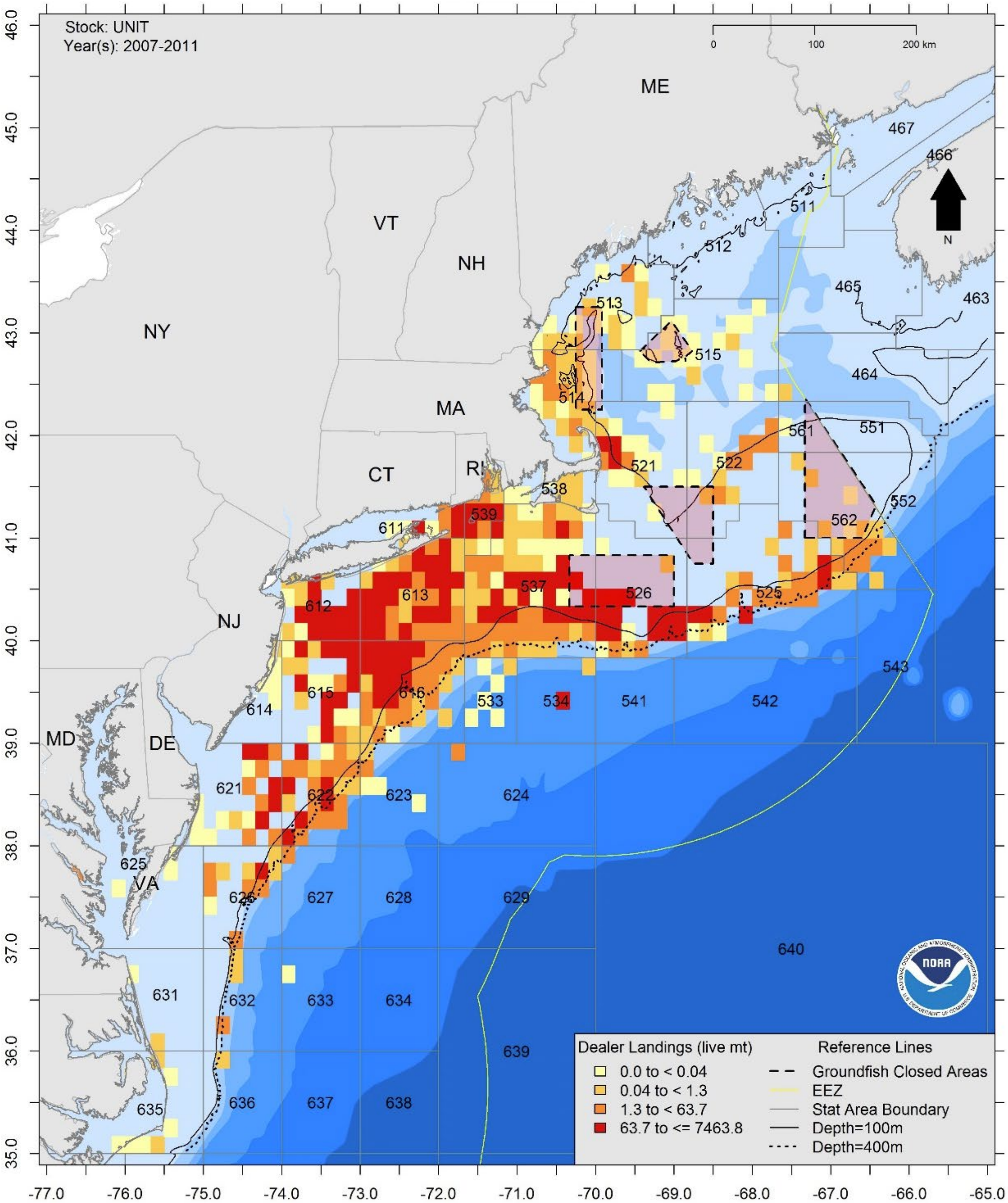

Figure 6. Spatial distribution of landings (mt) by ten-minute square, during 2007-2011.

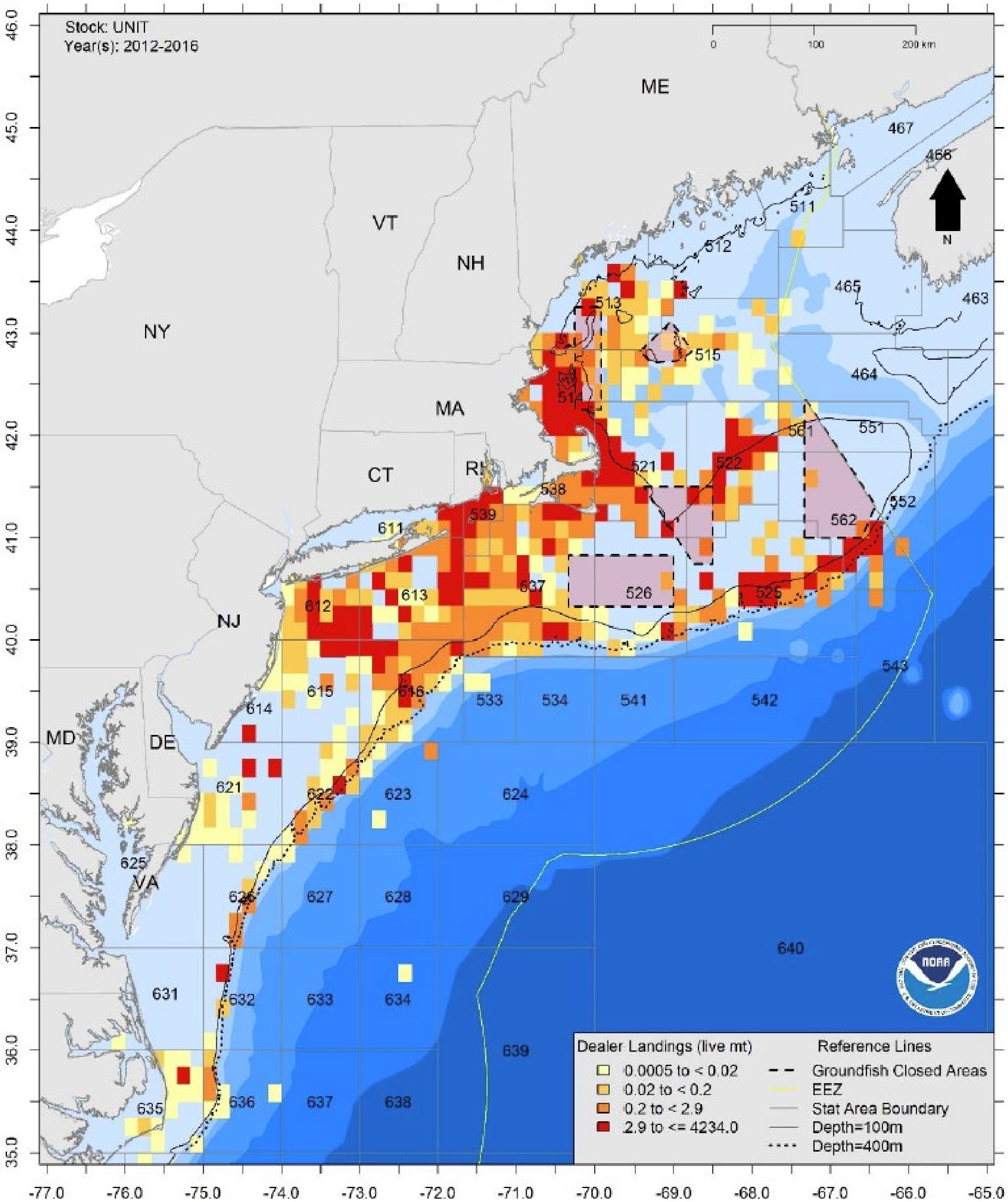

Figure 7. Spatial distribution of landings (mt) by ten-minute square, during 2012-2016.

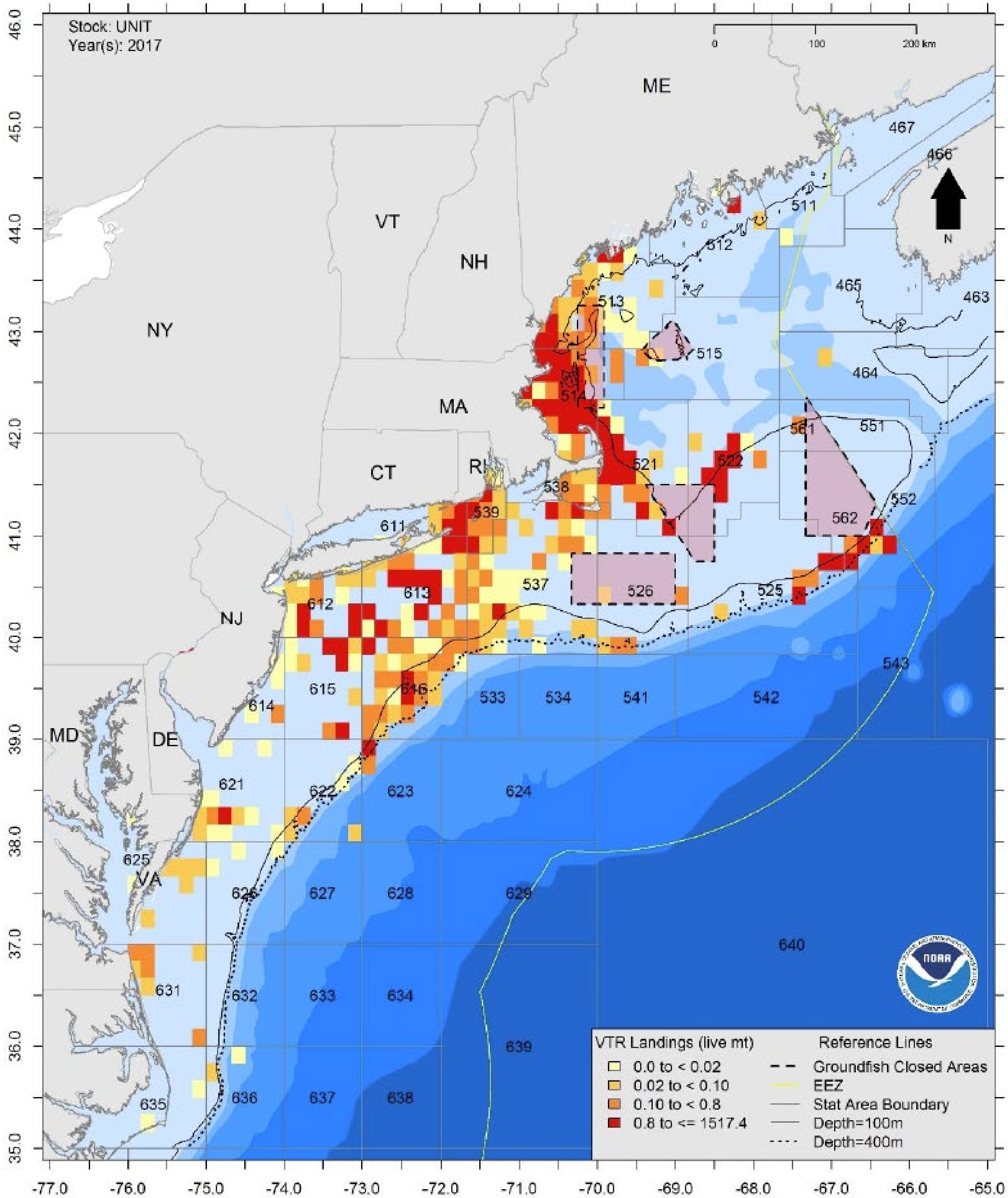

Figure 8. Approximate Primary 2018 Mackerel Catch Locations (from VTR data)

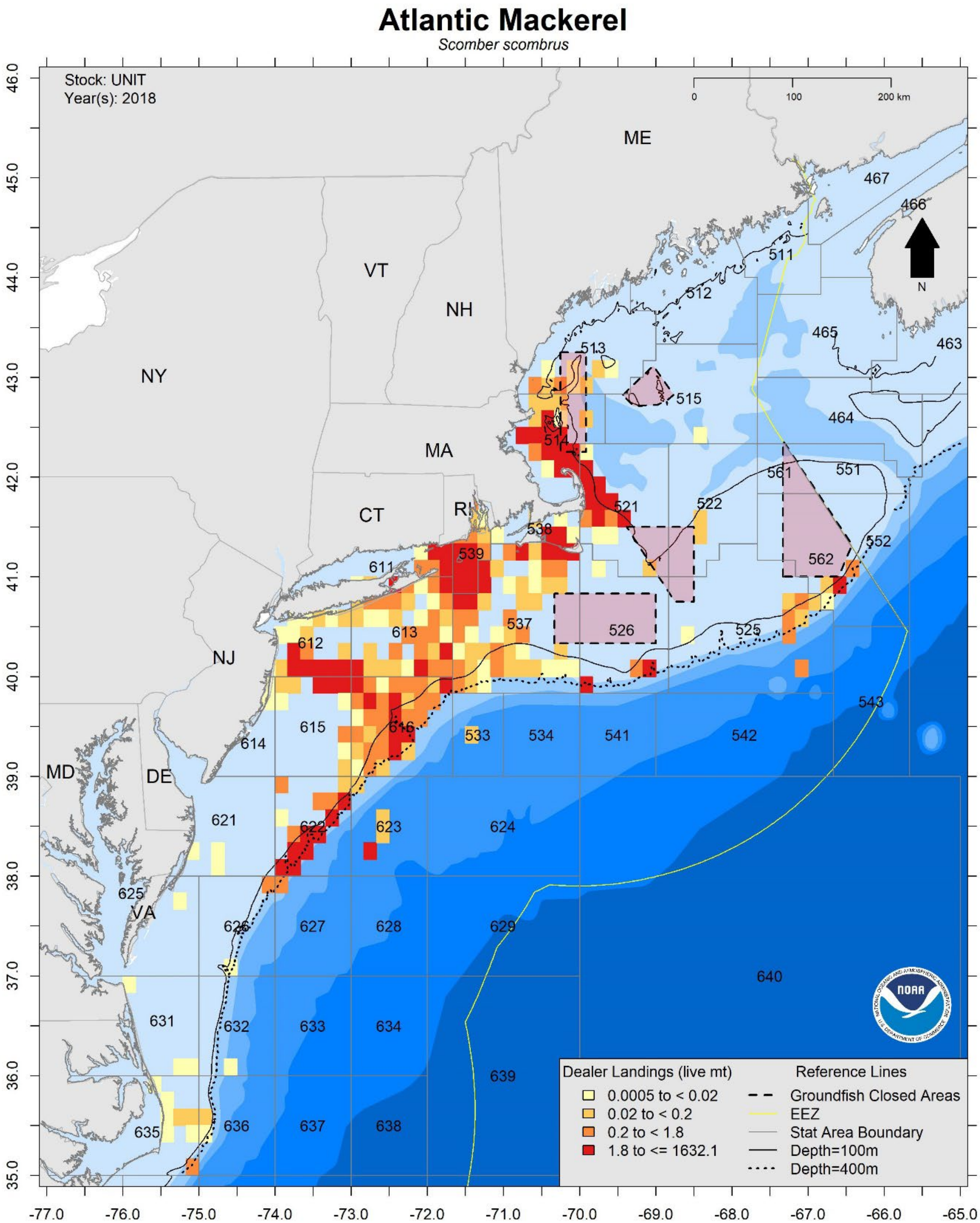

Figure 9. Approximate Primary 2018 Mackerel Catch Locations (from dealer and VTR data)

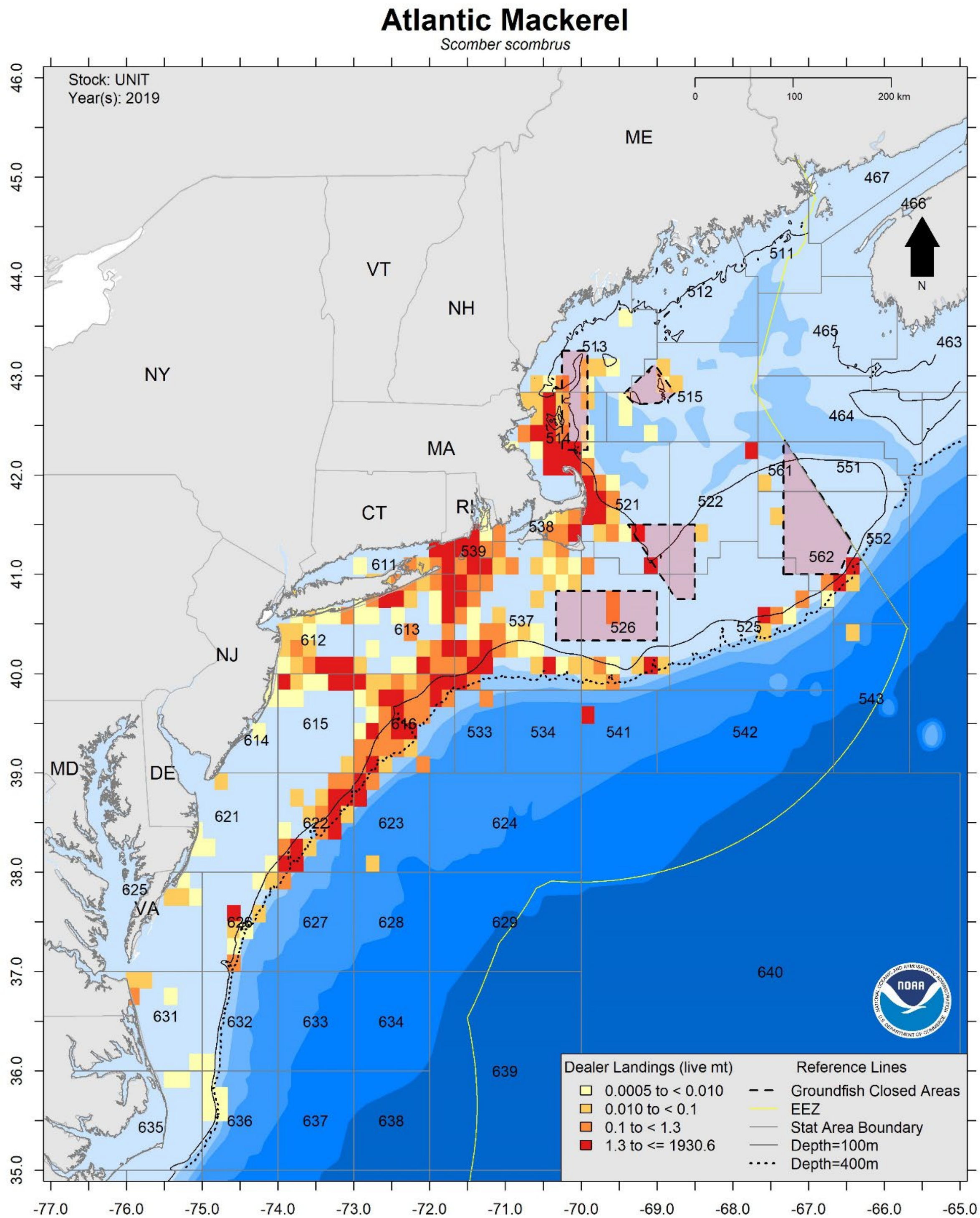

Figure 10. Approximate Primary 2019 Mackerel Catch Locations (from dealer and VTR data)

Updated maps are not available for 2020 and 2021, but the following tables bin mackerel landings by the same statistical areas noted on the figures above for 2020 and 2021, and the areas accounting for most 2020 and 2021 landings were not atypical. Area 514 is difficult to see on the above maps, but is just east of Massachusetts.

Table 17. Commercial mackerel landings by statistical area in 2020. Source: NMFS unpublished VTR data.

Stat Area	Metric Tons
613	2,900
521	1,164
612	1,152
616	806
615	738
514	705
Other/CI	580
Total	8,045

Table 18. Commercial mackerel landings by statistical area in 2021. Source: NMFS unpublished VTR data.

Stat Area	Metric Tons
522	2,023
521	1,854
612	992
514	450
Other/CI	332
Total	5,652

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In recent years (2017-2021) most mackerel landings have occurred in Massachusetts and New Jersey (see table below). There is more confidential information at the port level, but aggregate 2017-2021 landings and nominal revenues are also provided for major ports where possible.

Table 19. 2017-2021 Total Mackerel Landings by State

State	MT
MA	18,043
NJ	9,931
RI	3,979
ME	2,066
Other	254

Table 20. 2017-2021 Total Mackerel Landings by Port

PORT	MT
Cape May, NJ	9,849
Gloucester, MA	7,702
New Bedford, MA	7,108
Portland, ME	2,018
Point Judith, RI	1,703
Marshfield, MA	1,311
Chatham, MA	972
Other/CI	3,610

Table 21. 2017-2021 Total Mackerel Revenues by Port

Port	$
Gloucester, MA	11,636,380
Cape May, NJ	4,288,067
New Bedford, MA	3,515,974
Marshfield, MA	1,477,725
Portland, ME	1,344,837
Point Judith, RI	989,210
Chatham, MA	723,138
Other/CI	3,350,833

Table 22. Numbers of vessels that actively fished for mackerel, by landings (lbs) category, 1982-2021.

YEAR	Vessels 1 mil +	Vessels 100,000 - 1mil	Vessels 50,000 - 100,000	Vessels 10,000 - 50,000	Total
1982	0	10	10	43	63
1983	0	10	5	26	41
1984	0	11	14	29	54
1985	0	12	10	28	50
1986	1	10	5	37	53
1987	1	15	8	31	55
1988	2	20	8	40	70
1989	6	17	8	27	58
1990	6	16	7	39	68
1991	13	18	1	38	70
1992	9	17	13	48	87
1993	0	16	11	55	82
1994	2	27	14	44	87
1995	4	24	11	50	89
1996	7	45	15	53	120
1997	6	30	20	46	102
1998	9	16	6	39	70
1999	6	15	9	37	67
2000	5	3	0	26	34
2001	5	3	2	20	30
2002	12	3	1	22	38
2003	14	6	5	23	48
2004	18	6	1	14	39
2005	15	11	4	17	47
2006	20	12	5	10	47
2007	16	12	2	20	50
2008	15	5	1	17	38
2009	15	6	6	18	45
2010	10	9	2	14	35
2011	0	3	3	17	23
2012	3	9	1	9	22
2013	4	3	3	13	23
2014	6	5	1	13	25
2015	5	9	10	12	36
2016	3	16	7	26	52
2017	6	7	14	27	54
2018	8	6	3	24	41
2019	3	11	4	38	56
2020	7	9	1	10	27
2021	4	9	3	6	22

Recreational Fishery

The figure below describes total Atlantic mackerel recreational catch (numbers of fish) from 1981 to 2021 (2021 preliminary). Estimates before 2018 use calibration factors to account for substantial survey changes that were fully implemented in 2018, including the mail-based fishing effort survey and changes to the MRIP site-intercept survey (APAIS). Catch since 2018 has been relatively stable, but the time series exhibits substantial year to year variability in some years.

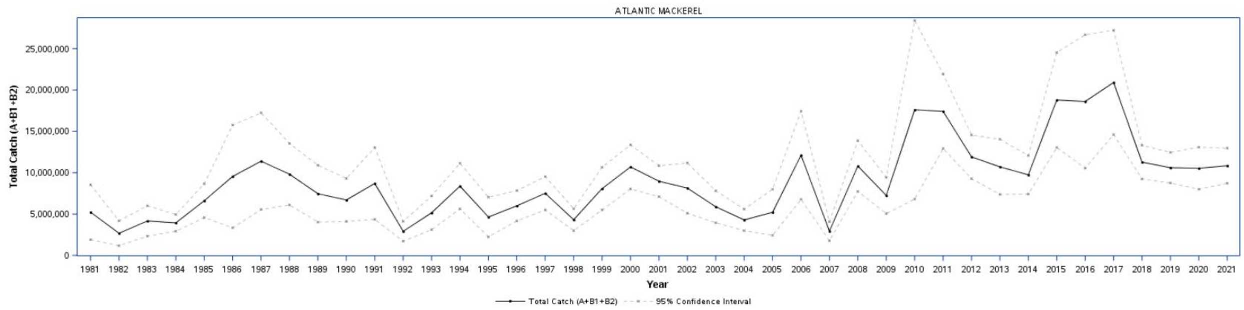

Figure 11. MRIP mackerel time series 1981-2017, total catch, numbers of fish.

The following more detailed discussion of recent catch focuses on data since 2018 to avoid any concerns about the effects of the calibration for pre-2018 data. Earlier discussions have highlighted that for-hire operators are not interviewed about trip catches but their anglers/customers could be, if they are at a site that is included on the MRIP site register. Anglers are to be asked about all fish caught and their disposition (available to be measured, harvested but not available, and/or released).

Table 23. 2018-2021 MRIP Mackerel Estimates (#s) by Catch Type

Estimate Status	Year	Common Name	Observed Harvest (A)	PSE	Reported Harvest (B1)	PSE	Released Alive (B2)	PSE
FINAL	2018	ATLANTIC MACKEREL	2,330,587	23.3	7,164,214	11.3	1,782,338	19.9
FINAL	2019	ATLANTIC MACKEREL	2,646,784	16.3	5,913,593	12.6	2,041,877	18.8
FINAL	2020	ATLANTIC MACKEREL	3,136,063	19.6	6,439,192	17.6	964,581	15.2
PRELIMINARY	2021	ATLANTIC MACKEREL	705,745	18	8,663,790	12	1,473,430	19.5

Table 24. 2018-2021 MRIP Mackerel Estimates (#s) by State

Estimate Status	Year	State	Common Name	Total Catch (A+B1+B2)	PSE	** Contribution of Imputed Data to Total Catch Rate
FINAL	2018	CONNECTICUT	ATLANTIC MACKEREL	63	71.6	0%
FINAL	2018	MAINE	ATLANTIC MACKEREL	2,851,922	21	0%
FINAL	2018	MASSACHUSETTS	ATLANTIC MACKEREL	6,396,674	11.9	0%
FINAL	2018	NEW HAMPSHIRE	ATLANTIC MACKEREL	1,961,169	18.9	0%
FINAL	2018	RHODE ISLAND	ATLANTIC MACKEREL	21,119	71.5	0%
FINAL	2019	MAINE	ATLANTIC MACKEREL	3,275,535	20.8	0%
FINAL	2019	MASSACHUSETTS	ATLANTIC MACKEREL	5,647,588	10.5	0%
FINAL	2019	NEW HAMPSHIRE	ATLANTIC MACKEREL	1,637,111	16.9	0%
FINAL	2019	RHODE ISLAND	ATLANTIC MACKEREL	11,262	79.5	0%
FINAL	2020	CONNECTICUT	ATLANTIC MACKEREL	11,283	69.1	0%
FINAL	2020	MAINE	ATLANTIC MACKEREL	3,628,454	18.5	1%
FINAL	2020	MASSACHUSETTS	ATLANTIC MACKEREL	5,318,596	20.1	1%
FINAL	2020	NEW HAMPSHIRE	ATLANTIC MACKEREL	1,525,643	19.3	10%
FINAL	2020	RHODE ISLAND	ATLANTIC MACKEREL	1,420	62.5	77%
PRELIMINARY	2021	CONNECTICUT	ATLANTIC MACKEREL	1,311	92.3	0%
PRELIMINARY	2021	MAINE	ATLANTIC MACKEREL	3,913,997	17.6	1%
PRELIMINARY	2021	MASSACHUSETTS	ATLANTIC MACKEREL	5,384,078	14.5	0%
PRELIMINARY	2021	NEW HAMPSHIRE	ATLANTIC MACKEREL	1,317,292	13.1	0%
PRELIMINARY	2021	RHODE ISLAND	ATLANTIC MACKEREL	218,882	113	0%

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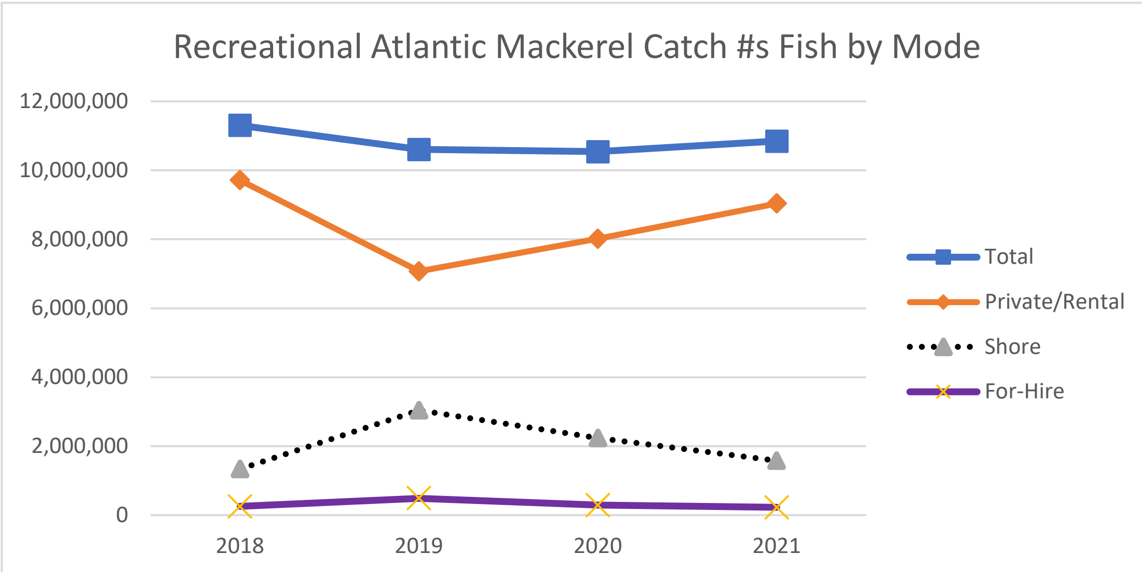

Figure 12. 2018-2021 MRIP Mackerel Estimates (#s) by Mode

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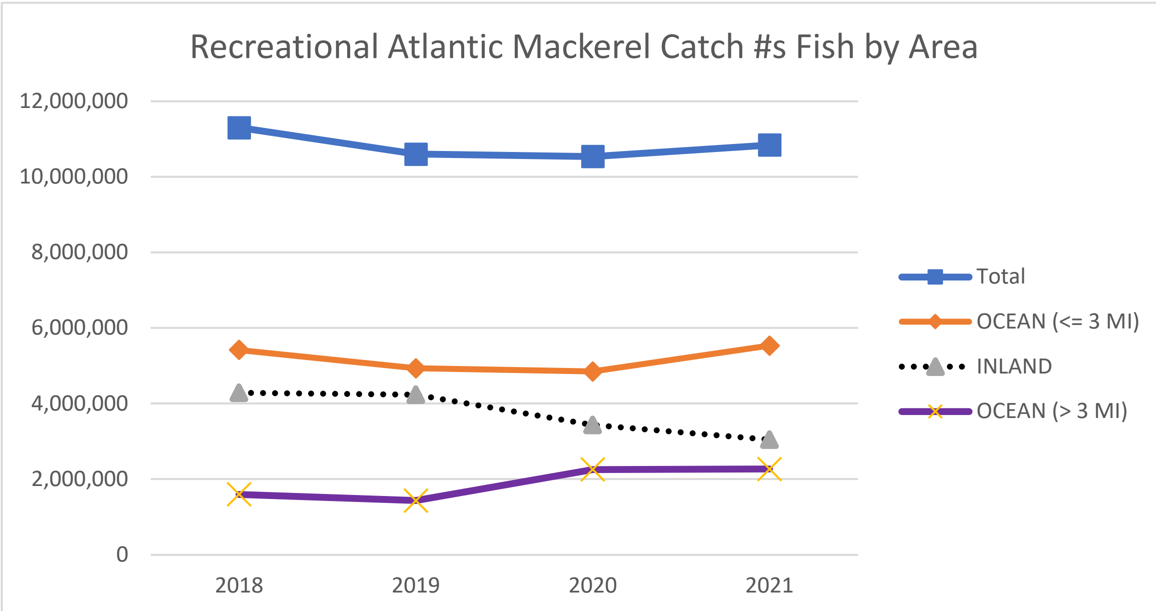

Figure 13. 2018-2021 MRIP Mackerel Estimates (#s) by Area

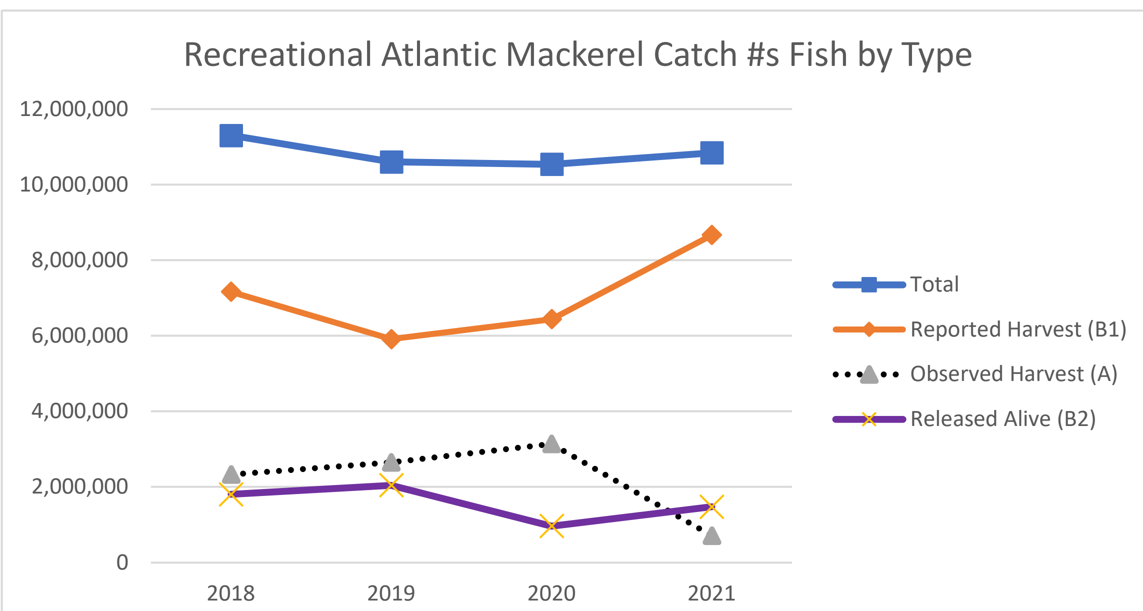

Figure 14. 2018-2021 MRIP Mackerel Estimates (#s) by Catch Type

6.4 Protected Species

Protected species are those afforded protections under the Endangered Species Act (ESA; species listed as threatened or endangered under the ESA) and/or the Marine Mammal Protection Act (MMPA). The Table below provides a list of protected species that occur in the affected environment of the MSB fisheries and the potential for the fishery to impact the species, specifically via interactions with MSB fishing gear (i.e., mid-water trawl and bottom trawl gear). The EA for this action will further describe interactions and impacts with these species, but all of the alternatives would decrease quotas compared to either no action (which would substantially increase quotas) or the status quo, so the action alternatives would not be likely to lead to increased effort or additional negative impacts on protected resources.

Table 25. Species Protected Under the ESA and/or MMPA that May Occur in the Affected Environment of the MSB FMP

Species	**Status**[2]	***Potential to interact with MSB fishing gear?***
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***No***
Humpback whale, West Indies DPS, (*Megaptera novaeangliae*)	Protected (MMPA)	No
Fin whale (Balaenoptera physalus)	***Endangered***	***No***
Sei whale (Balaenoptera borealis)	***Endangered***	***No***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter macrocephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[3]	Protected (MMPA)	Yes
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes

Species	Status[2]	***Potential to interact with MSB fishing gear?***
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Beaked whales (*Ziphius and Mesoplodon spp*)[4]	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[5]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		

Species	Status[2]	*Potential to interact with MSB fishing gear?*
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk *(Brosme brosme)*	Candidate	Yes
Giant manta ray (*Manta birostris*)	Threatened	Yes
Critical Habitat		
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No
North Atlantic Right Whale Critical Habitat	ESA (Protected)	No

Notes: Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks. Shaded rows indicate species who prefer continental shelf edge/slope waters (i.e., >200 meters).

[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).

[2] Status is defined by whether the species is listed under the ESA as endangered (i.e. at risk of extinction) or threatened (i.e. at risk of endangerment), or protected under the MMPA. Marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species for which ESA listing may be warranted.

[3] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often referred to as *Globicephala spp*.

[4] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon* are difficult to identify at sea, therefore, much of the available characterization for beaked whales is to the genus level only.

[5] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

Cusk is a NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. Additional information on cusk can be found at: https://www.fisheries.noaa.gov/endangered-species-conservation/candidate-species-under-endangered-species-act. .

7.0 Biological and Human Community Impacts

For habitat, protected resource, and non-target species impacts, the key determinant is not so much the catch itself but the amount and character of the related effort. A decrease in effort may result in positive impacts (+) as a result of fewer encounters and/or fewer habitat impacts from fishing gear, while an increase in effort may result in a negative impact (-). Similar effort likely results in neutral impacts (0). The table immediately below illustrates that the availability of the target species can drive effort as much as any quota change, and as effort changes so would impacts on habitat, protected resources, and non-target species. This is noted for the habitat, protected resource, and non-target species sections because the MSB fisheries often experience large swings in availability and therefore effort, independent of any regulatory changes. Because limits on catch do cap effort, catch limits are a factor related to effort and impacts but many other factors are at least somewhat beyond the control of the Council (such as fish abundance, availability of other opportunities, weather, climate, fish movements/ availability, variable productivity, etc.). [5]

[5] National Oceanic and Atmospheric Administration Administrative Order 216-6A and the Companion Manual contains criteria for determining the significance of the impacts of a proposed action and it includes the possibility of introducing or spreading a nonindigenous species. This potential impact does not fit into the sections below so it is addressed in this introduction. There is no evidence or indication that these fisheries have ever resulted or would ever result in the introduction or spread of nonindigenous species.

Table 26. Changes in effort as a result of adjustments to quota and/or fish availability.

Change in quota	**Fish abundance/availability**		
	Decrease in availability	**No change in availability**	**Increase in availability**
Decrease in quota	Fishing effort may decrease, increase, or stay the same depending on a combination of factors[6].	Effort likely to decrease or stay the same. If per trip catch stays the same, the fishery will be closed earlier with fewer trips taken (reducing effort). However managers may reduce trip limits or adjust regulations that extend the fishing season (keeping effort the same).	Effort likely to decrease or stay the same. A lower quota plus higher catch per unit of effort (CPUE) from higher availability should decrease effort. However, managers may reduce trip limits or adjust regulations that extend the fishing season which may keep effort relatively even.
No change in quota	Effort may increase or decrease. Even with no change, fishermen may take more trips to catch the same amount of fish (increasing effort) or may stop targeting a stock of fish if availability is low enough to decrease profitability (decreasing effort).	Fishing effort may remain the same given the quota has not changed and availability is expected to be similar.	Effort should decrease. While the quota has not changed, fishermen should be able to take fewer trips to catch the same amount of fish (decreasing effort).
Increase in quota	Fishing effort likely to increase or stay the same. A higher quota plus lower catch per unit of effort from lower availability should increase effort. However, managers may increase trip limits or adjust regulations to allow more efficient fishing (keeping effort the same).	Effort likely to increase or stay the same. If per trip catch stays the same, the fishery will be closed later with more trips taken (increasing effort). However managers may increase trip limits or adjust regulations to allow more efficient fishing (keeping effort the same).	Fishing effort may decrease, increase, or stay the same depending on a combination of factors.

[6] Factors affecting fishing effort include other species abundance, availability of other opportunities, weather, climate, fish movements/availability, variable productivity, and market forces/price changes.

Environmental impacts are described both in terms of their direction (negative, positive, or no impact) and their magnitude (slight, moderate, or high). The table below summarizes the guidelines used for each VEC to determine the magnitude and direction of the impacts described in this section.

Table 27. General definitions for impacts and qualifiers relative to resource condition (i.e., baselines)

General Definitions				
VEC	Resource Condition	Impact of Action		
		Positive (+)	Negative (-)	No Impact (0)
Target and non-target Species	Overfished status defined by the MSA	Alternatives that maintain or are projected to result in a stock status above an overfished condition*	Alternatives that maintain or are projected to result in a stock status below an overfished condition*	Alternatives that do not impact stock / populations
ESA-listed protected species (endangered or threatened)	Populations at risk of extinction (endangered) or endangerment (threatened)	Alternatives that contain specific measures to ensure no interactions with protected species (i.e., no take)	Alternatives that result in interactions/take of listed species, including actions that reduce interactions	Alternatives that do not impact ESA listed species
MMPA protected species (not also ESA listed)	Stock health may vary but populations remain impacted	Alternatives that maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions with/take of marine mammals that could result in takes above PBR	Alternatives that do not impact MMPA protected species
Physical environment / habitat / EFH	Many habitats degraded from historical effort and slow recovery time (see condition of the resources table)	Alternatives that improve the quality or quantity of habitat or allow for recovery	Alternatives that degrade the quality/quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human communities (socioeconomic)	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities
	Impact Qualifiers			
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible		To such a small degree to be indistinguishable from no impact	
	Slight (sl), as in slight positive or slight negative		To a lesser degree / minor	
	Moderate (M) positive or negative		To an average degree (i.e., more than "slight", but not "high")	
	High (H), as in high positive or high negative		To a substantial degree (not significant unless stated)	
	Significant (in the case of an EIS)		Affecting the resource condition to a great degree, see 40 CFR 1508.27.	
	Likely		Some degree of uncertainty associated with the impact	
*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the MSA status, but this must be justified within the impact analysis.				

7.1 Managed Resource - Mackerel

Taking no action would lead to overfishing in 2023 and expected failure to rebuild due to the high catches that could be implemented without taking action and a reversion to previous specifications.

All of the action alternatives are predicted to rebuild mackerel within 10 years. Given the imprecision of 10-year projections, quantitatively comparing the relatively small changes in probability of rebuilding is likely to be uninformative and possibly misleading. The 4-fold error in the last 3-year projection estimate for 2019 SSB illustrates the degree of uncertainty. 2023 specifications alone require a 4-year projection from 2019, and projecting out to 2032 is really a 13-year projection (2019 to 2032). The probabilities of rebuilding are also dependent on the underlying recruitment assumptions, which makes comparing Alternative 1 to Alternatives 2-5 challenging in terms of the calculated probabilities, but the very low catches in Alternative 1 will create the highest probability of rebuilding in reality. Finally, the likely iterative nature of mackerel rebuilding with MTAs expected in 2023, 2025, 2027, and 2029 greatly complicates interpreting the probability of rebuilding. For example, if one were to lock in the projected catch trajectories for 10 years, Alternative 4 appears to have a higher probability of rebuilding (60.5%) than Alternative 3 (51.5%). However, the higher later catches in Alternative 3 that reduce its probability of rebuilding to near 50% would only occur if rebuilding is actually on track, and the initially lower catches of Alternative 3 mean that early rebuilding would be more likely with Alternative 3 than with Alternative 4. So while the overall rebuilding probability of Alternative 4 is calculated as higher with the full series of catches, Alternative 3 is in fact the more risk averse option (in terms of avoiding a failure to rebuild) due to the lower catches.

Accordingly, a simpler and probably better way to consider the impacts of the alternatives on mackerel is qualitatively based on allowed catches in years that would be considered in the 2025 Mackerel MTA, 2023 and 2024. The 2025 Mackerel MTA should consider catch through 2024, so one way to compare across all alternatives in terms of relative probability of leading to stock growth by the 2025 Mackerel MTA is to just consider 2023-2024 combined catch for each rebuilding path. The higher the combined 2023 and 2024 combined catch, the relatively less likely stock growth will occur. The Action Alternatives 1-5 have been ordered from least to most 2023- 2024 combined catch, so that is the same order from most likely stock rebuilding to least likely stock rebuilding by the 2025 MTA.

7.2 Habitat/Protected Resources/Not Target Species

For these valued ecosystem components, there are relatively greater negative effects with more effort, and relatively less negative effects with less effort. Compared to no action, which would lead to substantially higher quotas, all of the action alternatives would be expected to have less negative effects. For 2023, the only year that this action proposes to set specifications, even Alternative 5, which would lead to the highest quotas among the action alternatives, would also have quotas similar or less than the status quo, so negative impacts to Habitat/Protected Resources/Not Target Species would be expected to remain similar to or less than the status quo, and less than no action.

7.3 Socioeconomic Impacts

This action would primarily affect the mackerel fishery. As discussed above, the availability of the targeted species may drive effort (and catch and revenues) as much as any regulations.

Mackerel Commercial Fishery Current Condition:

Due to the year-to-year variation in catch and effort in the fishery, it is difficult to fully quantify human community impacts but the current fishery supports a number of vessels, as described in Section 6.3, and provides a variety of jobs related directly to fishing and also in associated support services. 22 vessels landed over 10,000 pounds of mackerel in 2021, with total mackerel landings valued at $3.1 million. From 2019-2021 mackerel ex-vessel revenues varied from $2.9-$5.2 million, averaging $3.7 million. The Council has received input from commercial tuna fishermen that commercial tuna fishing could be impacted by limitations on mackerel, but commercial vessels can get open access commercial incidental mackerel permits that would allow retention of up to 5,000 pounds of mackerel as bait (catch would need to be reported on Vessel Trip Reporting linked to that permit).

Socioeconomic Mackerel Commercial Fishery Impacts:

Socioeconomic impacts related to commercial mackerel fishing are likely directly related to the quotas that are set. In the short run, the Alternatives sorted in order of 2023 quotas from most to least are No action, Alternative 5, Alternative 4, Alternative 3, Alternative 2, Alternative 1. Alternatives 1-3 would result in negative or near zero commercial quotas and do not appear practicable. All of the Alternatives would result in substantially lower quotas than no action, but the more relevant comparison is to the 2022 quota of 4,963 MT. Depending on Canadian and recreational deductions, Alternative 5 would result in a 2% to 54% reduction in quota. Depending on Canadian and recreational deductions, Alternative 4 would result in a 28% to 80% reduction in quota. These ranges will be able to be refined at the time of final action. While no action would implement much higher quotas, it would not be a legal option given it would result in substantial overfishing. Over the 10 years in the rebuilding plan, total summed catches, in order of most to least would be Alternative 3, Alternative 5, Alternative 4, Alternative 2, Alternative 1. However, given the large error observed in the first iteration of projecting mackerel biomass even 3 years into the future, it is not clear what the meaningfulness of comparing summed 10-year catches would actually be.

Mackerel Recreational Fishery Current Condition:

Mackerel catch had been relatively stable from 2019-2021, very close to the average of 10.7 million fish. The majority of fish are harvested, but are not made available to MRIP dockside interviewers – rather the majority of catch estimates result from "reported harvest" by interviewees. These fish may have been used for bait or the interviewee just doesn't want to show the fish to the MRIP interviewer. MRIP interviews are conducted with anglers by state staff, who also ask about fish that are discarded/released. These reported discards represented on average 14% of catch from 2019-2021. Almost all catch in recent years has been in Maine, New Hampshire, and Massachusetts. Private (and rental) boat catch is responsive for most catch, with about 20% from shore and a very small amount (5% or less) from the for-hire sector.

NMFS estimated the 2017 economic effects of recreational fishing in states including Maine, New Hampshire, and Massachusetts (Lovell et al 2020). The following describes their findings.

Marine recreational fishing trips in Maine supported 714 full or part-time jobs, and contributed $75 million in sales, $27 million in income, and $45 million in gross domestic product (GDP) to the state's economy.

Table 28. Maine Marine Recreational Fishing Trips Economics

Fishing Mode	Expense ($1,000's)	# Jobs	Sales ($1,000's)	Income ($1,000's)	Value Added ($1,000's)
For-Hire	$2,863	52	$4,725	$1,644	$2,747
Private Boat	$15,322	138	$15,957	$5,353	$9,009
Shore	$40,223	524	$54,603	$20,012	$32,799
Total Trip	$58,408	714	$75,285	$27,009	$44,555

Marine recreational fishing trips in New Hampshire supported 378 full or part-time jobs, and contributed $37 million in sales, $15 million in income, and $25 million in gross domestic product (GDP) to the state's economy.

Table 29. New Hampshire Marine Recreational Fishing Trips Economics

Fishing Mode	Expense ($1,000's)	# Jobs	Sales ($1,000's)	Income ($1,000's)	Value Added ($1,000's)
For-Hire	$6,168	100	$9,393	$3,593	$5,680
Private Boat	$12,176	93	$9,555	$4,371	$6,376
Shore	$14,107	185	$18,166	$7,249	$12,569
Total Trip	$32,451	378	$37,114	$15,213	$24,625

Marine recreational fishing trips in Massachusetts supported 2,784 full or part-time jobs, and contributed $326 million in sales, $156 million in income, and $225 million in gross domestic product (GDP) to the state's economy.

Table 30. Massachusetts Marine Recreational Fishing Trips Economics

Fishing Mode	Expense ($1,000's)	# Jobs	Sales ($1,000's)	Income ($1,000's)	Value Added ($1,000's)
For-Hire	$30,563	463	$49,737	$19,342	$31,838
Private Boat	$181,933	1,118	$139,187	$68,344	$95,335
Shore	$100,756	1,203	$136,898	$68,646	$97,822
Total Trip	$313,252	2,784	$325,822	$156,332	$224,995

Mackerel is not a frequent directed target, for example in 2021 only 5% of the 17.1 million marine fishing trips in New England targeted mackerel as a primary or secondary species.

While there is some overlap with the above for-hire estimates, NMFS has also separately estimated the economic impacts of fishing for Highly Migratory Species (HMS) like tunas (Hutt and Silva 2019). These trips could be indirectly affected by limits on mackerel fishing due to use of mackerel as bait. Non-tournament HMS Angling Trips (Tournament trips were only estimated from Maine through Texas) in 2016 were estimated to have the following impacts:

Table 31. Total expenditures and economic contributions generated by New England non-tournament Atlantic HMS Angling trips, registered HMS tournament operations, and HMS tournament participating teams from Maine to Texas in 2016. Non-tournament trip expenditures are reported by region and nationally, while tournament-related expenditures are only reported nationally.

Type and Region	Total Expenditures	Employment (jobs)	Income	Value Added	Total Sales Output
Non-tournament Angling Trips					
New England	$5,172,293	37	$2,061,493	$3,056,170	$4,867,047
Tournament Angling[1]	$37,544,910	532	$26,153,290	$46,180,928	$84,671,666
Tournament Operation[2]	$20,170,466	295	$15,120,988	$26,099,884	$43,970,942

While it cannot be directly estimated what proportion of value would be lost if access to mackerel is limited (related to directed fishing or harvest for bait), the Council hopes to get additional public input on this issue. The Council has received input that a bag limit in the range of 10-15 fish per person should mitigate most of the potential negative effects of being limited in using mackerel for bait for striped bass and/or tuna fisheries.

8.0 LITERATURE CITED AND SELECTED OTHER BACKGROUND DOCUMENTS

TO BE ADDED

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 28, 2022

To: Michael P. Luisi, Chairman, MAFMC

From: Paul J. Rago, Ph.D., Chair, MAFMC Scientific and Statistical Committee (SSC)

Subject: Report of the March 2022 SSC Meeting

The SSC met via webinar from 15th-16th March 2022, addressing the following topics:

- Review and Potential Change to 2022 *Illex* ABC specifications
- Golden Tilefish update and review of 2023 ABC
- Blueline Tilefish update and review of 2023 ABC
- Atlantic Mackerel 2023-2024 Rebuilding ABC Specifications
- Overview of Council Action: Request for review of Harvest Control Rule
- Ecosystem Science and Application
- Receive update from Economics Working Group on 2021 and future activities

See Attachment 1 for the meeting's agenda.

All SSC members were able to participate for all or part of the meeting (Attachment 2). Other participants included Council members, Council staff, NEFSC and GARFO staff, and representatives of industry, stakeholder groups, and the general public. Council staff provided outstanding technical support throughout the process. The SSC benefited from preparations prior to the meeting; presentations and supporting documents were relevant and high quality. Jason Didden consulted with the NEFSC and SSC on an ongoing basis to improve the information necessary for both the *Illex* squid and Atlantic Mackerel discussions. Kiersten Curti, NEFSC, provided timely responses on rebuilding alternatives for Atlantic Mackerel rebuilding projections. A special thanks to Brandon Muffley who guided the SSC's work before, during, and after the meeting.

Within the SSC, Thomas Miller's guidance on *Illex* discussions and David Secor's contributions for Atlantic Mackerel were both substantial. Their intensity and scholarship are greatly appreciated. I thank Sarah Gaichas and Geret DePiper for their excellent meeting notes and members of the SSC and Council staff for their comments on an earlier draft of this report.

All documents referenced in this report can be accessed via the SSC's meeting website https://www.mafmc.org/ssc-meetings/2022/march15-16. This report uses many acronyms: a comprehensive guide is listed in Attachment 3.

I convened the meeting and made an opening statement regarding my role as a contractor to the Council for the purpose of providing technical support to the Council on *Illex* ABC analyses. Details of my analyses are provided below. To avoid any appearance of conflict of interest, Dr. Michael Wilberg (SSC vice chair) chaired this portion of the meeting and Dr. Thomas Miller led discussions on the Terms of Reference. I also clarified the scope of my contractual support from the Council, noting in particular that my participation in the NRCC's *Illex* Research Track Assessment Working Group was not supported by either the Council or any other entity.

***Illex* Squid**

Rago Presentation

The presentation focused on evaluation of alternative catch limits of 24,000 to 60,000 mt for 2022. The methodology built upon the methods used in 2021 and included some advances developed within the Research Track Assessment. Analyses were based on commercial catch data and NEFSC fall bottom trawl surveys data from 1997 to 2021. Survey data were not available for 2017 and 2020, and catch data for 2021 are considered preliminary. Alternative catch limits were evaluated with respect to their implications for percentage escapement and the ratio of fishing mortality to natural mortality over all years. Percentage escapement is the ratio of fished to the unfished stock size at the end of the fishing season. The numerator is based on the predicted residual stock size given an initial stock size and an alternative catch limit. The denominator is based on same initial stock size but decremented only by natural mortality. In addition to the observed catch and survey values, the computation relies on three parameters: catchability (i.e., probability of capture per tow), availability (i.e., fraction of stock in the sampling domain), and the instantaneous natural mortality rate.

The revised methodology more fully considered the uncertainty in the catchability, availability and natural mortality parameters. Ranges of these parameters were refined by comparisons with values in the scientific literature or via analyses prepared in support of the Research Track Working Group by John Manderson, Brooke Lowman and Anna Mercer. Estimates of availability were improved via spatial analyses of seasonal bottom trawl surveys conducted in the shelf waters of the US and Canada. Notably, these estimates do not consider the availability of unsampled but possibly extensive offshore populations. Estimates of catchability were improved by comparisons with calibration experiments and expert judgement of fishermen. Finally, estimates of a range of natural mortality rates were based on comparisons with values used in the scientific literature.

Effects of uncertainty in the parameters were evaluated by assuming that each parameter had a uniform distribution with lower and upper bounds as described above. The joint effect of these three sources of uncertainty on escapement was evaluated by integrating over the entire parameter space using a numerically intensive method. Additional details on the parameterization and methodology may be found in the report by Rago (2022) to the Mid-Atlantic Fishery Management Council.

Biological reference points for *Illex* squid have not been developed, but the effects of alternative catch limits were compared to several candidate thresholds that have been applied to manage squid stocks elsewhere and have been suggested for forage species. Target escapement rates of 40% and 50% have been used for other squid species. A ratio of fishing mortality F to natural mortality M equal to 2/3 has been considered for forage species. For the purposes of the analyses considered by the SSC, escapement estimates below 50% and F/M ratios greater than 2/3 were considered as evidence of overfishing. Numerical methods were used to compute the average probability of falling below 50% escapement and above F/M=2/3 for each alternative catch limit. The average was estimated by computing these probabilities for each available year between 1997 and 2021 (n=23).

Based on the actual catches (1997-2021) the estimated probabilities of falling below 50% escapement were below 13%. The maximum historical probability of exceeding F/M=2/3 was less than 21%. Hence the historical catches are unlikely to have resulted in overfishing during this period. Consideration of hypothetical alternative catches reveal similarly low probabilities of creating overfishing over most years. If future years were similar to the poor years 1999, 2001 or 2013, alternative quotas greater than 28,000, 48,000 and 55,000 mt, respectively would have led to escapement levels below 50%. Such exceptions are useful for quota recommendations if the probability of a poor future year is known. Otherwise, analyses based on consideration of all historical years is likely to give a more accurate forecast of risk in an "average" future year. Statistical theory can advise on the consequences of alternative catches but choices related to appropriate risk are matters of policy, not science.

The Council's Risk Policy can be applied to the evaluation of alternative catch levels if the ratio of current stock sizes to Bmsy was known. Since this ratio is also not known, any evaluation of risk must be based on assumed values for B/Bmsy. If the current stock size exceeds Bmsy (target biomass) then catch limits up to 60,000 mt would not exceed a 28% probability of overfishing. If the population is actually about one half Bmsy (threshold biomass), then the Council Risk Policy limits the probability of overfishing to 20%. Under this hypothesis, the highest quota consistent with the policy is 47,000 mt. Continuing this logic and considering the F/M threshold of 2/3, the highest acceptable catch limit is 40,000 mt.

Ongoing research efforts to link oceanographic conditions to historic and future stock conditions may improve both forecasting stock size and estimating risk of overfishing.

Following Rago's presentation, Mike Wilberg noted that the Research Track Assessment (RTA) peer review was completed the week before the SSC meeting. The findings of that meeting and the reports from CIE reviewers have not been summarized, and were not available for consideration by the SSC.

Following the presentation, a number of questions were raised by the SSC.

The catchability q, availability v, and natural mortality M parameters are assumed to be independent but in fact, could be correlated. Covariance among parameters would alter the estimated probabilities but the magnitude and direction of changes are not known. Additional work on the potential consequences of oceanographic processes on the joint distribution of q, v, and M was recommended. The SSC further noted that the estimated range of availability does not account for the fraction of the population offshore. Under this circumstance, the likelihood of overfishing would be lower than reported in the Rago report. Similarly, a 50% escapement policy was chosen for evaluation of alternative quotas. If the more commonly used reference point of 40% escapement level had been used, the risks would have been lower for each of the alternative catch levels. Unfortunately, existing databases of worldwide fishery stock assessment results have few case studies for squid or other comparably short-lived species. Within the Mid-Atlantic region, it was noted that F/M=2/3 has been proposed for Butterfish, but neither the Research Track nor the SSC had endorsed such an approach.

The SSC had several questions about the range of values used for catchability. It was noted that the Bigelow to Albatross conversion (i. e., divide Bigelow catches by 1.4) suggest the Albatross efficiency could not exceed 0.7. Broadscale comparisons of day vs night differences in catch rates further suggested reductions in catchability. Questions regarding the nature of autocorrelation considered in availability analyses were addressed by John Manderson. He provided additional details on the underlying models used by himself and colleagues and noted that Rago had selected more conservative ranges (i.e., those more likely to give higher biomass estimates and therefore give higher estimates of fishing mortality). Another SSC member suggested further refinement of the escapement model parameterization to include alternative statistical distributions (instead of Uniform).

Several SSC members noted the difficulties of having the RTA and SSC meetings in adjacent weeks. Having a longer span would allow for more complete consideration of the RTA findings. For 2022, Council staff advised that this was desirable and that the SSC would be considering the results of a Management Track Assessment for *Illex* at a meeting later in the year. Catch recommendations for 2023 would be considered at that time.

Didden Staff Memo

Jason Didden, Council staff, provided an overview of the 2021 fishery, trends in prices and comments from fishery Advisory Panel. Catches in 2021 were the highest ever during the period of the US-only fishery. Price and demand are the primary drivers of the commercial fishery. The US fishery is small relative to other squid fisheries so prices are largely dependent on international markets. Recent MSC certification of the US *Illex* fishery is viewed as a positive development. Harvesters reported major within-year changes in *Illex* availability to US fishing areas. Such changes are consistent with patterns deduced from mathematical models and investigations of oceanographic processes. Harvesters also commented on the utility of a more extended fishing season to derive a better understanding of the population throughout the year. Harvesters also appreciated participation in discussions about oceanographic factors.

The RTA's conclusions regarding the 2023 fishing year and beyond are not yet known. In view of the dynamic aspects of the fisheries, the Council recommended reconsideration of the SSC's recommendation for 33,000 mt in 2022. In May 2021, the SSC agreed with the staff recommendation of 33,000 mt but expressed concerns that a full range of alternatives had not been evaluated. The report from Rago, commissioned by the Council, was intended to build upon the 2021 analyses. In view of the additional scope for increase suggested by these analyses, the staff recommended an increase of 10% from 2021 to a total of 36,300 mt for 2022. The current risk policy allows for such increases when an OFL does not exist.

The SSC inquired about seasonal patterns of within year fisheries landings and potential influences of COVID 19. In contrast to longfin squid, *Illex* were less affected by restaurant closures. Lisa Hendrickson, NEFSC provided additional context about the spatial pattern of the fishery noting similar patterns in stat area distributions and specific areas within stat areas. As noted earlier, the recommendations from the Research Track Assessment are not yet known nor are the consequences for the MTA later in 2022. The SSC will consider catch recommendations for 2023 at a meeting later in 2022.

Public Comment

Public commenters noted the use of escapement targets in squid fisheries around the world. MSC now recommends the use of escapement targets in their most recent guidance documents. Fisheries operating under such targets have generally been stable. Another commenter requested a 20% increase from the previous ABC to 39,600. He noted the economic and social importance of this fishery particularly during this period when other pelagic fishing opportunities are declining. This proposal was supported by other who further emphasized the small area of fishing relative to the total stock area, the exclusion of *Illex* in offshore areas and the short season length. Others cited observations from research vessels from tows deeper than 2500 m. Finally, it was noted that ex-vessel value alone is an insufficient measure of economic value.

Illex ABC recommendations for 2022

Following these presentations and general discussion, the SSC addressed the Terms of Reference (italics) for *Illex* Squid. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For *Illex* squid, the SSC will provide a written report that identifies the following for the 2022 fishing year:

1) *Review the current 2022 Illex acceptable biological catch (ABC) of 33,000 MT and determine if an ABC adjustment is warranted. If so, please specify an adjusted 2022 Illex ABC and provide any rationale and justification for the adjustment;*

The SSC notes that *Illex* squid continues to be a data poor species.

The SSC received a detailed report from Dr. Paul Rago, who recused himself from discussion of ABC specification. The report included an enhanced, numerical analysis of possible scenarios related to available biomass, the impact of the fishery, and the vulnerability of squid to surveys. This represented extensions to the framework that he had previously presented to the SSC and that provided the basis for the existing ABC determination.

The SSC recognized Rago's presentation included a substantially more comprehensive evaluation of the underlying dynamics of the population and the fishery. The principal conclusions from the Rago presentation accepted by the SSC were:

- Escapement has been relatively high over the last 10 years, suggesting a relatively small impact of the fishery on the component of the stock that is exploited.
- Assumptions regarding parameters that were inputs to the analyses thought were thought to lead to minimum likely estimates.
- Distributions of the joint estimate of F:M suggests that exploitation rate in the fishery is likely low.
- By comparison to empirical escapement reference points used to manage squid fisheries elsewhere globally, the current ABC levels are associated with low risks of exceeding those escapement standards.
- The analyses do not consider any autocorrelation in the dynamics of the squid population that could be caused by stock-recruitment dynamics or by environmental drivers.

The SSC believes that an ABC of 33,000 MT for 2022 is no longer warranted. Instead, the SSC recommends an ABC for 2022 of 40,000 MT based on the following lines of evidence

- It is consistent with discussions of the SSC last year that noted a desire to increase the ABC, but felt it was constrained from so doing because of the lack of a more complete exploration of the implications catch on the squid population. Dr. Rago's enhanced numerical analysis provides such information.
- It represents an approximately 20% increase in the ABC above the 2021 determination, consistent with the incremental approach the SSC has adopted previously.
- Based on an evaluation of a prolonged time series, it is consistent with
  - a low chance of falling below the escapement level of 40% that has been used in the management of other squid fisheries (slide 38, p=0.065), and
  - a moderate risk of exceeding a ratio of F:M=2/3 (slide 40, p=0.2)

  Both a 40% escapement level and an F:M=2/3 have been suggested as candidate reference points.
- The SSC believes this level of ABC will lead to a low risk of overfishing.
- The SSC did not feel comfortable increasing the ABC beyond this level because we continue to lack a clear link between escapement, F:M and the risk of overfishing and thus cannot yet directly apply the Council's risk policy.

2) *The most significant sources of scientific uncertainty associated with determination of the ABC;*

The SSC noted the following ongoing sources of uncertainty for this ABC determination

- The lack of a peer-reviewed OFL introduces substantial uncertainty for the foundation of ABC determination. As an alternative, the SSC is relying on data poor approaches and reference points used to manage other squid fisheries and used to promote sustainability of exploited forage species.

- Continued uncertainty over the fraction, and the interannual variability, of the squid population that is subject to exploitation. This likely leads to estimates that are likely lower bound estimates of the impact of the fishery on the squid population.
- The lack of understanding of stock- recruitment processes in squid complicates development of biological reference points.
- The lack of understanding of the coherence of squid availability on the shelf with environmental drivers of distribution complicate understanding of whether sequences of good or bad years are likely to occur, which would bias understanding of stock status when using data poor approaches.
- Levels of escapement that afford protection against overfishing are poorly understood analytically and empirically.
- Estimates of q, v, and M are uncertain and estimates are assumed to be uncorrelated, whereas there are easily conceived processes that could introduce correlations among these key parameters.

3) *The materials considered by the SSC in reaching its recommendations;*

The SSC considered:

- A detailed presentation and report, "Evaluation of Alternative Catch Limits for *Illex* in 2022" from Paul Rago.
- ToRs for the research track assessment.
- Maps of the spatial distribution of the squid fisheries for 2019 and 2020 from Lisa Hendrickson
- Fishery advisory performance report for 2022 and fishery information document from Jason Didden
- *Illex* ABC-Staff Recommendation memo from Jason Didden

4) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

The SSC believes these recommendations meet National Standard guidelines for best available scientific information available.

Golden Tilefish

José Montañez, Council staff, started the discussion on Golden Tilefish ABCs for 2023 began with a review of the fishery performance data for 2021. The stock is not overfished and not experiencing overfishing in 2020 based on the results of a 2021 Management Track Assessment. A data update for 2021 was not provided by the NEFSC but the SSC looks forward to an update in 2023 and the results of a Research Track Assessment in 2024. Harvesters reported an overall increase in CPUE and a broad size distribution, including smaller fish. These improvements are consistent with the changes predicted by the stock assessment. The current quota of 891 mt is part of a 3-year quota for 2022-2024. Actual landings have been slightly below the quotas. Prices were up slightly in 2021 compared to 2020.

In view of the positive signs from the fishery, and the absence of any negative indicators of stock status, the SSC concluded that no adjustments to the quota for 2023 are warranted. The SSC recommends continuation of the previously specified ABC. The SSC also reiterated its ongoing concerns about reductions in biological port sampling for Golden Tilefish.

Blueline Tilefish

Jason Didden reported that commercial landings were down in 2021 but prices were increasing. The trip limit in 2021 dropped from 500 to 300 fish when the stock reached 70% of the quota. The change is designed to reduce targeted trips and the large buffer (30%) reflects the high variability of the catch estimates. Mandatory reporting of recreational private boat harvests has been very low thus far. Blueline tilefish are rare in the MRIP angler intercepts and catches estimates generally have low precision. An operational assessment in collaboration with the Southeast Fisheries Science Center is anticipated in 2024.

Council staff recommended no changes to the existing ABC of 100,520 lb and the SSC concurred with this recommendation.

Atlantic Mackerel

Landings and prices were down in 2021 but similar to recent years. Demand remains strong but US production is a small fraction of worldwide trade.

Following the July 2021 meeting of the SSC and its report, the Council passed a motion in requesting additional guidance from the SSC on rebuilding options for Atlantic Mackerel. Five distinct options were specified to achieve within a 10-year period. The options are distinguished by varying assumptions about recruitment, the desired probability of rebuilding within the 10-year period, and specification of risk for each proposed catch trajectory. The need for reconsideration of rebuilding options arose when the 2021 MTA revealed that rebuilding was lagging behind earlier projections. The Council requested that the options would align with the Council's Risk Policy and the SSC's derivation of a 150% CV for the OFL. Jason Didden, MAFMC presented the options specified by the Council and Kiersten Curti, NEFSC, provided details on each rebuilding option.

Mackerel recruitment has been low in recent years and various assessments have debated the underlying causes. Environmental conditions may be resulting in low recruitment. Alternatively low recruitment may be due to reduced spawning stock biomass. If stock size is low due to long-term environmental conditions, then severe reductions in ABC are required to achieve rebuilding. Alternatively, if stock size is responsible, then increases in recruitment could occur in response to lower rates of fishing. The feedback effect would accelerate recovery beyond that possible if recruitment is assumed to be stationary about a reduced recent average. The stock-dependent recruitment hypothesis was considered in 4 of the 5 rebuilding options (Table 1 below).

The stock recruitment relationship assumes that larger recruitments are more likely when the stock is high than when it is low. The SSBmsy for mackerel is estimated as 181,090 mt and Fmsy=0.22. This hypothesis is formalized as a step function in which the distribution of possible recruitment has a smaller range (2009 onward) and lower average when the stock biomass is below the threshold (0.5 SSBmsy). The converse (larger range (1975 onward) and higher mean recruitment) is true when the stock biomass is above the threshold (0.5 SSBmsy). The basis for this type of stock recruitment relationship and examples may be found in Brodziak et al. 2001.

Rebuilding scenarios were evaluated using a stochastic projection model based on 2000 bootstrap estimates of the terminal year population sizes from the stock assessment model. Owing to the varying starting conditions and random effects of time varying recruitment, the population trajectories under the rebuilding scenarios result in a broad distribution of values. Measures of central tendency (i.e., median) were used to describe the expected rebuild times, the probability of rebuilding by 2032 and the expected catch trajectories. It was noted that not all of the realizations would successfully rebuild, even under the most aggressive reductions in fishing mortality.

Suggestions from the SSC included alternative ways of capturing the patterns associated with each realization and illustration that rebuilding may fail even with very long rebuilding periods. The distribution of SSB for each year would useful to characterize because it is expected to be skewed with heavy tail of high rebuild probabilities. The SSC also suggested further investigation into potential environmental drivers for recent low recruitment. It was further noted that rebuilding would be monitored via Management Track Assessments every two years. Adjustments to the rebuilding strategy are expected. The SSC emphasized the deliberative nature of discussions about the stock recruitment relationship and rebuilding strategies. These discussions included extensive consultations among NEFSC and SSC as well as the DFO Canada and other assessment partners.

Following these presentations and general discussion, the SSC addressed the Terms of Reference (italics) for Atlantic Mackerel. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Atlantic Mackerel, the SSC will provide a written statement that identifies the following for the 2023 – 2024 fishing years:

1) *Provide acceptable biological catch (ABC) recommendations, in weight, for the Council's rebuilding alternatives. The rebuilding alternatives include either P* based calculations or a target probability of rebuilding (e.g., 50% or 60%) specified by the Council. The alternativesuse one of the two recruitment assumptions previously recommended by the SSC – the most recent recruits (2009 onwards) or a two-phase approach that only*

incorporates the longer time series (1975 onwards) once biomass is over half of the rebuilding target. The SSC also previously recommended a 150% CV for the P based calculations.*

This table summarizes the alternatives specified by the Council and gives the calculated 2023, 2024, and total rebuilding plan (2023-2032) ABC estimates. Note that an OFL CV probability of 150% applies to alternatives 2 and 5. The SSC recommends Alternative is 2: Split standard P^* (see ToR 2).

Table 1. Atlantic Mackerel Rebuilding Options Summary

Rebuilding Alternative Name	Rebuilding Risk Policy	Recruitment	Probability Rebuild by 2032	F (2023/2024 if multiple)	Rebuilt by (median)	2023 median Catch/ ABC (mt)	2024 median Catch/ ABC (mt)	Rebuild Plan median catch/ABC 2023-2032 (mt)
1. 2009+ Rebuild	50% chance of rebuilding by 2032	2009+	56.6%	0.01	June 2031	703	865	12,866
2. Split standard P*	Use basic P* as rebulding plan.	Split at 1/2 Bmsy	51.5%	0.07/ 0.08	June 2031	4,539	6,207	171,291
3. Split 60% rebuild	60% chance of rebuilding by 2032	Split at 1/2 Bmsy	60.5%	0.12	June 2031	8,094	9,274	144,147
4. Split 50% rebuild	50% chance of	Split at 1/2 Bmsy	53.4%	0.14	June 2032	9,371	10,591	157,821

	rebuilding by 2032							
5. Split 50% rebuild with P* deduction	Use rebuild F from split 50% chance of rebuild and then deduct per P* as if rebuild F was overfishing F	Split at 1/2 Bmsy	62.3%	0.04/ 0.05	June 2029	2,976	4,168	134,022

2) *Provide any guidance regarding the relative risks associated with the different rebuilding alternatives and identify the most significant sources of scientific uncertainty associated withrebuilding;*

The SSC reviewed all alternatives and recommends the P^* approach with the maximum fishing mortality threshold (MFMT) equal to the Fmsy proxy (Alternative 2). This alternative, (1) fulfills rebuilding plan requirements; (2) is the most responsive to new information on changes in stock status; (3) produces the highest rebuilding plan 10-year catch yield); (4) is fully consistent with the Council's P^* risk policy; and (5) would avoid "break points" in catch limit advice, which would reduce year-to-year changes in the ABC.

Risks and scientific uncertainties pertain to the two classes of alternatives: Alternative 1, which considers projections on the basis of only recent recruitment (2009+) and the remainder (Alternatives 2-5) that use the recent recruitment period under the condition of $SSB<0.5\ SSB_{MSY}$, and use the entire recruitment series (1975+) when $SSB \geq 0.5\ SSB_{MSY}$ (Alternatives 2-5).

<u>Alternative 1</u>

Risks:

- ABC/Catch levels are quite low indicating risk of a depleted industry and foregone catch once SSB recovers.
- At low to nil catch levels, fishery-dependent data will become unavailable to support stock assessment.
- High discard potential if recruitment recovers under low catch

Scientific Uncertainties:

- Predictions of which recruitment regime exists is highly uncertain owing to lack of understanding on how recruitment is controlled (i.e., role of SSB, the environment, and the food web).
- Recreational catch/unreported removals may exceed low ABCs under this Alternative; knowledge about catch will needs to become more precise at low ABCs.

- Uncertainty accumulates with length of projections.

Alternatives 2-5

Risks:

- Stock may not recover without the low F specified in Alternative 1.
- The SSB trigger implies a sudden change in recruitment state, which is not supported by current understanding of what drives recruitment
- The two recruitment stanza approach applies uses an SSB trigger for which there is limited analytical support (SSC Chairman's September 22, 2021 Report to MAFMC)
- An immediate shift towards a higher recruitment regime is assumed at $SSB \geq 0.5\ SSB_{MSY}$, whereas an unknown lag may occur between increased SSB and recruitment.
- Because a stock-recruitment relationship is unknown for this stock, it is uncertain whether SSB changes will be driven by increased recruitment or vice versa. This approach implies a S-R relationship, which may be arbitrary given that it has not been parameterized in the assessment
- The approach of shifting recruitment regimes can have unexpected effects later on with respect to stock rebuilding. The threshold is sensitive to the timing of a pulse of strong recruitment and may not reflect longer-term SSB rebuilding.
- Approaches rely on a SSB-based boost to recruitment that has not been observed recently (since 2007).
- The lack of strong precedence of this approach (but see Brodziak et al. 2001) conveys risk in predicting its performance in rebuilding.

Scientific Uncertainties:

- We do not know the form of the underlying stock-recruitment relationship.
- Knowledge about catch will needs to become more precise at low ABCs.
- The trigger SSB for using one or the other recruitment series is deterministic, without consideration of error.
- Uncertainty in small amplitude changes in SSB
- Uncertainty in long projections

3) *Provide any data and/or assessment considerations for the 2023 Atlantic Mackerelmanagement track assessment;*

Management Track Assessment

- The Atlantic mackerel egg surveys and related ichthyoplankton processing and data analysis are fundamental in assessment and projections of rebuilding.
- Phase plots are instructive in evaluating linked changes between recruitment, SSB, and F.
- The US recreational sector is less represented in length data in the assessment than commercial sectors. Should evaluate recreational fishery data quality and assessment sensitivity

Considerations for future assessments

- Shoreside sampling needs to be improved (multispecies issue)
  - Cost per length is now higher so sampling reduced since FY 2020
  - Allocation also based on catch amount—but should have minimum sample size for assessments
- Further evaluate is needed on how error in the egg survey propagates to error in the spawning stock biomass index to better interpret small amplitude <50% changes in SSB.

4) *The materials considered by the SSC in reaching its recommendations;*

- Staff memo: 2023-2024 Atlantic Mackerel rebuilding recommendations and considerations
- NEFSC rebuilding projection tables:
  - Mackerel 10 Year Rebuilding Projections (Excel)
  - Mackerel P* Projections (Excel)
  - Figure – Mackerel SSB Rebuilding Projections
  - Figure – Mackerel Catch Rebuilding Projections
- 2022 Mackerel, Squid, Butterfish Advisory Panel Fishery Performance Report
- 2022 Atlantic Mackerel Fishery Information Document
- July 2021 SSC Meeting Report
- September 2021 SSC Meeting Report
- Brodziak, JKT, WJ Overholtz, and PJ Rago, 2001. Does spawning stock affect recruitment of New England groundfish? Canadian Journal of Fisheries and Aquatic Science 58:306-318

5) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for bestscientific information available.*

Agreed. The SSC believes these recommendations meet National Standard guidelines for best available scientific information available.

Council Action: Harvest Control Rule

Julia Beaty, Council staff, opened this session with a succinct overview of the Harvest Control Rule (HCR) under consideration by the Council. The HCR amendment is a complex set of measures designed to regulate recreational harvest of summer flounder, scup, black sea bass, and bluefish. The overall objective is to prevent overfishing by employing controls that account for stock status and its uncertainty. To the extent possible the measures are to be governed by angler preferences and a desire for stability of measures across jurisdictions and over time.

Five different alternatives have been proposed. All of them rely on regular updates of stock status but the algorithms that trigger changes in regulations differ. The basic features of the alternatives are described below:

- Status Quo—measures designed to prevent harvests from exceeding annual harvest limits.
- Percent Change—compares expected harvest to future harvest limits, and current stock size to target level.
- Fishery Score—attributes of stock and fishery (relative biomass, recruitment, fishing mortality and expected harvest) are scored, weighted, and summed to create an aggregate score. Four score intervals are defined and sets of recreational measures are defined within each bin.
- Biological Reference Point—current stock biomass and fishing mortality rates are used to define eight possible bins related to whether overfishing is occurring or not, and four levels of stock size relative to Bmsy. Within each of these eight bins, measure are further governed by trends in biomass, recruitment and recent harvests compared to their limits. The magnitudes of admissible changes are not defined but are categorized as "liberal", "default", "restrictive", "restrictive and re-evaluate", and "rebuilding".
- Biomass Matrix—similar to the Biological Reference Point measure but relies on current stock biomass and trends in biomass to create six possible sets of regulatory measures. Four levels of stock size and three levels of biomass trend (increasing, stable, decreasing) are defined. The six bins can span more than one level of biomass trend.

The HCR amendment is motivated by real and perceived uncertainties in the MRIP estimates of catch and perceptions that recent regulations are inconsistent with true stock size, rendering them ineffective. To address these concerns the HCR is a set of alternative algorithms that define a basis for adjusting regulations in response to changes in stock condition. The specific measures (e.g., bag limits, size limits, or seasons) are not defined. Such measures are to be defined during the specifications process by the appropriate technical groups familiar with the fisheries and jurisdictions.

The Council's request to the SSC is stated below:

> *Request that the SSC provide a qualitative evaluation, in time for final action at the June 2022 Council/Policy Board meeting, regarding the potential effect of each of the five primary alternatives in the Harvest Control Rule Addendum/Framework on the SSC's assessment and application of risk and uncertainty in determining ABCs. The intent is to provide the Council and Policy Board with information to consider the tradeoffs among the different alternatives with respect to the relative risk of overfishing, increasing uncertainty, fishery stability, and the likelihood of reaching/remaining at Bmsy for each approach at different biomass levels (e.g., for ½ Bmsy < B < Bmsy, the relative risk among alternatives is (highest to lowest) E > C > B > A>D).*

Julia's presentation and the motion from Council generated extensive discussion within the SSC. The SSC appreciated the breadth of the options and the efforts to link recreational measures to stock status. The SSC inquired about the processes that led to these alternatives and the selection of various bins and thresholds. Discrete, rather than continuous responses to changes in relative abundance or fishing mortality, could have important feedback effects for population dynamics. Some members expressed concerns that the implications of these control rules have not been evaluated to date. Several ongoing projects, such as the summer flounder MSE project, may be useful for a more comprehensive evaluation.

It was noted that the current process for setting the RHL relies on results from the most recent stock assessment and their relevant projection models. Hence further adjustments for biomass or fishing mortality within a given regulatory option could be viewed as double counting for such factors. To varying degrees, the recreational fisheries for all of the species in the HCR coexist with commercial fisheries. Concerns were raised that this linkage should be explored within the HCR, particularly because recreational overages may create overfishing for the stock as a whole.

As part of a more general discussion the SSC noted that management measures do not always have their intended effects. In theory the HCR will be more successful in addressing the uncertainty of such measure and responding appropriately as situations warrant. Such responsiveness may conflict with the underlying desirability of stable regulations over time.

Several SSC members expressed concerns that fully worked examples had not been provided. Julia explained that specific measures were excluded because it would detract from discussions about the principles underlying each alternative. Council staff are not anticipating conducting simulation studies to compare the efficacy of each alternative for each species. To facilitate such studies, stock assessments might consider using recreational and commercial "fleets" separately. This would allow for more direct estimation of the force of mortality imposed by anglers and commercial harvesters.

Economic and social concerns include angler responses to alternative measures. Angler discontent with current regulations is high in the Mid-Atlantic; this introduces additional uncertainty into the selection of options. MRIP is designed to capture broad trends at an annual time step over multi-state regions. Partitioning such data into smaller domains decreases the precision of estimates. Low precision and potential bias are likely to continue unless recreational data collection efforts are increased.

Prior to the SSC meeting a request to participate in a working group was sent to the Committee. Six members volunteered to participate (Tom Miller, Cynthia Jones, Alexei Sharov, Lee Anderson, Brian Rothschild, and Paul Rago). Tom Miller will chair the group. Several meetings will be held prior to the May 10-11, 2022 meeting of the SSC. The SSC will craft a formal response at that meeting for delivery to the Council at its June 7-9 meeting.

As part of its charge from the Council, the SSC will address two broad themes. First, it will consider how approaches to slow down the rates of change in RHL will affect the uncertainty measures used by the SSC. What are the possible feedback effects of this uncertainty? Second, each of the five options will be considered to identify those least likely to increase uncertainty. In view of the short time available for the review, consensus, rather than analytical approaches will be used.

Ecosystem Science and Application

State of the Ecosystem and EAFM Risk Assessment

Sarah Gaichas presented the NEFSC's State of the Ecosystem report that included over 60 contributors. The iterative process of presentation, suggestions and refinement continues to be appreciated by the SSC. In recent years the SOE report has focused more directly on information relevant to the Council's decision-making process. Wherever possible, links to the underlying methodology and data are provided. The report for 2022 retains the structure from 2021 with a three-page graphical report card, risk summary and synthesis theme. The remainder of the report reviews performance relative to management objectives and risks. Due to changes in the data processing for commercial catch data, some recent catch data for 2020 have not been included.

Recreational seafood and commercial seafood both show long term declines but these declines are not necessarily due to stock status declines. Only two stocks, Atlantic Mackerel and Bluefish are overfished and only one stock (Atlantic Mackerel) is subject to overfishing. Climate risk of particular concern for Surfclam & Ocean Quahog. Recreational effort increased but fleet diversity decreased. The range in opportunities might be important to consider, as contraction of party/charter and shift towards shoreside angling continues.

In the bottom trawl surveys the expected number of species does not appear to be changing over time. Owing to the discontinuity in survey (FSV Albatross vs. R/V Bigelow) methods, the current time series is insufficient to detect statistical differences.

New indicators were introduced in 2022 for Community & Social Vulnerability. Highly engaged and reliant communities are generally less vulnerable to Environmental Justice impacts. Recreational communities tend to be less vulnerable to Environmental Justice issues.

Climate risks appear to be increasing with notable increases in bottom temperature, the frequency of heat waves from August through fall, and changes in seasonality metrics. The Mid-Atlantic Cold Pool is both warming and becoming smaller. Ocean acidification is expanding and more warm core rings from the Gulf Stream are intruding on slope water. Some progress has been made linking these changes to *Illex* abundance.

Ecosystem changes include dominance of smaller zooplankton species, reductions in the energy contend of herring and reductions in fish condition factor. Predator biomass remains high with continuing increases in gray seals and relatively high levels of abundance for Highly Migratory Species. The number and extent of proposed offshore wind energy areas continues to increase.

The SSC expressed appreciation for the comprehensive and synthetic report, the open processes for further investigation of the underlying data and methodologies, and the responsiveness of the team to suggestions for improvement.

The SSC inquired about the use of trend lines and the possibility that the methodology might not be sensitive to local trends. It was noted that several models were evaluated for each time series to select trends based on an AIC value.

Several members asked for details on the Environmental Justice metrics and the underlying indicators. Lisa Colburn, NEFSC, was lead on this section.
https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities
Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental Justice also includes measures of the demographic composition of the communities, languages, unemployment, poverty and incarceration rates.

Update on SSC Ecosystem Work Group

Sarah Gaichas reported on the work of the Ecosystem Working Group. Several meetings were held and the following key objectives have been identified:

1. Expanding and clarifying the ecosystem portion of the SSC OFL CV determination process (short term objective)

   A flow chart outline has been developed to facilitate consideration of ecosystem drivers in stock assessments. If the ecosystem driver has been incorporated into the assessment model or stock projections there is no need to account for these factors outside the model. Otherwise the OFL might be adjusted in response to such omissions. The direction of adjustments might be known but the magnitude would likely be a function of expert judgement. Additional work on this is underway using John Wiedenmann's MSE model in collaboration with Mike Wilberg. Summer flounder and Atlantic mackerel are currently the focal species.

2. Developing prototype processes to provide multispecies and system level scientific advice appropriate for Council decision making, in particular where there are multispecies and multi-fleet tradeoffs linking directly to economic and social outcomes (long term objective)

   The NEFSC has secured funding for additional analytical support. Results may allow for direct incorporation of uncertainty into the OFL CV criteria rubric used by the SSC. Such modeling has the potential for deriving ecosystem level reference points.

3. Collaborating with SSC species leads, stock assessment leads, and relevant working groups in developing the stock-specific Ecosystem and Socio-economic Profiles (ESP) process to specify stock-specific Ecosystem ToRs that are impactful and can be integrated into assessments (moderate-term objective)

   This effort will continue on ongoing engagement of SSC members with stock assessment working groups as part of the RTA. In particular, further work with Bluefish RTA in 2023 is expected. It was noted that a more structured process, beginning with a conceptual model, will increase the odds of success.

The SSC appreciated the progress of the Ecosystem Working Group. It was noted that the timing of information flows is critical in the stock assessment process owing to the tight interdependencies among data and model components and the incompressible management timelines. The SSC expressed interest in receiving information from the Working Group in advance of the stock assessment results. For example, early information on the results of the Research Track Assessments for *Illex* and Butterfish would be helpful in advance of receiving the results of the Management Track Assessments for these species in July. If the current schedule does not allow for such changes, then an additional meeting of the SSC in 2022 may be warranted.

Economic Work Group

Geret DePiper provided an overview of the Economic Work Group activities in 2021 through early 2022. Activities were primarily focused on assisting the Council's Research Steering Committee (RSC) on the feasibility of re-starting the Research Set Aside (RSA) program in the Mid-Atlantic region. The RSA could allow for targeted research on topics relevant to sound management of MAFMC species. The group met regularly throughout the past year and supported the RSC by contributing substantively to four day-long workshops. These included: 1) identification of research topics, 2) application of economic theory for various funding options, 3) enforcement and tradeoff issues, and 4) development of a decision tree for creating a comprehensive RSA process. Draft goals of the revised RSA include:

1) Quality peer-reviewed research that maximizes benefits to public and Council by enhancing understanding of its managed resources.
2) Ensure monitoring, accountability and enforcement of RSA quota
3) Generate resources to fund projects aligned with Council priorities
4) Foster collaboration and trust among science, industry and Council.

Overall, the workshops were viewed as highly successful, a view affirmed by the RSC Chair Michelle Duval and members of the public. The Economics Work Group added value to the RSA process and established a strong partnership with the Council. Future requests for assistance from the Economics Work Group are expected. In the meantime, the work group will continue to support the Summer Flounder MSE project, the EAFM risk assessment and terms of reference for stock assessments and other reviews. The overall capacity of the SSC to address economic issues is ultimately limited. Concerns were expressed that substantive involvement in fewer issues is preferred to the converse.

Other Business

- The Scientific Coordination Subcommittee will be hosting a meeting of the Fishery Management Council's Scientific and Statistical Committees August 15^{th}-17^{th} in Sitka, Alaska. Sarah Gaichas will be presenting a keynote address. Up to three members of the SSC will participate in the meeting. The focus of the meeting will be inclusion of ecosystem information in stock assessments.
- There will be no changes to the species and topic leads for the SSC. See Council webpage for details. https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/6234d93b8ea4466be3d67345/1647630651288/2022+SSC+Species_Topic+Leads+Table.pdf
- For purposes of economic stability and regulatory stability, the Council often prefers multi-year specifications for ABCs. These approaches can be problematic with respect to the Council's risk policy, if the population is trending downward from a high level. A small group will be convened to address approaches for averaging ABCs. The SSC will be seeking clarification from Council regarding objectives for multi-year specifications.
- The May 10-11 meeting of the SSC will be a hybrid meeting in Baltimore.

Attachment 1

Mid-Atlantic Fishery Management Council

Scientific and Statistical Committee Meeting

March 15 – 16, 2022 via Webinar

Webinar Information
(Note: same information for both days)
Link: **March 15-16, 2022 SSC Meeting**
Call-in Number: 1-415-655-0001
Access Code: q59Uk4AE5qA

AGENDA

Tuesday, March 15, 2022

9:30 Welcome/Overview of meeting agenda (P. Rago)

9:35 Review and potential change to 2022 *Illex* ABC specifications
- Review updated *Illex* quota work products (P. Rago)
- Review of staff memo 2022 ABC recommendation (J. Didden)

11:00 Break

11:15 Continue review of 2022 Illex ABC specifications
- SSC 2022 *Illex* ABC recommendations (T. Miller)

12:30 Lunch

1:30 Golden Tilefish data and fishery update; review of previously recommended 2023 ABC (J. Montañez)

2:15 Blueline Tilefish data and fishery update: review of previously recommended 2023 ABC (J. Didden)

3:00 Break

3:15 Atlantic Mackerel 2023 – 2024 Rebuilding ABC Specifications

- Review of Council rebuilding alternatives and stock projections using SSC guidance (J. Didden and K. Curti)
- SSC 2023 – 2024 ABC recommendations (D. Secor)

5:30 Adjourn

<u>Wednesday, March 16, 2022</u>

8:30 Overview of Council Action: Recreational Harvest Control Rule (J. Beaty)
- Council motion on SSC input and guidance
- Discussion on process and approach to address Council motion (e.g., formation of work group)

10:15 Break

10:30 Ecosystem Science and Application (S. Gaichas)
- NEFSC 2022 Mid-Atlantic State of the Ecosystem Report
- 2022 update of Council's EAFM Risk Assessment
- SSC Ecosystem Work Group – update on work group work plan and progress
- Ecosystem and socio-economic work for 2022 Bluefish Research Track assessment

12:30 Lunch

1:00 Report from SSC Economic Work Group
- Update on engagement with the Council on the RSA redevelopment project
- Potential area(s) for future engagement

1:45 Other Business
- 2022 Scientific Coordination Subcommittee meeting
- Species/topic lead assignments
- ABC averaging approach

2:30 Adjourn

Note: agenda topic times are approximate and subject to change

Attachment 2

MAFMC Scientific and Statistical Committee

March 15-16, 2022

Meeting Attendance via Webinar

Name	Affiliation
SSC Members in Attendance:	
Paul Rago (SSC Chairman)	NOAA Fisheries (retired)
Tom Miller	University of Maryland – CBL
Ed Houde	University of Maryland – CBL (emeritus)
Dave Secor (March 15th only)	University of Maryland – CBL
John Boreman	NOAA Fisheries (retired)
Lee Anderson	University of Delaware (emeritus)
Jorge Holzer	University of Maryland
Yan Jiao	Virginia Tech University
Rob Latour	Virginia Institute of Marine Science
Brian Rothschild	Univ. of Massachusetts-Dartmouth (emeritus)
Olaf Jensen	U. of Wisconsin-Madison
Sarah Gaichas	NOAA Fisheries NEFSC
Wendy Gabriel	NOAA Fisheries (retired)
Mike Wilberg (Vice-Chairman)	University of Maryland – CBL
Cynthia Jones	Old Dominion University
Gavin Fay	U. Massachusetts-Dartmouth
Alexei Sharov	Maryland Dept. of Natural Resources
Geret DePiper	NOAA Fisheries NEFSC
Mike Frisk	Stony Brook University
Mark Holliday	NOAA Fisheries (retired)
Others in attendance (only includes presenters and members of public who spoke):	
Kiersten Curti (March 15th only)	NEFSC
Jason Didden	MAFMC staff
Brandon Muffley	MAFMC staff
Julia Beaty	MAFMC staff
Jeff Kaelin	Lund's Fisheries
José Montañez	MAFMC staff
Paul Nitschke (March 15th only)	NEFSC
Lisa Hendrickson (March 15th only)	NEFSC
John Manderson (March 15th only)	Open Ocean Research
Greg DiDomenico	Lund's Fisheries
Meghan Lapp	Seafreeze Ltd.
Eric Reid	Fisheries Consultant
Emerson Hasbrouck (March 16th only)	Cornell Cooperative Extension
Mike Waine (March 16th only)	American Sportfishing Association
Michelle Duval	MAFMC
Abby Tyrell (March 16th only)	NEFSC
Kim Hyde (March 16th only)	NEFSC

Attachment 3. Glossary

ABC—Acceptable Biological Catch
AIC—Akaike's Information Criterion
Bmsy—Biomass at maximum sustainable yield
CV—Coefficient of Variation
DFO—Department of Fisheries and Oceans, Canada
ESP—Ecosystem and Socio-economic Profiles
EAFM—Ecosystem Approach to Fisheries Management
F—Instantaneous rate of fishing mortality
FSV—Fishery Survey Vessel
GARFO—Greater Atlantic Region Fisheries Office
HCR—Harvest Control Rule
M—Instantaneous rate of natural mortality
MRIP—Marine Recreational Information Program
MTA—Management Track Assessment
MSC—Marine Stewardship Council
MSE—Management Strategy Evaluation
OFL—Overfishing Limit
P*—Probability of overfishing
q—catchability coefficient parameter
RHL—Recreational Harvest Limit
RSA—Research Set Aside
RSC—Research Steering Committee
RTA—Research Track Assessment
R/V—Research Vessel
SSBmsy—Spawning stock biomass at maximum sustainable yield
SSC—Scientific and Statistical Committee
v—availability parameter

Ecosystem and Ocean Planning Committee & Advisory Panel Meeting

February 24, 2022
Webinar Meeting Summary

The Mid-Atlantic Fishery Management Council's (Council) Ecosystem and Ocean Planning (EOP) Committee and Advisory Panel (AP) met on Thursday, February 24, 2022 from 1:00 p.m. to 2:30 p.m. The purpose of the meeting was for the EOP Committee and AP to provide feedback and input on a research project the Council is collaborating on with a research team from Rutgers University. The project is developing forecast models to predict short-term (1-10 years) climate-induced distribution changes for four economically important Mid and South Atlantic managed species (summer flounder, spiny dogfish, *Illex* squid, and gray triggerfish). A forecast model for summer flounder has been developed and the Committee and AP provided feedback on the model outputs and their potential utility and offered input on future project direction and next steps.

EOP Committee Attendees: K. Wilke (Committee Chair), A. Nowalsky (Committee Vice-Chair), J. Cimino, M. Duval, P. Geer, K. Kuhn, S. Lenox, T. Schlichter, S. Winslow, D. Stormer, M. Luisi (Council Chair), J. Hermsen, W. Townsend (Council Vice-Chair)

EOP Advisory Panel Attendees: W. Goldsmith, F. Hogan, S. Rubow, Z. Greenberg, J. Weis, M. Lapp, E. Bochenek, C. LoBue, M. Heard Snow, P. Himchak, F. Akers, J. Kaelin, P. Simon, P. deFur, J. Firestone, M. Binsted, J. Hancher, B. Brady

Other Attendees: M. Pinsky, A. Fredston, C. Collier, E. Knight, S. Close, G. DiDomenico, J. Byrd, K. Dancy, B. Muffley, K. Almeida, J. Beaty

Overview of project presentations:

Staff started the off the presentation with a review of the biological, science, and management challenges created due to shifting stock distributions. It also addressed the Council's interest and engagement in the current research project and the potential areas of application of the research project outcomes. Existing stock distribution models offer forecasts that are typically 60-100 years in the future and the Council has utilized this information in a strategic way, i.e., incorporation and policy recommendations in the Ecosystem Approach to Fisheries Management (EAFM) guidance document. The types of models being developed in this project may allow the Council to consider changes in stock distributions in both a strategic and a more tactical and responsive way within the management decision process.

Dr. Alexa Fredston, Rutgers University, then introduced "dynamic range models" that are designed to mechanistically forecast range shifts over short time scales while accounting for transient dynamics in populations. The team at Rutgers is fitting these models to data on each of the four focus species from 1972-2006, and running "retrospective forecasts" of the subsequent decade (2007-2016) to evaluate the model performance. Some of the features of these models include spatial structure, age structure, and a number of user options such as choosing which process (movement, mortality, or recruitment) is temperature-dependent. Preliminary results suggest that the temperature-dependent recruitment model has skill at forecasting summer flounder range dynamics. Future steps include running these models for the other species and "competing" the best models against more traditional species distribution modeling methods.

<u>Questions and feedback on project from Committee and AP:</u>

Following the presentations, the meeting was opened up for Committee and AP questions and feedback regarding the modeling framework and initial outputs for summer flounder. In general, the group was supportive of the modeling approach and work done to date, but also had a number of questions and raised a variety of areas for additional consideration by the project team. Below is a bulletized summary of some of the broader feedback offered by the Committee and AP (this is not comprehensive list of all discussion):

- Habitat, in addition to temperature, is also changing and has implications for recruitment, productivity and distribution shifts, particularly for an estuarine dependent species like summer flounder, and is not considered in current model.
    - The project team did note that the modeling framework is quite flexible and habitat variables could be added, but the goal of this project is to develop short-term forecasts with a "simplified" model that incudes stock dynamics, temperature and fishing as the primary drivers. If the results of the project show these initial factors are not sufficient for short-term forecasts, future model development may need to look to these other forces (i.e., habitat) and see if performance improves.
- Since the model is considering stock dynamics across the range of a species, there was interest in the ability to evaluate these dynamics and different spatial scales (i.e., are stock dynamics and distributions different off North Carolina than off Massachusetts, for example).
    - The project team noted this is a strength of the current model and spatial structure used to evaluate the data.
- The group recommended the project team consider other potential sources of data beyond the NEFSC trawl survey. For example, the use of industry and/or study fleet information and other fishery independent surveys (e.g., Rutgers larval survey). It was also noted that there is an opportunity to gain some additional insight and information from the upcoming *Illex* research track assessment peer review later in March.
    - The project team noted that *Illex* model development has yet to begin and would certainly be interested in the information from the peer review.
- The group commented on some of the differences found between forecast model and the observed data for summer flounder and the considerations for evaluating inter-annual variability versus overall 1-10 year prediction trend of the population centroid. It was also questioned how the centroid signal could be influenced by variability in the timing of the seasonal migration due to the inter-annual variability in temperature (e.g., stocks staying further north longer because of warmer water). The group supported the model outputs that provide not only the point estimates from the forecast model but also the associated

uncertainty associated with the estimate and if the observed data falls within the estimate bounds.

  - The project team noted the forecast model does a pretty good job at predicting the observed inter-annual variability in the population centroid, except for the last year of the prediction, which is the most uncertain model estimate. Need to consider the trade-offs associated with specifying a model to appropriately capture the inter-annual variability but also need to pick-up the correct long-term (10 year) trend in the signal as well.

Additional webinars/meetings with the project team and the EOP Committee and AP will be held in the future as the other three species-specific models are developed and the project begins to wrap-up. Staff will also keep the Council apprised of any project updates and developments.

MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

Research Set-Aside (RSA) Workshop Meeting 4 – Summary Recommendations

Wednesday, February 16, 2022

Compiled by

Brandon Muffley and Andrew Loftus

SUMMARY OUTCOMES

Research Set-Aside Workshop
Workshop 4 (Summary Recommendations)
Wednesday, February 16, 2022

Contents

SUMMARY OUTCOMES

Research Set-Aside Workshop
Workshop Meeting 4 (Summary Recommendations)

Workshop Goal: The goal of Workshop Meeting 4 is to review the recommendations from the first three workshops and provide input for consideration by the Council's Research Steering Committee (RSC) regarding recommendations for RSA program redevelopment.

Next steps after this workshop

Dr. Michelle Duval (RSC Chair)
(Full presentation is included in Appendix II)

- April 27th – RSC meeting to review all input and develop guidance and final recommendations for Council consideration.
- June 7–9 – Council meeting to review RSC recommendations and make a decision on whether to redevelop the RSA program.
- Depending on decision from Council:
    - If the decision is "no," there will be no further (immediate) work on redevelopment.
    - If the decision is "yes," begin to develop appropriate management action document (i.e., framework or amendment).
    - Depending upon action and included components, it would likely be 1+ years to complete.
    - Will need to coordinate/work with the Atlantic States Marine Fisheries Commission and state agency staff/enforcement on program details and specifics.

Role of the Scientific and Statistical Committee (SSC) Economic Work Group

Presentation by Dr. Geret DePiper (Chair, SSC Economic Work Group)

(NOTE: Full presentation is included in Appendix III and key points of the question & answer dialogue are captured in the appropriate summary section of the discussions below.

Key Points

- Economic Work Group was established by the Council specifically to provide input into the economic impact of issues before the Council.
- Collaborative and iterative process with the Council structure.
- RSA program inherently has a number of economic implications.
- A series of white papers has been developed for each of the previous RSA Workshops (Workshops 1-3).
- Supporting material for today's workshop focus on how the program design impacts the ability to achieve RSA goals:
    - Who participates.
    - How quota is allocated.
    - What RSA trips look like.

Workshop 1-3 Recap/brief overview of issues from the previous program

Presentation by Andrew Loftus (workshop facilitator)
(NOTE: Full presentation is included in Appendix IV)

Key Points

- **Workshop 1 (Research)**
  – Identify how research goals will be prioritized, projects will be screened, and results will inform management/be communicated to the Council and stakeholders.
- **Workshop 2 (Funding)**
  – Discuss how the program will be administered (federal grant program), discuss funding mechanism, and indicate that projects should be tied to management/assessment needs.
- **Workshop 3 (Enforcement)**
  – Identify potential program modifications that could prevent reoccurrence of previous enforcement issues.
- **Workshop 4 (Recommendations)**
  – Review the recommendations from the first three meetings (synthesized by the RSC) and provide input for RSC consideration regarding recommendations for RSA program redevelopment.

Workshop Goal Discussions

Draft Goals of RSA Program

Brandon Muffley (MAFMC staff)
(NOTE: Full presentation is included in Appendix V).

Summary

- Based on feedback and input from workshop #1 - #3, identified a list of nearly 20 different potential objectives.
  - o RSC took that list and created four draft goals and associated objectives.
- Developed a decision tree to identify different RSA program components and consider how they may support the goals and objectives identified.
- Prioritized and refined the draft Goals and Objectives
  - o Identified linkages across goals and implications for working through decision tree.
  - o Consider trade-offs associated with different decision tree options in achieving specified goals.
- Goals and Objectives provide the overall framework for a possibly revised program; while alternatives/questions in the decision tree specify the structure and details of program in support of goals.

Listed in Priority Order. Blue capitalized lettering indicates language added during the discussion.

Goal 1. Produce quality, APPROPRIATELY peer-reviewed research that maximizes benefits to the Council, MANAGEMENT PARTNERS, AND THE public and enhances the Council's understanding of its managed resources (Research)

1. Support more applied management-focused research activities.
2. Higher priority on proposed RSA projects whose results would likely have immediate application to species management.
3. Discourage commitments to longer-term monitoring projects.
4. Ensure all data collected (funding and research) through the RSA program is open access.

Goal 1 Discussion

- It is implied that states are included in the RSA program. For jointly managed species, should add language "management partners."
- Does all research need to be peer reviewed?
  - Should be scientifically valid but not necessarily a full independent peer review process.
  - The intent of "peer review" is to set a high bar, not necessarily an outside peer review such as for publication.
  - There is a peer review by NOAA as part of the RSA process.
  - Conclusion: Peer reviewed does not mean published.
- "Open access" for data is a lofty goal but may be difficult to implement.
  - "Confidential data" may not be able to be open access.
  - All objectives are subject to laws etc. so this would apply to open access and confidential data.
- For objective #2, suggestion to replace the word "immediate" with "timely" noting that research does take time and as does the QA/QC and peer review and key is having the information available when its needed.

Goal 2: Ensure effective monitoring, accountability, and enforcement of RSA quota (Enforcement and Administration)

Original Order	Revised Order	Goal #2 Objective
1	4	Minimize law and admin (agency and researcher) burdens.
2	6	Improve STATES' ability to revoke RSA fishing privileges.
3	5	Provide support for admin and law activities.
4	1	Apply enhanced, adaptive, and consistent enforcement standards and controls.
5	3	Increase state-federal science, enforcement, and administration collaboration and cooperation.
6	2	Ensure compliance with the reporting and use of the RSA quota.

Goal 2 Discussion

- Move #4 ("Apply…) and #5 "Ensure…." Should be moved up if this is prioritized.
- "Improve ability to revoke RSA fishing privileges" is not needed for the Federal level but is really applicable to the state level enforcement (perhaps add "state" into bullet 2).
- Suggested order for prioritization is 4, 6, 5, 1, 3, 2, agreed upon with no objection.

Goal 3: Generate resources to fund research projects that align with the priorities of the Council (Funding)

1. Maximize revenues from RSA quota.
2. Provide equitable opportunity to fund research across all Council-managed species.
3. Increase scientific and industry partnerships.
4. Evaluate fairness in fishing community access to RSA quota.

Goal 3 Discussion

- Does #2 mean using money from a species of value to support research on other species? Response: Yes, including this objective would indicate a willingness to use funds generated from one species to support research for another species. By including this objective, this would also answer, by default, questions raised in the decision tree document (see Topic 2, Questions 2A and 2B)
- "Maximizing revenues" depends on how it is defined. "Maximize" doesn't necessarily mean getting the highest gross return, but a high net return; minimizing administrative and law enforcement costs might maximize the net revenue of a program.

Goal 4: Foster collaboration and trust between scientific and fishing communities and the general public

1. Ensure all data collected (funding and research) through the RSA program is open access.[Move to #2]
2. Ensure an open, accountable, and transparent process through all steps (funding and research) of the RSA program. [Move to #1]
3. Increase scientific and industry partnerships.
4. Evaluate fairness in fishing community access to RSA quota.

Goal 4 Discussion

- A suggestion was made to combine Goal 1 and 4. However, others thought that they should remain separate, particularly to keep an emphasis on fostering fair collaboration with the fishing community. The point was made that quota taken away from fishermen for RSA should be used to provide science that benefits everyone, not just improve relationships with those participating in the RSA program.
- Objective #2 should be moved to the top.
- Need to be cautious about the expectations set by some of these objectives; certain aspects are confidential by law and cannot be "open."

Public questions/comments on Goals

- Input was offered that Goal 4 should be prioritized as the first one; trust should be the foundation, and participation of the fishing community is necessary for the RSA program. Following discussion, the Panel consensus was to leave the Goals prioritized as is.

Specific Topic Discussions

- Red/Orange text indicates the options recommended by the RSC.
- Green lettering is text added following the January RSC meeting.
- Blue lettering indicates language added during the discussion during this meeting.

Topic #1 - Who is involved in the RSA program?

Dr. Mark Holliday (SSC Economic Work Group)
(NOTE: Full presentation is included in Appendix VI)

Topic 1Summary

- Accept that trade-offs are a natural consequence of decision making.
- Clearly document rationale for decisions.

Topic #1 - Who is involved in the RSA program
Top Tier/Highest Priority Questions
1A. Allow commercial sector participation only
1B. Allow commercial and for-hire sector participation (no private recreational fishermen)
1Bi. Phase-in participation by one sector
1C. Allocation of quota across sectors or keep separate
2A. Fixed percentage of ABC for each fishery (i.e., different percentages for each fishery)
2B. Fixed percentage of ABC across all fisheries
2C. Fixed number of pounds for each fishery
3A. Allow participation only by federally-permitted vessels
3B. Allow participation by federally-permitted and state-permitted vessels
3Bi. Phase-in participation by permitted (state) vessels
3Bii. Appropriate/standardized reporting for all vessels
3C. Do not allow participation by vessel owners that are also dealers unless dealer has a physical address for place of business
4. Allow states to opt out of shoreside participation in an RSA program (e.g., providing required state exemption permits, etc.)
5A. Cap the number of vessels that can participate within each state
5Ai. Cap by sector (depending on alternatives 1A-1C)
6A. ~~Require~~ Allow observers/state staff onboard all RSA compensation fishing trips
6B. ~~Require~~ Allow all vessels to be equipped with VMS or AIS

Topic 1Discussion Summary

<u>Option Set 1 (1A-1C)</u>

- General support for keeping the RSA program open to both Commercial and For-Hire fishermen. Both sectors are important for generating specific science and if there is discontent from sectors that are excluded it is likely to erode long-term support for the program.
- Some comments that allocation of the RSA quota should be determined by the Council and that setting a standard for separate allocations as part of the RSA plan would complicate implementation and monitoring.
- Details will need to be fleshed out further by the RSC.

Option Set 2 (2A-2C)

- From an implementation standpoint, dealing with "fixed poundage" rather than a percentage is much easier.
- Requiring a percentage of ABC from each fishery may be problematic in the long-term. The value of a specific fish changes over time and species that don't generate sufficient revenue would not result in bids for harvest.
- The Council would have the option to not allocate RSA quota for species with little value.

Option Set 3 (3A-3C)

- Both federal and state-permitted vessels should be subject to the same reporting requirements.
- Support for sub-options associated with 3B (those in green).

Option Set 4

- There is a legal gray area for a state to opt out of allowing federally-permitted vessels to participate in federally-approved activities.
- "Opt in" might be a better option than opt out. Providing states flexibility to limit the sectors that can participate may help alleviate administrative burden and encourage states to opt in.
- Federal regulations and permits are helpful for enforcement; some states do not have the capability to enforce some issues with the existing state-issued permit infrastructure.

Option Set 5 (5A-5Ai)

- No recommendation; this should be a state decision.
- Current limitation of 50 federally-permitted vessels per RSA supported project.

Option Set 6 (6A-6B)

- Changing "require" to "allow" would make these requirements a moot point.
- Law enforcement needs to weigh in on this.
- Some discussion that "allow" applied to observers but that "require" pertained to VMS or AIS. These are two very different electronic systems and further discussion needs to occur.
- Overall support for some type of electronic monitoring and the RSC needs to consider/ discuss this further.

Topic #2: How would you allocate/divide the RSA quota?

Dr. Geret DePiper (SSC Economic Work Group)
(NOTE: Full presentation is included in Appendix VII)

Topic 2 Summary

Topic #2 - How would you allocate/divide RSA quota
Top Tier/Highest Priority Questions
1A. RSA applies to all fisheries/species 1B. RSA only for select fisheries/species
2A. Allow specific percentage of projected revenue from species quota sale to be used for research on other species 2B. All revenue from species quota sale can only be used for research related to that species
3A. Funding mechanism should include ability to use both bilateral agreements and third party auctions 3B. Funding mechanism should include the use of only bilateral agreements or third party auctions (only one) 3A-Bi. Conduct periodic review of funding mechanism(s) to determine approach supports or undermines project or program objectives
Secondary Tier Priority Questions
4A. Single species quota lots only 4Ai. Allow specific percentage of revenue from species quota sale to be used for other species research 4Aii. All revenue from species quota sale can only be used for that species 4B. Bundled and single species quota lots
5A. Support short-term projects only (2-3 years max) 5B. Support short- and long-term projects (i.e., monitoring)
6A. Proposals need to identify scientific need and how results will reduce uncertainty 6B. Proposals need to identify how results will address a timely/relevant management issue 6C. Proposals need to include a detailed data sharing/management plan

Topic 2 Discussion Summary

Option Set 1 (1A-1B)

- Agreed that the language for these options should be revised to clarify that it refers to FMPs and species and not fishing sectors (e.g., private recreational fisherman are not a component of the RSA program).
- The Council would have the option to allocate or not any specific species.

Option Set 2 (2A-2B)

- Consensus that funds generated by RSA could be used to support research for any managed species (MAFMC and any other management entity, e.g., ASMFC or NEFMC). This requires additional discussion by the RSC.

Option Set 3

- The Council doesn't have the ability to tell a PI how to monetize a quota but Council could offer guidance or recommendations. This option allows for both bilateral and third party (i.e., auction) agreements.
- 3A and 3Ai —if/when conducting future reviews of the RSA funding mechanism(s), need to include mortality as part of this review to ensure we are minimizing/not

increasing mortality associated with harvest of RSA quota and mortality associated with RSA related research.

Topic #3 - What does an RSA trip look like?

Dr. Lee Anderson (SSC Economic Work Group)
(NOTE: Full presentation is included in Appendix VIII)

Topic 3 Summary

Topic #3 - What does an RSA trip look like
Top Tier/Highest Priority Questions
1A. Compensation harvest completely decoupled from funded research (i.e. vessels harvesting RSA quota are not vessels conducting research) 1B. Compensation harvest decoupled from research activity, but vessels harvesting RSA quota also participate in research trips 1C. Where feasible, compensation harvest is coupled with research activity
2A. Require RSA harvest OF A SPECIFIC SPECIES to occur on separate trips from non-RSA harvest OF THAT SAME SPECIES 2B. Allow both RSA and non-RSA harvest on the same trip
3A. Limit RSA offloads to specific ports in each state 3Ai. Limit RSA sales to specific dealers in each state 3Ai(1). Limit RSA sales to only federally permitted dealers 3B. Require all RSA quota to be offloaded at the same port from pre-trip notification
4. Limit RSA offloads to specific hours (e.g., 6am-8pm)
5A. Require all participating vessels to submit a pre-trip notification 24hrs in advance to declare intent to harvest RSA quota that includes port and anticipated day/time of landing. 5B. Require all vessels to report port of landing, amount of RSA quota onboard, and complete an electronic trip report at least six hours prior to landing
6A. Allow RSA trips to land quota after the regular season closes 6B. Allow RSA trips to increase trip limits during the regular season 6C. Allow RSA trips flexibility in both the timing and landings throughout the year
Secondary Tier of Priority Questions
7A. Unlimited transfer/leasing of RSA quota between vessels 7B. Do not allow transfer/leasing of RSA quota except under catastrophic circumstances. 7C. Allow for one or limited number of transfers/leases of RSA quota between vessels

Topic 3 Discussion Summary

<u>Option Set 1 (1A-1C)</u>

- It is very rare where harvesting activities are integrated into the research activities (option 1C) but the group supports for keeping this option since there is concern for increasing mortality by allowing harvest under the RSA program and the mortality associated with the research.

Option Set 2 (2A-2B)

- Having dedicated trips will likely improve enforceability and administration of the program.
- However, this may increase discards and complicate trips for fishermen.
- "Landing flexibility" allows vessels to possess another state's quota in other states along the coast and was not in place when the previous RSA program was in place which may complicate this option.
- Summary: RSA trips/harvest and non-RSA trips/harvest *for the same species* could not occur on the same trip but harvesting of other species where RSA quota is not used would be allowed. All harvest of a species under a declared RSA trip (e.g., summer flounder) would count against the RSA quota, regardless if under/over the state designated trip limit.
- RSC needs to discuss how to address remnant RSA quota that is not sufficient to justify a separate trip.

Option Set 3 (3A-3B)

- This requirement is feasible and the intent of the program currently.

Option Set 4

- No discussion (RSC indicated this is a state issue and they should identify offload timing requirements based on fishery needs and enforcement capabilities)

Option Set 5 (5A-5B)

- No objection but some thought that both 5A and 5B should both be required for an enforceable program. However, there was considerable concern about requiring an electronic trip report 6 hours before landing since some trips in the Mid-Atlantic are not even 6 hours long.
- eVTRs require reporting (completion of the VTR) before they enter port. Any pre-landing reporting will aid enforcement.
- RSC needs to discuss the 6 hour pre-landing reporting requirement (5B).

Option Set 6 (6A-6C)

- This must be interpreted in the context of all of the other requirements specified earlier.
- This allows flexibility (e.g., after season closure and higher trip limits).

Option Set 7 (7A-7C)

- Not discussed (second tier questions)

Public questions/comment

- Topic 3, Option 2A – maybe one compromise is to specify by species; require harvest of RSA
- What happens if a vessel has a small amount of RSA quota left over? This needs to be addressed.

Wrapping it all up: Summary of Consensus Decisions

Andrew Loftus (workshop facilitator)

- The RSC needs to assemble a summary table comparing elements of the former RSA program to that proposed through this workshop process, particularly addressing the issues that were identified when the old program was discontinued.
- Goals 1-4 were agreed to with the current priority order. Some reordering of objectives under specific goals and some word tweaking were recommended but not major changes.

Topic Areas

- Recommendations made by the RSC were generally agreed to with some clarification and tweaking.
- More discussion is needed on monitoring – electronic and state-observer and the different components of VMS and AIS.
- Possibly provide a state opt-in option (rather than opt out) regarding participation in the RSA program.
- Need to consider a state's ability (or lack of) for regulating a state-permitted vessel participating in a federally approved RSA program; some states lack the authority.
- Include a recommendation "Where feasible, compensation harvest is coupled with research activity."
- Need further refinement of Topic 3, 2A. "Require RSA harvest to occur on separate trips from non-RSA harvest" and the nuances to this in consideration of the impacts on increasing discard of fish. Make sure that it refers to specific RSA species quota.
- General agreement on the need for tight pre-trip notification of an RSA trip (and species) as well as pre-landing notification, although the 6 hour requirement may need to be nuanced.
- At a future meeting, the RSC will be considering all of these discussions and some second tier questions that were not addressed in this workshop before making a recommendation to the Council.

Appendix I. Workshop 4 Agenda

MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

Research Set-Aside Workshop
Workshop Meeting 4

Wednesday, February 16, 2022
9:00 a.m. – 4:00 p.m. EST

Webinar Link: RSA Redevelopment Workshop #4

Meeting Number (Access code): 2338 185 4153; **Password:** 6WQi2whHrX7

Meeting Page: https://www.mafmc.org/council-events/rsa-workshop-4

Purpose

The Mid-Atlantic Fishery Management Council and its Research Steering Committee (RSC) are hosting a Research Set-Aside (RSA) Workshop to help the RSC develop a recommendation to the Council with public input on whether and how to redevelop the Mid-Atlantic RSA program. *The goal of Workshop Meeting 4 is to review the recommendations from the first three meetings and provide input for RSC consideration regarding recommendations for RSA program redevelopment.* For additional background information and details on the other workshops, please visit: https://www.mafmc.org/workshop/rsa.

Briefing Materials

- 2021 RSA Workshop Final Reports: Workshop #1, Workshop #2, and Workshop #3
- RSC Meeting Summary from January 18, 2022
- RSA Decision Tree Tables (posted on the workshop meeting page)
- SSC Economic Work Group Memo: Decision Tree Cost/Benefit and Trade-off Considerations (posted on the workshop meeting page)

Supplemental Materials

- 2014 Program Issues Memo
- 2019 New England Fishery Management Council RSA Program Review (focus on Sections 4 and 6)
- Comprehensive Historical Program Documentation

Agenda

9:00 a.m. – 10:00 a.m.	**Welcome -** Research Steering Committee and Council Chairs
	Ground Rules & Review of Workshop Structure - Andrew Loftus (Facilitator)
	Next steps after this workshop - Michelle Duval, RSC Chair
	Role of the SSC Economic Work Group - Geret DePiper, Economic Work Group Chair
	Workshop 1-3 Recap/brief overview of issues from the previous program - Andrew Loftus
10:00 a.m. – 10:15 a.m.	**Overview of RSC process since last workshop –** Brandon Muffley • **Public questions/comment**
10:20 a.m. – 10:30 a.m.	**Break**
10:30 a.m. – 11:30 a.m.	**Draft Goals of RSA Program –** seek comments on goals for an RSA Program - Brandon Muffley • **Facilitated Discussion** • **Public questions/comment** • **Panel Consensus**
11:30 a.m. – 12:30 p.m.	**Topic 1 – Who is involved in the RSA program? –** Mark Holliday, Economic Work Group • **Review and comments on draft RSC decisions** • **Facilitated Discussion** • **Public questions/comment** • **Panel Consensus**
12:30 p.m. – 1:00 p.m.	**Lunch**
1:00 p.m. – 2:00 p.m.	**Topic 2 – How would you allocate/divide the RSA quota? –** Geret DePiper, Economic Work Group • **Review and comments on draft RSC decisions** • **Facilitated Discussion** • **Public questions/comment** **Panel Consensus**
2:00 p.m. – 3:00 p.m.	**Topic 3 – What does an RSA trip look like? –** Lee Anderson, Economic Work Group • **Review and comments on draft RSC decisions** • **Facilitated Discussion** • **Public questions/comment** • **Panel Consensus**

3:00 p.m. – 3:15 p.m.	**Break**
3:15 p.m. – 3:45 p.m.	**Wrapping it all up: Summary of Consensus Decisions** - Andrew Loftus • **Public Comment**
3:45 p.m. – 4:00 p.m.	**Next Steps -** Michelle Duval
4:00 p.m.	**Adjourn**

Note: agenda topic times are approximate and subject to change

Presentations are not included here for space considerations but can found in the final report posted to the Workshop #4 meeting page at: https://www.mafmc.org/council-events/rsa-workshop-4

Appendix II. Presentation: Process and Timeline for Possible RSA Redevelopment

Appendix III. Presentation: Economic Work Group Overview

Appendix IV. Presentation: Synopsis of RSA Workshop Outcomes

Appendix V. Presentation: Draft Goals of RSA Program

Appendix VI. Presentation: Topic #1 - Who is Involved in the RSA Program?

Appendix VII. Presentation: Topic #2 - How Would You Allocate/Divide RSA Quota?

Appendix VIII. Presentation: Topic #3 - What does an RSA trip look like?

Appendix IX. Workshop 4 Registrants

First Name	Last Name	Affiliation
Panelists		
John	Almeida	NOAA General Counsel
Lee	Anderson	MAFMC Scientific and Statistical Committee (Econ WG)
Chris	Batsavage	MAFMC Research Steering Committee
Bob	Beal	Atlantic States Marine Fisheries Commission
Eleanor	Bochenek	NFI-SMC, Retired Rutgers University
James	Cassin	NOAA Office of Law Enforcement
Laura	Deighan	NMFS GARFO
Geret	DePiper	MAFMC Scientific and Statistical Committee (Econ WG)
Michelle	Duval	MAFMC Research Steering Committee
Pat	Geer	MAFMC Research Steering Committee
Emily	Gilbert	NMFS GARFO
Laura	Hansen	NMFS GARFO
Emerson	Hasbrouck	Cornell University
Dewey	Hemilright	Council Member (Law Enforcement Committee)
Mark	Holliday	MAFMC Scientific and Statistical Committee (Econ WG)
Shannah	Jaburek	NMFS GARFO
Yan	Jiao	MAFMC Scientific and Statistical Committee (Econ WG)
Michael	Lanning	NMFS GARFO
Scott	Lenox	Council Member (Law Enforcement Committee)
Andrew	Loftus	Facilitator
Mike	Luisi	Maryland Dept. of Natural Resources/MAFMC Chair
Brandon	Muffley	MAFMC Staff
Adam	Nowalsky	MAFMC Research Steering Committee
Eric	Powell	Successful applicant/SCEMFIS
Paul	Rago	MAFMC Scientific and Statistical Committee (Econ WG)
Sean	Reilly	NYSDEC Police
Paul	Risi	MAFMC Research Steering Committee
Mary	Sabo	MAFMC staff
Ryan	Silva	NOAA Fisheries/MAFMC Research Steering Committee
Todd	Smith	NOAA Office of Law Enforcement
Jason	Snellbaker	NJ Marine Enforcement Unit/ASMFC LEC
Wes	Townsend	MAFMC Vice Chair
Kate	Wilke	MAFMC Research Steering Committee
General Public and Other Participants		
Katie	Almeida	The Town Dock
Sam	Asci	New England Fishery Management Council staff

Dave	Bethoney	Commercial Fisheries Research Foundation
Bonnie	Brady	Long Island Commercial Fishing Association
Jay	Hermsen	NMFS GARFO
Tara	McClintock	Cornell University Cooperative Extension-Marine Program
Nichola	Meserve	MA Division of Marine Fisheries
Mike	Plaia	AP member - MAFMC, NEFMC, ASMFC
Brad	Schondelmeir	MA Division of Marine Fisheries
Sarah	Turner	NMFS GARFO
Mike	Waine	American Sportfishing Association
Scott	Curatolo-Wageman	Cornell Cooperative Extension

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 25, 2022

To: Council

From: Chris Moore, Executive Director

Subject: Executive Director's Report

The following materials are enclosed for review during the Executive Director's Report at the April 2022 Council Meeting:

1. 2022 Planned Meeting Topics
2. 2023 Council Meeting Dates
3. GARFO Letter: Proposed Rule to Revise Surfclam and Ocean Quahog Recordkeeping and Reporting Regulations (3/3/22)
4. Monte Rome Petition: Nantucket Shoals Essential Fish Habitat Surfclam Closure (1/13/22)
5. NMFS Letter: Response to Monte Rome Petition (3/10/22)
6. Staff Memo: Update on 2022 Monkfish Work Priorities (3/24/22)
7. Press Release: Recreational Harvest Control Rule Framework/Addenda Public Hearings (3/4/22)
8. GARFO Email: Update on Atlantic Sturgeon Bycatch Working Group (3/18/22)
9. CCC Letter: Response to Department of Interior Request for Information to Inform Interagency Efforts to Develop the American Conservation and Stewardship Atlas (2/25/22)
10. Rep. Huffman Statement On Status Of Magnuson-Stevens Act Reauthorization (3/24/22)
11. Public Comment: Opposition to COMPETES Act (3/14/22)
12. Mid-Atlantic Marine Heavy Mineral Sands Forum (3/31/22)

2022 Planned Council Meeting Topics

Updated: 3/21/22

April 5-7, 2022 Council Meeting - Galloway, NJ

- 2023 Golden Tilefish Specifications: Review
- 2023 Blueline Tilefish Specifications: Review
- 2022 Illex Specifications: Review
- Atlantic Mackerel Rebuilding 2.0 Amendment: Approve Alternatives for Public Hearing Document
- ~~Review River Herring and Shad Spatial/Temporal Analyses~~
- Climate Change Scenario Planning: Update
- 2022 Mid-Atlantic State of the Ecosystem Report
- 2022 EAFM Risk Assessment Update
- Research Set-Aside Redevelopment Workshop: Update
- Atlantic Surfclam Genetics Project: Presentation
- Offshore Wind Updates
- Sea Turtle Bycatch in MAFMC Trawl Fisheries: Update and Feedback

May 5, 2022 - Arlington, VA

- Recreational Harvest Control Rule Framework/Addenda: Update (with ASMFC Policy Board)

June 7-9, 2022 Council Meeting - Riverhead, NY

- Recreational Harvest Control Rule Framework/Addenda: Final Action (with ASMFC Policy Board)
- 2023-2025 Chub Mackerel Specifications: Approve
- Mackerel Rebuilding 2.0 Amendment (includes RH/S cap and 2023-2025 Mackerel Specifications): Final Action
- 2023 Longfin Squid Specifications: Review
- 2023 Atlantic Surfclam and Ocean Quahog Specifications: Review
- Aquaculture Policy: Review and Approve
- Research Set-Aside Program Redevelopment: Review Committee Recommendations and Consider Council Action
- Habitat Activities Update (including aquaculture and a preview of Northeast Regional Habitat Assessment products)
- Unmanaged Commercial Landings Report
- Atlantic Large Whale Take Reduction Plan Phase II: Update and Feedback
- EAFM Summer Flounder Management Strategy Evaluation: Model Development and Outputs
- Review spatial revenue analyses from NEFSC related to river herring and shad bycatch

August 8-11, 2022 Council Meeting - Philadelphia, PA

- 2023 Summer Flounder, Scup, and Black Sea Bass Specifications and Commercial Measures: Review (Joint with ASMFC SFSBSB Board)

- 2023 Bluefish Specifications and Recreational Management Measures: Review (Joint with ASMFC Bluefish Board)
- EAFM Summer Flounder Management Strategy Evaluation: Final Results and Recommendations (Joint with ASMFC SFSBSB Board)
- Evaluation of Commercial Scup Discards and Gear Restricted Areas: Review
- Recreational Reform Initiative Technical Guidance Document: Discuss Next Steps (Joint with ASMFC Policy Board)
- Recreational Sector Separation and Catch Accounting Amendment: Discuss Next Steps (Joint with ASMFC Policy Board)
- 2023 Illex Specifications: Approve
- 2023-2024 Butterfish Specifications: Approve
- Offshore Wind Updates
- Climate Change Scenario Planning: Review Scenario Creation Workshop Outcomes and Draft Scenarios

October 4-6, 2022 Council Meeting - Dewey Beach, DE

- 2023 Implementation Plan: Review Draft (Executive Committee)
- Atlantic Surfclam and Ocean Quahog Species Separation Requirements Amendment: Approve Alternatives for Public Hearing Document
- Ocean City Video Project: Review Results
- Private Recreational Tilefish Permitting and Reporting: Review Performance
- Joint Council-SSC Meeting
- Essential Fish Habitat Redo: Initiate Amendment
- Climate Change Scenario Planning: Review Final Scenarios and Generate Recommendations

December 12-15, 2022 Council Meeting - Annapolis, MD

- 2023 Implementation Plan: Approve
- 2023-2026 Spiny Dogfish Specifications: Approve
- 2023 Recreational Management Measures for Summer Flounder, Scup, and Black Sea Bass: Approve (Joint with ASMFC SFSBSB Board)
- Recreational Reform Initiative Technical Guidance Document: Review Draft (Joint with ASMFC Policy Board)
- Recreational Sector Separation and Catch Accounting Amendment: Approve Scoping Document (Joint with ASMFC Policy Board)
- Atlantic Surfclam and Ocean Quahog Species Separation Requirements Amendment: Final Action
- EAFM Risk Assessment Comprehensive Review: Update
- Habitat Activities Update (Including Aquaculture)
- Offshore Wind Updates

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

2022 Council Meeting Topics At-a-Glance

	April	May (ASMFC Spring Mtg)	June	August	October	December
Mackerel, Squid, Butterfish *and* **River Herring and Shad (RH/S)**	• 2022 Illex Specs Review • Mackerel Rebuilding 2.0 Amd: Approve Alternatives		• 2023-2025 Chub Mackerel Specs • 2023 Longfin Squid Specs – Review • RH/S Spatial/ Temporal Analyses • Mackerel Rebuilding 2.0 Amd: Final Action	• 2023 Illex Specs Review • 2023-2024 Butterfish Specs		
Recreational Reform		• Recreational HCR FW/ Addenda: Update	• Rec HCR FW/ Addenda: Final Action	• Rec Reform Technical Guidance Doc: Discuss • Rec Sector Separation and Catch Accounting Amd: Discuss		• Rec Reform Technical Guidance Doc: Review Draft • Rec Sector Separation and Catch Accounting Amd: Approve Scoping Doc
Summer Flounder, Scup, Black Sea Bass (SF/S/BSB)				• SF/S/BSB 2023 Specs Review • Commercial Scup Discards and GRAs: Review		• SF/S/BSB 2023 Rec Mgmt Measures
Bluefish				• Bluefish 2023 Specs and Rec Mgmt Measures Review		
Tilefish	• 2023 Golden Tilefish Specs Review • 2023 Blueline Tilefish Specs Review				• Private Tilefish Permitting/ Reporting Update	
Atlantic Surfclam and Ocean Quahog (SC/OQ)	• Surfclam Genetics Project Presentation		• SC/OQ 2023 Specs Review		• SC/OQ Species Separation Amd: Approve Public Hearing Doc	• SC/OQ Species Separation Amd: Final Action
Spiny Dogfish						• 2023-2026 Dogfish Specs
Science Issues	• RSA Workshop: Update		• RSA Redevelopment: Final Action		• Joint Council-SSC Meeting • Ocean City Video Project: Review Results	

	April	May (ASMFC Spring Mtg)	June	August	October	December
EAFM	• 2022 State of the Ecosystem Report • 2022 EAFM Risk Assessment		EAFM Summer Flounder MSE: Model Development and Outputs	• EAFM Summer Flounder MSE: Review Final Results		• EAFM Risk Assessment Comprehensive Review: Update
Habitat, Aquaculture, Wind	• Offshore Wind Update		• Habitat Update • Aquaculture Policy: Approve	• Offshore Wind Update	• EFH Redo Amd: Initiate	• Habitat Update • Offshore Wind Update
Protected Resources	• Sea Turtle Bycatch: Update		• Atlantic Large Whale Take Reduction Plan Phase II			
Other	• Climate Change Scenario Planning Update		• Unmanaged Commercial Landings Report	• Climate Change Scenario Planning: Review Draft Scenarios	• 2023 Implementation Plan: Draft Deliverables • Climate Change Scenario Planning: Final Scenarios and Recommendations	• 2023 Implementation Plan: Approve

Acronyms/Abbreviations

Amd	Amendment
EAFM	Ecosystem Approach to Fisheries Management
FW	Framework
GRAs	Gear Restricted Areas
HCR	Harvest Control Rule
Mgmt	Management
MSB	Mackerel, Squid, Butterfish
MSE	Management Strategy Evaluation
Rec	Recreational
RH/S	River Herring and Shad
SC/OQ	Atlantic Surfclam and Ocean Quahog
SF/S/BSB	Summer Flounder, Scup, Black Sea Bass
Specs	Specifications
SSC	Scientific and Statistical Committee

Actions Referenced in this Document

- **Mackerel Rebuilding 2.0 Amd:** Atlantic Mackerel Rebuilding 2.0 Amendment
- **Rec HCR FW/ Addenda:** Recreational Harvest Control Rule Framework/Addenda
- **Rec Reform Technical Guidance Doc**: Recreational Reform Initiative Technical Guidance Document
- **Rec Sector Separation and Catch Accounting Amd:** Recreational Sector Separation and Catch Accounting Amendment
- **SC/OQ Species Separation Amendment:** Atlantic Surfclam and Ocean Quahog Species Separation Requirements Amendment

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

2023 Council Meeting Schedule

(As of March 16, 2022)

February 7 – 9, 2023	Hotel Washington 515 15th Street NW Washington, DC 20004
April 4 – 6, 2023	TBD
June 6 – 8, 2023	Hilton Virginia Beach Oceanfront 3001 Atlantic Avenue Virginia Beach, VA 23451
August 7 – 10, 2023	Westin Annapolis 100 Westgate Circle Annapolis, MD 21401
October 3 – 5, 2023	TBD
December 11 – 14, 2023	The Notary Hotel 21 North Juniper Street Philadelphia, PA 19107

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

March 3, 2022

Mike Luisi, Chair
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201,
Dover, DE 19901

Dear Mike:

This letter is to notify the Mid-Atlantic Fishery Management Council of a proposed rule we are preparing that would revise the recordkeeping and reporting regulations for vessels that harvest Atlantic surfclam or ocean quahog. The proposed regulatory changes would be made under the Secretary's rulemaking authority specified in section 305(d) of the Magnuson-Stevens Fishery Conservation and Management Act and would not require Council action to change the Atlantic Surfclam and Ocean Quahog Fishery Management Plan (FMP).

As you know, the surfclam and ocean quahog individual transferable quota (ITQ) fishery has always reported fishing trips using a separate logbook from the standard vessel trip report (VTR) used by other fisheries in our region. When all other commercial fisheries in our region transitioned to all-electronic trip reporting in November 2021, the ITQ clam fleet was advised to temporarily continue using paper logbooks because there was not a suitable electronic reporting option available that fulfilled the unique ITQ fishery requirements. We are currently working on changes to our Fish-Online eVTR reporting application to accommodate the surfclam and ocean quahog ITQ fisheries. Previous efforts to include clam reporting as part of the Northeast Fisheries Science Center's Fisheries Logbook Data Recording Software (FLDRS) version 5 will be discontinued so that the FLDRS program can focus on meeting the needs of the Study Fleet.

We plan to take this opportunity to update, clarify, and reconcile some of the reporting idiosyncrasies that have developed over the long history of this FMP. For example, the current regulations are not explicit about how a surfclam or ocean quahog vessel should report other species they catch incidentally. Our view has been that the vessel operator must report the surfclam or ocean quahog catch on a clam logbook, but also complete a standard VTR to report any other catch. The proposed change to the regulations would eliminate the separate clam logbook, and instead require vessels fishing in the surfclam and ocean quahog ITQ fishery to meet the same trip reporting requirements as our other commercial fisheries, with the addition of a few ITQ-specific questions. This will make it easier to integrate clam reporting into the Fish-Online eVTR app, and allow clam vessels to report their target species as well as any species caught incidentally with a single report.

The proposed action would require all vessel operators to complete the standard eVTR with a few additional fields for surfclam or ocean quahog trips. In practice, a vessel operator would initiate a trip in the Fish-Online app just as they do for any commercial fishing trip. If it's a surfclam or ocean quahog ITQ trip, a few additional fields from the current clam logbook would automatically appear on the trip offload section of the report. Specifically, vessel operators would be asked to report the ITQ allocation number they are fishing under, all of the cage tag numbers associated with those landings, and the price received per bushel. These changes will also make it easier for other eVTR app developers to include surfclam and ocean quahog reporting if they choose, but inclusion of clam-specific fields will not be required for eVTR apps to be certified.

By completing a standard eVTR, clam vessel operators would need to report some information they do not currently report, report other information in a different format, and some information in current reporting regulations would no longer be required. The new data fields include "quantity and size of gear," "average depth," and "operator's permit number." The "date/time sailed" and "date/time landed" fields would replace the current "time at sea" field, and "total hauls" and "average tow duration" would replace "duration of fishing time." The regulations currently include "crew share by percentage" as a required field for the clam logbook. However, that field has not been included on paper logbooks for at least 20 years, possibly longer. Because it has not been collected, we would propose removing this requirement from the regulations, and not trying to start collecting it now. Additional details of all the proposed changes will be described in the proposed rule document.

We welcome Council input on this process and will notify you of the public comment period when a proposed rule publishes. If you have any questions about these potential changes, or would like to provide comment before a proposed rule is published, please contact Doug Potts (Douglas.Potts@noaa.gov).

Sincerely,

Michael Pentony
Regional Administrator

cc: Dr. Chris Moore, Dr. Jon Hare

Intershell International Corp

9 Blackburn Drive

Gloucester, MA 01930

01/13/2022

Memo To: Michael Pentony

Memo From: Monte Rome

Re: Emergency Action Request

Please review the enclosed request for Emergency Action forwarded to the Secretary of Commerce today.

Thanks for your attention to this very pressing issue.

Monte Rome

Monte Rome

Intershell International Corp.

9 Blackburn Drive

Gloucester, MA 01930

01/13/2022

Gina M. Raimondo - Secretary of Commerce

1401 Constitution Avenue NW

Washington, D.C. 20230

RE: Nantucket Shoals Essential Fish Habitat Surf Clam Closure

Emergency Action Requested Per Magnuson 305 (C)

Dear Ms. Raimondo,

My name is Monte Rome and I write you as a N. E. Surf Clam Harvesting Fleet Owner, a Surf Clam Processor and on behalf of the other participants in the American Surf Clam Industry of New England who are all integral parts of the American Surf Clam Industry.

With this letter, I am writing to express to you the dire situation in the Community of Surf Clam Harvesters and Processors who harvest and process the American Surf Clam in the New England area with surf clams from the Nantucket Shoals fishing grounds. Together this Industry has supported hundreds of jobs, many of which have disappeared and more that will continue to disappear because of the lack of raw materials due to the closure of the Nantucket Shoals harvest area for this specie.

The clams from this area have been an important and regenerative (sustainable) food supply for our Country for the past 40 plus years and add greatly to the food security we must maintain with our growing population. It is also the only commercially productive grounds that exist for this area of the Country but represents a negligible part of the ocean covered by the Omnibus Habitat Amendment and OHA2 work. These clams are part of the Essential Fish Habitat (EFH) and occupy this area as Essential Surf Clam Habitat which has been coded by many studies and publications over decades of concern for the impacts of surf clam dredging and habitat effect from the process of harvesting surf clams. As stated, EFH (Essential Fish Habitat) relates to all species and this area is the EFH which supports the spawning, reproduction, and growth to maturity of the American Surf Clam.

The NEFMC and GARFO closed almost all this productive EFH Surf Clam Habitat under OHA2 without an applicable science basis in April of 2019. To date and for many reasons, there has been no scientific evidence of sensitive fish habitat to protect – only speculation upon which the closure is based. The enclosed Habitat PDT Meeting agenda of March 7, 2019 will reveal this lack of information which predicated the closure. While the 'RULE' purporting to allow our businesses to continue with equitable openings of the area, instead the RULE has created an exceptional expense for vessels and a declining supply of this raw material which has affected all

However, one processor with 3 vessels who was extended an Exempted Fisheries Permit (EFP) for research of less than 1% of the area containing clams, has excelled in food production, maintaining his business, and harvesting with great efficiency. This demonstrates the inequity and difference between the designated areas which 'others' were permitted to fish and the EFP holder. The EFP holder is catching more than 4 times the average rate than those who have been relegated to areas dictated by the Regional Administrator at the NEFMC meeting of December 4, 2018. All other vessels, processors, workers, haulers and distributors conducting business as the New England Surf Clam Industry are struggling to maintain their businesses while one participant has excelled. We 'others' are failing in our businesses and failing the American people because of deleterious rule making.

Many of us in the Surf Clam Community spent lengthy days traveling to and attending the several NEFMC PDT (Planning and Development Team) meetings to discuss the issues in 2018 and 2019. However, at the December 2018 NEFMC meeting and without notice the Regional Administrator dictated that we must accept the non-vetted, non-preferred alternative rather than the PDT and Industry vetted and recommended alternative for open areas for fishing.

While our Community has tried every day to make the designated areas provide for our Industry, we are now at the expected precipice and need an immediate **Emergency Action to Open This Area for the next 5 years** while we collect and provide accurate data about the habitat to the NEFMC and GARFO so a suitable rule might be enacted at a later date. Data collection of this type takes many years, and we need all the time requested to collect this data if required.

We need your immediate support for this requested measure which must be undertaken if the NE Surf Clam Industry is to survive. The decline of this Industry is a direct result from the discriminatory and meritless closure of the area which has decimated our staffs and made the future of our Industry and jobs questionable. Please give this issue your immediate and serious attention.

The undersigned will appreciate your swift action in approving this request for Emergency Action. Thank you.

Very truly yours,

Howard Monte Rome

Cc: Janet Coit, NOAA Deputy Administrator

Michael Pentony, Regional Administrator NOAA

Tom Nies, NEFMC Executive Director

Alan Renquirrel, Nantucket Sound Seafood

Sam Martin, Galilean Seafoods

Dan McKiernan, MA. Division of Marine Fisheries

Eric Reed, NEFMC Council Chair

Michelle Bachman, NEFMC Fishery Habitat Analyst

Robbie Gosselin, Gosselin & Sons Trucking

David Costa, Costa Trucking

Congressman Seth Moulton

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910
THE DIRECTOR

March 10, 2022

Mr. Monte Rome
Intershell International Corporation
9 Blackburn Drive
Gloucester, MA 01930

Dear Mr. Rome,

I have received your January 13, 2022, letter to Secretary of Commerce Gina Raimondo regarding surfclam fishing in the Great South Channel Habitat Management Area (HMA). Your letter requests the Secretary to take emergency action to open the HMA to surfclam fishing for the next five years.

Section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) allows the Secretary of Commerce to promulgate emergency regulations when the Secretary finds that an emergency exists involving any fishery. NOAA's National Marine Fisheries Service (NMFS) policy guidance defines an emergency as a situation that: 1) Results from recent, unforeseen events or recently discovered circumstances; 2) presents serious conservation or management problems in the fishery; and 3) can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts on participants to the same extent as would be expected under the normal rulemaking process. The Magnuson-Stevens Act stipulates that any emergency regulations shall remain in effect for not more than 180 days after the date of publication in the *Federal Register*, and may be extended for one additional period of not more than 186 days.

As you know, the New England Fishery Management Council's Habitat Committee discussed the status of the surfclam fishery within the HMA at its January 18, 2022, meeting, and the full Council discussed the issue at its February 1, 2022, meeting. The Council voted to have the Habitat Committee review a progress report from a project that had an exempted fishing permit (EFP) to fish in the HMA, but took no action with regard to requesting that the Secretary take emergency action.

We have evaluated your request for Secretarial emergency action consistent with the requirements of the Magnuson-Stevens Act. However, your request for an emergency rule for a period of five years far exceeds the time limitations of Magnuson-Stevens Act section 305(c) described above. Moreover, the situation you describe in your January 13, 2022, letter does not qualify as an emergency as it does not result from recent, unforeseen events or recently discovered circumstances. The potential for adverse economic impacts from fishing restrictions in the HMA that you have described experiencing were discussed and analyzed in the Environmental Impact Statement prepared for the Council's Omnibus Habitat Amendment 2, which created the HMA. They were also discussed in the Environmental Assessment for the follow-on Clam Dredge Framework Adjustment that established three exemption areas within the HMA that allow fishing for surfclams and blue mussels. To the extent that the New England Fishery Management Council revisits its decisions through the Council process, I urge you to participate and express your views. If you have additional questions about the management of the HMA or the Atlantic surfclam fishery more broadly, please contact Douglas Potts from the Greater Atlantic Regional Fisheries Office Sustainable Fisheries Division (Douglas.Potts@noaa.gov).

Sincerely,

Janet L. Coit
Assistant Administrator for Fisheries

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: March 24, 2022

To: Chris Moore, Executive Director

From: Jason Didden

Subject: Update on 2022 Monkfish Work Priorities

Dr. Rachel Feeney, New England Council Staff and Monkfish Plan Coordinator, led development of this update. Monkfish is a joint Fishery Management Plan (FMP) with New England as lead.

In December 2021, the New England Fishery Management Council (NEFMC) set the following as work priorities for 2022 related to the Monkfish FMP:

- Develop and submit action to adjust monkfish specifications for 2023-2025, including potential modifications to the discard estimation methods based on the recent work done by the Plan Development Team (PDT); consider a 12-inch minimum mesh size for monkfish gillnets; consider requiring VMS for the federal fishery, including evaluation of costs; consider measures to reduce discards in the southern monkfish management area.

- Advisory Panel (AP) and PDT develop a fishery performance report to help the Council/Committee better understand present conditions of the fishery

- Monkfish management track assessment.

This memo contains a progress update on these priorities, including expected timelines. The Monkfish FMP webpage contains more information about this work and the meetings that are being held this year: https://www.nefmc.org/management-plans/monkfish.

MONKFISH MANAGEMENT TRACK ASSESSMENT

The Northeast Fisheries Science Center will conduct a management track assessment for monkfish over the summer, the scope of which will be set by the Assessment Oversight Panel in May 2022. Monkfish was last assessed in 2019. That assessment (and the one in 2016) used a trawl survey index to determine stock status, because the difficulty in aging monkfish precluded use of growth models. Since 2010, both the northern and southern stocks of monkfish are considered not overfished and overfishing is not occurring, but substantial uncertainty in this determination is recognized. The status of the stocks will be revisited with updated data during the 2022 assessment, which will be peer reviewed in September.

FRAMEWORK ADJUSTMENT 13 TO THE MONKFISH FMP

The specifications for fishing years 2023-2025 will be developed through Framework Adjustment 13 to the Monkfish FMP. This action will also include consideration of the potential measures identified in the first bullet above. On February 28, the Monkfish PDT met to begin work on this action, particularly to develop background information on the specifications setting process and to inform the development of the alternatives for the types of management measures identified by the Council.

The NEFMC is expected to formally initiate Framework 13 at its April 2022, meeting. The Monkfish Advisory Panel will meet on May 4 to discuss this action and make recommendations. Work on this action will continue through the remainder of 2022. The PDT will develop recommendations for setting the Acceptable Biological Catch (ABC) following the 2022 assessment. The NEFMC's Scientific and Statistical Committee will meet mid-October to recommend an ABC for each stock. The NEFMC is expected to take final action at its December 2022 meeting, with the MAFMC taking final action the following week.

MONKFISH FISHERY PERFORMANCE REPORT

The PDT and Advisory Panel will collaboratively develop the first monkfish fishery performance report. The PDT has developed a draft outline of this report.

The NEFMC will be briefed on the progress of this work priority at its April 2022 meeting. The PDT is preparing background fishery information for the report. On May 4, 2022, the Advisory Panel is expected to review the draft report and provide their input on: the current state of the fishery; factors influencing fishing effort and markets; impacts of fishing regulations; ideas for improvement; and more. The PDT will then develop a draft of the full report to be reviewed by the Monkfish Committee in May 2022. A social sciences sub-panel of the SSC is expected to review the draft over the summer and the report will be finalized prior to the fall 2022 NEFMC and MAFMC meetings. The report can then be provided to the SSC when they discuss ABCs/ specifications in October 2022.

The Monkfish Committee met on March 24, 2022 to discuss several of the topics in this update, and outcomes of the meeting will be provided in a later update.

MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

PRESS RELEASE

FOR IMMEDIATE RELEASE
March 4, 2022

PRESS CONTACT: Mary Sabo
(302) 526-5261

Public Hearings Scheduled for Recreational Harvest Control Rule Framework/Addenda

The Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission) are considering changes to the process for setting recreational management measures (bag, size, and season limits) for summer flounder, scup, black sea bass, and bluefish. The Council is considering these changes through a framework action. The Commission is considering an identical set of options through draft addenda. Collectively, these management actions are referred to as the *Recreational Harvest Control Rule Framework/ Draft Addenda*.

The Framework/Draft Addenda is intended to provide greater stability and predictability in recreational management measures from year to year and allow for more explicit consideration of stock status. The Framework/Draft Addenda proposes five possible approaches for setting recreational measures. Key differences between the options include the information considered when setting measures (e.g., stock size, recent harvest levels, whether overfishing is occurring) and the circumstances under which measures would change (e.g., a change in stock size, an expected harvest limit overage or underage).

The Commission has scheduled a series of public hearings to gather input on its Draft Addenda. Although the Council's framework development process does not include public hearings, all public comments provided during the Commission's comment period will be considered by both groups before taking final action.

All those interested in the management of the recreational summer flounder, scup, black sea bass, and bluefish fisheries are encouraged to provide input during any of eight virtual public hearings to be held between **March 16** and **April 13, 2022.** Written comments may be submitted through **April 22, 2022**. Please see the Commission's press release for a hearing schedule and instructions for submitting comments.

The Commission's Draft Document for Public Comment provides detailed information about each option under consideration in the Framework/Draft Addenda. Additionally, an Options Reference Guide has been developed to help stakeholders understanding and compare the proposed management options.

Contact: If you have questions or need additional information, please contact Julia Beaty at jbeaty@mafmc.org or (302) 526-5250.

From: Michael Pentony - NOAA Federal <michael.pentony@noaa.gov>
Sent: Friday, March 18, 2022 4:10 PM
To: Moore, Christopher <cmoore@mafmc.org>; Luisi, Michael <michael.luisi@maryland.gov>
Subject: Update on Atlantic Sturgeon Bycatch Working Group

Dear Chris and Mike,

Thank you for your and the Council's comments during the February Council meeting on the Atlantic Sturgeon Bycatch Working Group (ASBWG) and our plans for developing an action plan. The May 27, 2021, Biological Opinion specifically required us to convene a working group to comply with the Incidental Take Statement. As we presented at the February Council meeting, the Federal Advisory Committee Act (FACA) prevents us from accommodating direct participation in the working group from the Councils and Commission, unless we go through the lengthy process of establishing a FACA-compliant working group. This is not possible given the May 27, 2022, deadline for publication of an Action Plan. However, our plan is to release the May document as a draft Action Plan, and provide specific time for the Councils, Commission, and public to provide feedback before we finalize the Plan.

There was some discussion at the Council meeting that the Councils/Commission could contribute additional information or technical advice to the ASBWG. This remains true, though the ASBWG has not identified a specific need at this point in time. If Council members or staff have anything specific for the ASBWG to consider, I encourage you to contact Spencer Talmage (spencer.talmage@noaa.gov, 978-281-9232) to determine if it is additional/new information and how and when to submit it.

The draft Action Plan currently under development by the ASBWG will provide a set of recommendations to the Councils as guidance for the reduction of Atlantic sturgeon bycatch in the Federal large-mesh gillnet fisheries. We will distribute the draft Action Plan as soon as possible after completion, so that it may be subject to review by the Councils, Commission, and general public preferably during the June Council meetings. We will likely request feedback by later in the summer so that we may finalize the Action Plan and provide the final document to the Councils in advance of the September and October meetings. This would allow the Councils to consider which actions may be incorporated into the priority-setting process for 2023. We envision that the Councils may make decisions as to how they will proceed during this priority-setting process for 2023. We will be available to present the draft Action Plan at the June Council meetings and at the ASMFC's August meeting and, if requested, we can present the final Action Plan in the fall.

We appreciate your feedback and hope that the action plan is an effective tool to help us work together to reduce bycatch of Atlantic sturgeon. Please let me know if you have any questions.

Mike

--
Michael Pentony
Regional Administrator
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930
Phone: 978-281-9283

February 25, 2022

The Honorable Debra Haaland
Secretary of the Interior
Department of the Interior
1849 C. Street, N.W.
Washington, DC 20230

Dear Secretary Haaland:

Please accept these comments from the Council Coordination Committee (CCC) regarding the Request for Information (RFI) to inform how the American Conservation and Stewardship Atlas (Atlas) can best serve as a useful tool for the public and how it should reflect a continuum of conservation actions in the America the Beautiful (ATB) initiative.

The CCC represents the shared interests of the U.S. Regional Fishery Management Councils (Councils). Established through Federal statute in 1976, the Councils manage the most broadly distributed activity in U.S. Federal waters -- fishing. The Councils use sound science in applying scale-appropriate, adaptive, stakeholder-driven approaches to fisheries management, including developing special use and restricted zones in U.S. Federal waters that occur along the conservation continuum contemplated under ATB.

The Councils already apply a process that adheres closely to the eight ATB key principles for conserving and restoring land and waters. All Council conservation areas are established using a collaborative and inclusive approach, where people have worked together to conserve the health and productivity of marine resources (Principle 1). These areas provide conservation of relatively undisturbed natural places in the U.S., and yield meaningful benefits to all Americans, including providing healthy sustainable protein that is available and affordable to a broad range of U.S. consumers (Principle 2). While the Exclusive Economic Zone (EEZ) is owned by the nation (not private landowners as on land), the Councils work closely with fishermen and stakeholders in each region to ensure effective stewardship of these areas, fisheries, and the ecosystem (Principle 6). Conservation areas are established to create jobs, support productive fisheries, and support vibrant coastal communities (Principle 5). All conservation areas are established using the best scientific information available (Principle 7) and are developed to be flexible and adaptive to adjust to a changing climate and availability of new scientific information (Principle 8). Further, because the Councils operate through a stakeholder driven process, some conservation areas are developed using locally led or locally designed conservation efforts (Principle 3) and other areas have been developed to support priorities of tribal nations and communities (Principle 4).

The first step in establishing a database of conservation areas is to define the term 'conservation area.' From the CCC's perspective, a conservation area is an established, geographically defined area, with planned management or regulation of activities that provides for the maintenance of biological productivity and biodiversity, and ecosystem function and services (including providing recreational opportunities and healthy, sustainable seafood to a diverse range of consumers). The CCC also emphasizes that many conservation areas can achieve conservation goals without prohibiting all fishing activity as the overall health of fish stocks and ecosystems are also managed through science-based annual catch limits, gear restrictions, and other tools to support and conserve marine habitat.

The Atlas should include the best available data to support the ATB initiative. The Councils are experts in the data that is available to support decision making in the U.S. Federal waters, particularly data on fisheries and habitat. Councils have noted that the Protected Seas database developed in coordination with the National Ocean Service does not accurately reflect all conservation areas established to regulate fisheries in the EEZ. That database should not be used as the sole, authoritative source in development of the Atlas for Council managed areas.

The Atlas preparers should utilize the expertise of the Councils and the CCC report being prepared on conservation areas. A preliminary report to the CCC in October 2021 showed that there are at least 663 Council-implemented conservation areas in the U.S. EEZ, and all bottom tending fishing gears have been prohibited in more than 54% of the EEZ. Details on these areas are being compiled. The Council's comprehensive evaluation of these conservation areas relative to the goals of ATB will be complete and ready to incorporate into the Atlas in June 2022, after being presented at the May 2022 CCC Meeting.

The report will review the area-based management in the Councils and NOAA Fisheries purview, inform the five questions posed in the RFI notice, address the eight principles in the Executive Order, and provide the data needed for the Atlas.

At this time the CCC offers the following recommendations. The Atlas needs to be more than just a database. It should describe the conservation activities in different regions of the U.S., reflect the continuum along which those activities are applied, and assess the risks to biodiversity given the current conservation and management programs in place. The Atlas should be more than an accounting of whether we have reached 30% conservation target by 2030. It should tell the story of how different types of conservation measures in the U.S. benefit the environment, the economy, and provide access and opportunity to our communities, including those that are underserved. The Atlas also needs to be more than just a baseline, it should be a living document. Like the Council process, it should have the flexibility to be nimble and adapt to a changing environment.

The CCC should be an active partner in this effort. Toward that end, we request you put a placeholder for input on the Fishery Management Councils' conservation actions in U.S. Federal waters, with the intention of using the CCC report when it is available in June 2022. Our CCC Area-Based Management Subcommittee will be available to answer questions and engage with you to support incorporating this information into the American Conservation and Stewardship Atlas.

Please feel free to reach out to the current CCC Chair, Michael Luisi at michael.luisi@maryland.gov if you have any questions about this request.

Sincerely,

Mike Luisi, Chair
Mid-Atlantic Fishery Management Council

Eric Reid, Chair
New England Fishery Management Council

Melvin Bell, Chair
South Atlantic Fishery Management Council

Dale Diaz, Chair
Gulf of Mexico Fishery Management Council

Marcos Hanke, Chair
Caribbean Fishery Management Council

Simon Kinneen, Chair
North Pacific Fishery Management Council

Marc Gorelnik, Chair
Pacific Fishery Management Council

Archie Taotasi Soliai, Chair
Western Pacific Fishery Management Council

Cc: C. Moore, T. Nies, J. Carmichael, M. Rolón, C. Simmons, M. Burden, D. Witherell, K. Simonds, E. Werwa, J. Coit, H. Sagar

REP. HUFFMAN STATEMENT ON STATUS OF MAGNUSON-STEVENS ACT REAUTHORIZATION

MARCH 24, 2022

Washington, D.C. – Today, Congressman Jared Huffman (D-San Rafael) released the following statement regarding the status of his Magnuson-Stevens Act (MSA) reauthorization legislation, the *Sustaining America's Fisheries for the Future Act*, in light of Congressman Don Young's passing:

"Over the past three years, I have worked to update and reauthorize the Magnuson-Stevens Act – traveling coast to coast to hear from stakeholders, releasing discussion drafts for public review, and partnering with lawmakers from across the country in what has been a uniquely inclusive and comprehensive process. As part of this effort, I have had the privilege to work closely with the MSA's original author, Congressman Don Young," **said Rep. Huffman.** "Although we often differed politically, we were always able to have productive conversations when it came to fisheries management, and he was a brilliant negotiator for this landmark bill. His death is a tremendous loss for Alaska, the country, and all of us who had the honor of working with him. I've always said it's important all voices be heard in this MSA reauthorization process – and so, we will be pausing further committee consideration of the legislation until his replacement is elected and we can ensure the voices of the Alaskan people are represented before the bill advances further through the House. I am grateful for the progress Rep. Young and I accomplished together as we neared the finish line with this bill, and I look forward to finalizing it with whomever takes the torch from the venerable Don Young."

More information on the *Sustaining America's Fisheries for the Future Act* and the reauthorization process can be found here.

From: John Whiteside <john@jwhiteside.com>
Sent: Monday, March 14, 2022 4:24 PM
To: Luisi, Michael <michael.luisi@maryland.gov>; Moore, Christopher <cmoore@mafmc.org>
Subject: opposition to the COMPETES Act
Importance: High

Good afternoon gentlemen.
I'm hearing that the COMPETES Act is gaining traction in Congress. It's being pitched as the 'China Bill'. If enacted, Section 71103 (Shark Fin Sales Elimination) will usurp the Federal Fishery Management Plans for spiny dogfish, skate and all other shark fisheries in the US.
It is vital that the Mid-Atlantic Council take a stand opposing Section 71103.

Please let me know if I can be of assistance.

Regards,
John

John F. Whiteside, Jr.
Law Office of John F. Whiteside, Jr., P.C.
678 State Road
Dartmouth, MA 02747
Phone: (508)991-3333
www.JWhiteside.com

Mid-Atlantic Marine Heavy Mineral Sands Forum
Virginia Department of Energy and the U.S. Bureau of Ocean Energy Management

March 31, 2022 – 9am – 4:30pm (EST)
Virtual format – *Cisco Webex*

The Virginia Department of Energy (Virginia Energy), in collaboration with the U.S. Bureau of Ocean Energy Management (BOEM), is developing a feasibility study for the recovery of economic minerals from marine sand deposits, ideally as an integral part of coastal resilience projects. Economic minerals include critical minerals[1] containing titanium, zirconium, and rare earth elements, as well as other valuable commodities such as garnet, sillimanite minerals, and precious metals. Among the key factors we are considering as part of the study are alternative methodologies for mining and economic mineral separation, potential environmental impacts at mining and processing locations, current Federal, State, and local regulatory requirements that apply to mining and mineral recovery operations in coastal and offshore areas, and impacts on stakeholders with interests in coastal and marine policymaking.

Purpose:

The goals of the Forum are to convene scientists and stakeholders from Federal, State, and local government and industry to gather information pertaining to: 1) the Federal, State, and local permitting and regulatory framework that impacts mining and mineral extraction operations in coastal and offshore areas; 2) environmental standards and best practices for management of marine seafloor mineral resources on the Continental Shelf; and 3) logistical criteria and economic feasibility for mining of critical commodities as part of ongoing coastal resilience projects. From this Forum, we will cultivate a list of questions and data needs to help inform our feasibility study, potentially leading to future cooperative studies.

The Forum will be held on March 31, 2022 from 9:00 am to 4:30 pm Eastern Standard Time (EST) and will be conducted in a virtual format, moderated by Virginia Energy, using the Cisco Webex video conferencing platform. The draft agenda includes speakers whom have been involved with offshore marine minerals and/or critical mineral assessments, particularly in the Mid-Atlantic region. Invited speakers will share experiences related to the mapping, assessment, and recovery of mineral sand resources, including sands for beach replenishment and economic heavy minerals.

1 – Nassar, N.T., and Fortier, S.M., 2021, Methodology and technical input for the 2021 review and revision of the U.S. Critical Minerals List: U.S. Geological Survey Open-File Report 2021–1045, 31 p., https://doi.org/10.3133/ ofr20211045.

Objectives and Outcomes:

Utilizing a virtual format, we have grouped presentations into five (5) session themes:

1) An overview of critical mineral commodities associated with marine mineral sands and the feasibility of extracting mineral resources;
2) Current offshore sand mining operations for beach replenishment;
3) Federal and State regulatory framework and permitting requirements;
4) Environmental standards and best practices; and
5) Current technologies for heavy minerals assessment.

We will cover each of these topics at a relatively high level to allow for a comprehensive scoping of additional informational needs. There will be multiple discussion and information sharing opportunities throughout the day. We will emphasize applications and scenarios focused on economic mineral extraction from a sand replenishment source area under the currently known permitting and regulatory framework.

South Atlantic Fishery Management Council
Update and Liaison Report

Spring 2022

The South Atlantic Fishery Management Council (Council) met in Jekyll Island, Georgia, March 7-11, 2022.

Below is a summary of the Council's actions:

Acceptable Biological Catch Control Rule Amendment
Staff presented the most recent actions and alternatives language drafted by the IPT concerning the acceptable biological catch (ABC) control rule (with focus on the stock risk rating), carry-overs, and revisions to framework procedures. The SSC Chair provided SSC recommendations. The Council provided direction to staff for further development of the amendment. The draft amendment will be reviewed and considered for public hearings at the June 2022 Council meeting.

Allocations Decision Tool
The tool involves a decision tree approach and online tool to assist the Council in incorporating multiple types of information into sector allocation decisions. The Council reviewed the approach at a special meeting on February 7, 2022 and discussed an example of how to apply the approach to greater amberjack. At the March meeting the Council further discussed the approach, potential changes, and how to use the tool moving forward. The Council directed staff to develop an additional online tool to collect public input on topics relevant to allocations and long-term trends in the fisheries and to update Fishery Performance Report discussion questions to gather more input on social and economic factors. The decision tree approach and online tool will be applied to Spanish mackerel for review by the Council at the December 2022 meeting.

Commercial Electronic Logbook Amendment
The Council directed staff to begin work on an amendment that would authorize NMFS to implement electronic reporting for commercial fisheries managed by the South Atlantic Council. The Council will review an options paper at the June 2022 meeting.

SEDAR Items
The Council approved the terms of reference for the Yellowtail Snapper Interim Analysis.

Dolphin Wahoo Regulatory Amendment 2
This amendment includes measures to extend the applicable geographic range of the minimum size limit, establish separate recreational retention limits onboard for-hire and private vessels, and remove or reduce captain and crew bag limits for dolphin. The Council approved the amendment for public scoping and will review the amendment at the June 2022 meeting.

Atlantic King Mackerel (CMP Amendment 34)
This amendment includes measures to update catch levels for Atlantic king mackerel based on the most recent assessment and modify recreational management measures, including increasing the bag limit in federal waters off Florida and modifying the requirement to land fish with heads and fins intact. The Council reviewed draft rationale and approved the following definition: damaged fish refers to king or Spanish mackerel that are damaged only through natural predation. The Council approved the amendment for formal review.

Snapper Grouper Amendments
Release Mortality Reduction & Red Snapper Catch Levels
In December 2021, the Council directed staff to investigate management measures that could reduce mortality of released snapper grouper species and the frequency of encounters with fish that cannot be kept. By implementing a measure to reduce such encounters, the Council also intends to reduce discards of red snapper, possibly resulting in revision of the SSC's recommended ABC for red snapper. Staff presented an overview of the magnitude of the discard problem in the snapper grouper fishery and a summary of benefits and challenges of management measures considered thus far. The Council formally initiated Regulatory Amendment 35 to reduce snapper grouper releases, initially developing options based on time, area, and depth restrictions, and to implement catch levels for red snapper based on the most recent SSC recommendation. Staff will gather available information and present it to the Council in June 2022. The Council will then provide additional direction for development of management alternatives.

Recreational Reporting/Permitting Amendment (Amendment 46)
The Council received recommendations from the Private Recreational Reporting Workgroup, which met five times in 2021 and 2022, and discussed resuming development of Amendment 46 to establish a permit and reporting requirements for the private recreational snapper grouper fishery in the South Atlantic region. An Ad Hoc Advisory Panel will be appointed in June 2022 and the Council will resume discussion of the amendment at their September 2022 meeting.

Wreckfish ITQ Modernization (Amendment 48)
This amendment addresses recommendations from the 2019 review of the Wreckfish ITQ Program and revises the objectives for the Snapper Grouper FMP. The amendment is expected to take some time to develop due to the nature of some of the actions under considerations (e.g., moving away from a paper coupon-based program to an electronic program). Staff reviewed a decision document with updated actions and alternatives for consideration. The Council approved the range of actions which address sector allocations, electronic reporting, the

wreckfish permit, season and spawning closures, vessel monitoring requirements, offloading sites and times, and cost recovery.

Snowy Grouper (Amendment 51)
The amendment adjusts catch levels based on the latest stock assessment (SEDAR 36 Update). Snowy grouper are overfished and undergoing overfishing. A rebuilding plan is currently in place and is not being modified. The Council removed consideration of a spawning season closure for the commercial sector and requested additional input from the Snapper Grouper AP on commercial trip limit modifications and consideration of regional management. The Council also picked preferred alternatives to facilitate analysis for the ACL/ABC, allocations, and commercial trip limit actions. Additionally, a Citizen Science project is being explored to obtain additional data on snowy grouper. The Council is expected to approve the amendment for public hearings in June 2022.

Golden Tilefish and Blueline Tilefish (Amendment 52)
The amendment increases catch levels for golden tilefish based on the latest stock assessment (SEDAR 66), revises sector allocations, and considers changes to commercial management measures (fishing year and trip limits) and recreational post-season accountability measures. The Council directed staff to convene a meeting of the golden tilefish commercial longline endorsement holders to discuss way to improve management of that gear sector. There are 23 vessels in the South Atlantic that hold such endorsements. The amendment also includes actions to modify recreational management measures for blueline tilefish (reduce the bag limit, prohibit retention by captain and crew on for-hire vessels, and modify the recreational season) and revise the post-season recreational accountability measure. The Council is expected to approve the amendment for public hearings in June 2022.

Gag (Amendment 53)
The amendment responds to the latest stock assessment (SEDAR 71). Gag are overfished and undergoing overfishing. The amendment would establish a 10-year rebuilding plan, adjust catch levels and management measures to end overfishing. During the March meeting the Council reviewed a novel allocation method, removed options to modify the minimum size limit for both sectors, and modified the range of options for the recreational vessel limit. In addition, the Council removed consideration of restrictions to spearfishing gear and picked preferred actions to facilitate analysis for the rebuilding plan and ACL/ABC Actions. The Council is expected to approve the amendment for public hearings in June 2022.

Greater Amberjack (Amendment 49)
The amendment adjusts catch levels in response to the latest stock assessment (SEDAR 59). Greater amberjack are not overfished and overfishing is not occurring. The Council indicated their preference to retain the current recreational minimum size limit and explore additional sector allocation alternatives. In addition, the Council requested AP input on the commercial minimum size limit, commercial seasonal trip limits, and April spawning closure. The Council approved the draft amendment for public hearings, which will be conducted during the public comment session at the June 2022 Council meeting.

New England Fishery Management Council Meeting Agenda
Tuesday - Thursday, April 12-14, 2022
Hilton Hotel, 20 Coogan Boulevard, Mystic, CT 06355
tel: (860) 572-0731 | Hilton Mystic
Webinar Registration Option

Sending comments? Written comments must be received at the New England Fishery Management Council (NEFMC) office no later than 8:00 a.m., Thursday, April 7, 2022 to be considered at this meeting. Please address comments to Council Chair Eric Reid or Executive Director Tom Nies at: NEFMC, 50 Water Street, Mill 2, Newburyport, MA 01950. Email submissions should be sent to comments@nefmc.org.

IMPORTANT: *The Council will hold its April 2022 meeting at the Hilton Hotel in Mystic, CT. This will be a hybrid meeting with in-person participation coupled with a webinar option for individuals who cannot or prefer not to attend in person. The Council continues to follow all public safety measures related to* ***COVID-19*** *and intends to do so for this meeting. The Council is encouraging all in-person participants to wear masks in the meeting room except when seated. Additional spacing between seats will be provided to allow for social distancing. Please participate remotely if you are experiencing COVID symptoms or do not feel well. Updates will be posted on the Council's* ***April 2022 meeting webpage****.*

PUBLIC COMMENTS: *The Council's "Guidelines for Providing Public Comments" can be found* ***here****. Anyone interested in speaking during the open period for public comment on Thursday, April 14, 2022 at 9:30 a.m. should fill out the sign-up sheet on the table at the entrance to the Council meeting room. To speak remotely, email Janice Plante at jplante@nefmc.org to get on the list.*

Tuesday, April 12, 2022

1:00 p.m. **Announcements and Council Introductions** (Chair Eric Reid)
Brief announcements and short introductions by individual Council members and staff

1:15 **Reports on Recent Activities**
Council Chair, Council Executive Director, Greater Atlantic Regional Fisheries Office (GARFO) Regional Administrator, National Oceanic and Atmospheric Administration (NOAA) General Counsel, Northeast Fisheries Science Center (NEFSC), Mid-Atlantic Fishery Management Council (MAFMC), Atlantic States Marine Fisheries Commission (ASMFC), U.S. Coast Guard, NOAA Enforcement, ICCAT Advisory Committee/Highly Migratory Species Advisory Panel

2:45 **Monkfish Committee Report** (Libby Etrie)
Framework 13: initiate action for 2023-2025 fishery specifications and other measures

3:45 **Habitat Committee Report** (Council Chair Eric Reid)
(1) Habitat Areas of Particular Concern (HAPCs): final action on framework to designate a new HAPC in Southern New England; (2) Offshore Energy, Aquaculture, Cables, and Habitat-Related Work: update; (3) Coast Guard Approaches to Maine, New Hampshire, and Massachusetts Port Access Route Study: approve Council comment letter; (4) NOAA Fisheries/BOEM Draft Federal Survey Mitigation Implementation Strategy: review and comment on the strategy, which describes the approach the agencies will use for mitigating the impacts of wind energy development on NOAA Fisheries surveys

Wednesday, April 13, 2022

9:00 a.m. **Scallop Committee Report** (Melanie Griffin)
Scallop Survey Working Group: update; Evaluation of Rotational Management Program: update on next steps; Limited Access Leasing: potential approval of scoping document

10:30 **Sea Turtle Bycatch in Trawl Fisheries** (Carrie Upite, GARFO)
GARFO recap of NOAA Fisheries action to develop bycatch reduction measures to reduce takes of sea turtles in trawl fisheries; Council comments

11:15 **Northeast Trawl Advisory Panel** (Dr. Mike Sissenwine)
Report on results of March 2022 meeting

11:30 **Research Track Assessments** (Dr. Russ Brown, NEFSC)
Presentation on peer review results for research track assessments for: (1) Gulf of Maine haddock; and (2) *Illex* squid and butterfish

12:30 p.m. **Lunch Break**

1:45 **Maximized Retention Electronic Monitoring** (Jonathan Labaree, Liz Moore, GMRI)
Presentation on the Gulf of Maine Research Institute's (GMRI) Maximized Retention Electronic Monitoring Program for Groundfish Monitoring Amendment 23

2:45 **Groundfish Committee Report** (Rick Bellavance)
Framework 65: initiate action to include (1) 2023 total allowable catches (TACs) for U.S./Canada shared resources on Georges Bank; (2) 2023-2024 specifications for GB cod and GB yellowtail flounder; (3) 2023-2025 specifications for 14 additional groundfish stocks; (4) revised rebuilding plans for Gulf of Maine cod and Southern New England/Mid-Atlantic winter flounder; (6) additional measures to promote stock rebuilding; and (7) acceptable biological catch (ABC) control rule revisions; Potential Changes to Groundfish Priorities: discuss committee recommendations for how to address changes to cod management units

Thursday, April 14, 2022

9:00 a.m. **Atlantic Mackerel** (Jason Didden, Mid-Atlantic Fishery Management Council staff)
Presentation on Mid-Atlantic Council alternatives to rebuild Atlantic mackerel; Council comments

9:30 **Open Period for Public Comment**
Opportunity for the public to provide brief comments on issues relevant to Council business but not listed on this agenda (please limit remarks to 3-5 minutes)

9:45 **State of the Ecosystem 2022** (Dr. Sean Lucey, NEFSC)
Presentation on the Northeast Fisheries Science Center's State of the Ecosystem 2022 New England report

10:45 **Scientific and Statistical Committee (SSC)** (SSC Chair Dr. Lisa Kerr)
Receive SSC's recommendations on the State of the Ecosystem 2022 report; Council discussion

11:15 **Ecosystem-Based Fishery Management (EBFM) Committee** (John Pappalardo)
EBFM Public Information Workshops: update on workshop outreach and planning, introduction to workshop facilitator; Prototype Management Strategy Evaluation (MSE): committee recommendations on a plan to conduct a Prototype MSE for EBFM and the Georges Bank example Fishery Ecosystem Plan (eFEP)

12:30 p.m. **Lunch Break**

1:30 **Atlantic Herring** (GARFO staff)
Update on status of the Industry-Funded Monitoring (IFM) Program for the Atlantic herring fishery; Council discussion

2:15 **Other Business**

Times listed next to the agenda items are estimates and are subject to change.
This meeting is being held in person and by webinar. Council member financial disclosure forms are available for examination on the Council website.

Although other non-emergency issues not contained on this agenda may come before this Council for discussion, those issues may not be the subject of formal action during this meeting. Council action will be restricted to those issues specifically listed in this notice and any issues arising after publication of this notice that require emergency action under section 305 (c) of the Magnuson-Stevens Act, provided the public has been notified of the Council's intent to take final action to address the emergency.

Documents pertaining to Council actions are available for review prior to a final vote by the Council.
Please check the Council's website, www.nefmc.org, or call (978) 465-0492 for copies.
This meeting will be recorded. Consistent with 16 USC 1852, a copy of the recording is available upon request.