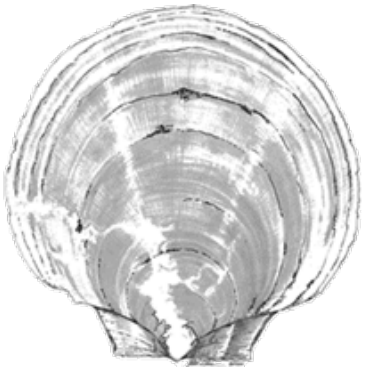
Scallop Fishery Management Plan

Framework Adjustment 33

Including an Environmental Assessment and

Regulatory Flexibility Analysis



DRAFT

January 15, 2021

Prepared by the

New England Fishery Management Council

In consultation with the

National Marine Fisheries Service

New England
Fishery Management Council

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FRAMEWORK ADJUSTMENT 33 TO THE ATLANTIC SEA SCALLOP FISHERY MANAGEMENT PLAN

Proposed Action: Propose updated fishery specifications for FY 2021 and FY 2022 (default) with corresponding management measures, and manage removals from the NGOM management area.

Responsible Agencies:

New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, MA 01950

National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Washington, D.C. 20235

For Further Information:

Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, Massachusetts 01950
Phone: (978) 465-0492
Fax: (978) 465-3116

Abstract:

The New England Fishery Management Council, in consultation with NOAA's National Marine Fisheries Service, has prepared Framework Adjustment 33 to the Atlantic Sea Scallop Fishery Management Plan, which includes a final environmental assessment that presents the range of alternatives to achieve the goals and objectives of the action. The proposed action focuses on setting scallop fishery specifications for fishing years 2021 and 2022 (default). The document describes the affected environment and valued ecosystem components and analyzes the impacts of the alternatives on both. It addresses the requirements of the National Environmental Policy Act, the Magnuson Stevens Fishery Conservation and Management Act, the Regulatory Flexibility Act, and other applicable laws.

1.0 EXECUTIVE SUMMARY

2.0 TABLE OF CONTENTS

2.1 TABLES

2.2 FIGURES

2.3 MAPS

2.4 ACRONYMS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
AIM	An Index Method of Analysis
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
ANPR	Advanced Notice of Proposed Rulemaking
AP	Advisory Panel
APA	Administrative Procedures Act
APL	Annual Projected Landings
ASMFC	Atlantic States Marine Fisheries Commission
B_{MSY}	Biomass that would allow for catches equal to Maximum Sustainable Yield when fished at the overfishing threshold (FMSY)
BiOp, BO	Biological Opinion, a result of a review of potential effects of a fishery on Protected Resource species
CAI	Closed Area I
CAII	Closed Area II
CEQ	Council on Environmental Quality
CPUE	Catch per unit of effort
d/K	Discard to kept catch ratio
DAM	Dynamic Area Management
DAS	Day(s)-at-sea
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	Exclusive economic zone

EFH	Essential fish habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	Fishery management plan
FW	Framework
FY	Fishing year
GARFO	Greater Atlantic Regional Fisheries Office
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	Gross registered tons/tonnage
HAPC	Habitat area of particular concern
HPTRP	Harbor Porpoise Take Reduction Plan
IFM	Industry-funded monitoring
IFQ	Individual fishing quota
ITQ	Individual transferable quota
IVR	Interactive voice response reporting system
IWC	International Whaling Commission
LOA	Letter of authorization
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	Marine protected area
MRI	Moratorium Right Identifier
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
NEAMAP	Northeast Area Monitoring and Assessment Program
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NLS-N	Nantucket Lightship North
NLS-S-deep	Nantucket Lightship South Deep
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	Optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area

SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAS	Stock Assessment Subcommittee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	Spawning stock biomass
SSC	Scientific and Statistical Committee
TAL	Total allowable landings
TED	Turtle excluder device
TEWG	Technical Expert Working Group
TMS	Ten minute square
TRAC	Transboundary Resources Assessment Committee
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
VEC	Valued ecosystem component
VPA	Virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
YPR	Yield per recruit

3.0 BACKGROUND AND PURPOSE

3.1 BACKGROUND

This framework to the Scallop Fishery Management Plan (FMP) sets fishery specifications for fishing year (FY) 2021 and default measures for FY 2022. The New England Fishery Management (Council) decided to develop a one-year action only, including default measures for Year 2 (FY2022).

The list of measures routinely addressed as part of scallop specifications has increased over the years to include overall annual catch limits, specific allocations for both limited access (LA) and limited access general category (LAGC) vessels. Below is a list of the measures included in scallop fishery specifications:

- Overfishing Limit (OFL) and Acceptable Biological Catch (ABC), which is approved by the SSC;
- Annual Catch Limits (ACL) (for both the limited access and limited access general category fisheries, Annual Catch Target (ACT) for the LA fishery; and Annual Projected Landings (APL) for LA and LAGC;
- Allocations for limited access vessels include DAS allocations, access area allocations with associated possession limits;
- Allocations for limited access general category vessels include an overall IFQ for both permit types, as well as a fleet wide, area-specific maximum number of access area trips available for the general category fishery;
- NGOM TAC(s);
- Incidental catch target-TAC; and set-aside of scallop catch for the industry funded observer program and research set-aside program.

The Council also has included other management measures for consideration in this action, such as measures to mitigate impacts on Georges Bank yellowtail flounder and Northern windowpane flounder.

3.2 PURPOSE AND NEED

This Framework (FW33) is intended to set specifications and to adjust management measures for the Atlantic Sea Scallop fishery. The need for this action is to achieve the objectives of the Atlantic Sea Scallop FMP to prevent overfishing and optimize yield by improving yield-per-recruit from the fishery, to manage total removals from the Northern Gulf of Maine management area, and to mitigate impacts on Georges Bank yellowtail flounder.

The purpose for this action is to set specifications including: OFL, ABC, scallop fishery ACLs and ACTs including associated set-asides, day-at-sea (DAS) allocations, general category fishery allocations, and area rotation schedule and allocations for the 2021 fishing year, as well as default measures for FY2022 that are expected to be replaced by a subsequent action (Table 1).

Table 1. Purpose and need for Framework 33.

Purpose	Need
To set specifications including: OFL, ABC, scallop fishery ACLs and ACTs including associated set-asides, day-at-sea (DAS) allocations, general category fishery allocations, and area rotation schedule and allocations for the 2021 fishing year, as well as default measures for FY2022 that are expected to be replaced by a subsequent action.	To achieve the objectives of the Atlantic Sea Scallop FMP to prevent overfishing and improve yield-per recruit from the fishery.
To set landing limits for the LA and LAGC components in the Northern Gulf of Maine management area based on exploitable biomass.	To manage total removals from the Northern Gulf of Maine management area.

3.3 SUMMARY OF ANNUAL CATCH LIMITS

Amendment 15 (2011) established a method for accounting for all catch in the scallop fishery and included designations of Overfishing Limit (OFL), ABC, ACLs, and Annual Catch Targets (ACT) for the scallop fishery, as well as scallop catch for the Northern Gulf of Maine (NGOM), incidental, and state waters catch components of the scallop fishery. The scallop fishery assessment will determine the exploitable biomass, including an assessment of discard and incidental mortality (mortality of scallops resulting from interaction, but not capture, in the scallop fishery).

The OFL is specified as the level of catch and associated fishing mortality rate (F) that, above which, overfishing is occurring. The OFL will account for landings of scallops in state waters by vessels without Federal scallop permits. The 2020 management track assessment set the OFL equivalent to F = 0.61. To account for scientific uncertainty, ABC is set at a level with an associated F that has a 25-percent probability of exceeding the F associated with OFL (i.e., a 75-percent probability of being below the F associated with the OFL).

The ACL is equal to the ABC in the Scallop FMP. The 2020 management track assessment determined that the F associated with the ABC/ACL is F=0.45. Set-asides for observer and RSA are removed from the ABC (1 percent of the ABC/ACL and 1.25 mil lb. (567 mt) respectively). After those set-asides are removed, the remaining available landings (allocation) is divided between the LA and LAGC fisheries

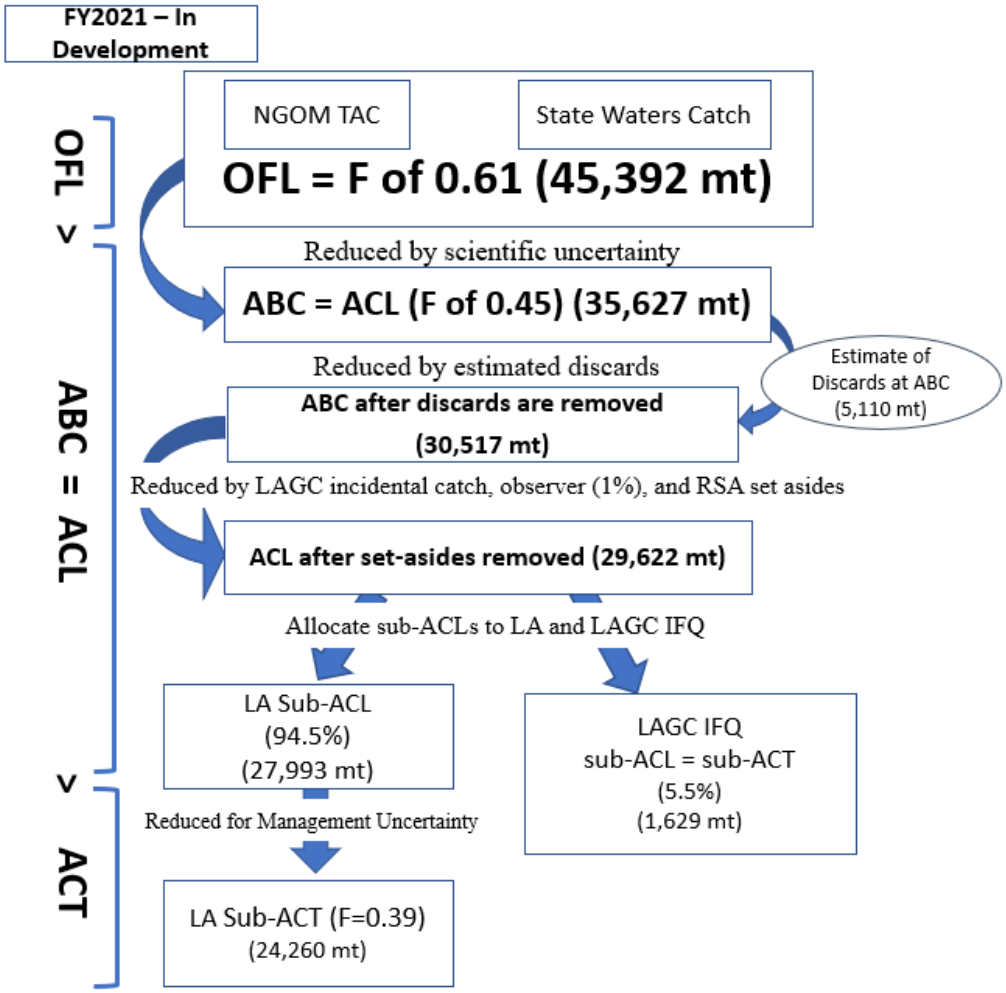
into two sub-ACLs: 94.5% for the LA fishery sub-ACL, and 5.5% for the LAGC fishery sub-ACL. Figure 4 summarizes how the various ACL terms are related in the Scallop FMP.

Amendment 15 also established ACTs for each component in order to account for management uncertainty. For the LA fleet, the ACT will have an associated F that has a 25-percent chance of exceeding ABC (75% probability that the ACT will not exceed the ABC/ACL). The F associated with the LA ACT is F = 0.39. The major sources of management uncertainty in the LA fishery are carryover provisions including the 10 DAS carryover provision and allowing vessels to fish unused access area allocation within the first 60 days of the following fishing year. For the LAGC fleet, the ACT will be set equal to the LAGC fleet's sub-ACL, since this component is quota-managed and is presumed to have less management uncertainty. The fishery specifications allocated to the fishery may be set at an F rate lower than the ACT, but fishery specifications may not exceed this level. For example, the Council's preferred alternative for FY 2020 specifications is anticipated to result in an overall F=0.182.

Finally, since the NGOM portion of the scallop fishery is not part of the scallop assessment for the rest of the fishery, the NGOM catch target will be added and specified as a separate Total Allowable Catch (TAC), in addition to ABC/ACL for the rest of the fishery.

The annual projected landings (APL) were developed using a forward projection model (SAMS) of the scallop resource. The APL is the combination of projected landings of exploitable scallops from open area DAS when fishing at an F determined by the Council, and expected landings from access areas. The APL is allocated between the Limited Access component (94.5%) and the LAGC IFQ component (5.5%).

Figure 1 – Scallop ACL-Flowchart with proposed 2021 OFL, ABC, and ACL values.



4.0 ALTERNATIVES UNDER CONSIDERATION

4.1 ACTION 1 – OVERFISHING LIMIT AND ACCEPTABLE BIOLOGICAL CATCH

4.1.1 Alternative 1 - No Action for OFL and ABC

Under Alternative 1 (No Action), the OFL and ABC would be the default 2021 values adopted in Framework 32 (Table 2) that were calculated for FY2020 and FY2021 based on survey and fishery data through 2019. These would remain in place until a subsequent action replaced them. Through Framework 32, these values were selected based on the same control rules: 1) OFL is equivalent to the catch associated with an overall fishing mortality rate equivalent to F_{MSY}; and 2) ABC is set at the fishing mortality rate with a 25% chance of exceeding OFL where risk is evaluated in terms of the probability of overfishing compared to the fraction loss to yield. These values include estimated discards. Therefore, when the fishery specifications are set based on these limits (Table 3), the estimate of discards is removed first and allocations are based on the remaining ABC available (Table 2, column to the far right).

Table 2 - No Action OFL and ABC for FY 2021 (default) approved through Framework 32 (values in mt).

Fishing Year	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards removed)
2021	47,503	40,430	3,995	36,435

Table 3 – No Action (default) ACL related values for the scallop fishery based on 2021 OFL and ABC approved through Framework 32.

Catch limits	2021 (mt)
Overfishing Limit	47,503
Acceptable Biological Catch/ACL (discards removed)	36,435
Incidental Catch (Estimated catch by LAGC Cat. C permits)	23
Research Set-Aside (RSA)	567
Observer Set-Aside	364
ACL for fishery	35,481
Limited Access ACL	33,530
LAGC Total ACL	30,242
LAGC IFQ ACL (5% of ACL)	1,951
Limited Access with LAGC IFQ ACL (0.5% of ACL)	1,774
Limited Access ACT (F=0.46)	177
Annual Projected Landings (APL)***	(*)
Limited Access Projected Landings (94.5% of APL)	(*)
Total IFQ Annual Allocation (5.5% of APL)	923
LAGC IFQ Annual Allocation (5% of APL)	839
Limited Access with LAGC IFQ Annual Allocation (0.5% of APL)	84

*The catch limits for the 2021 fishing year are subject to change through a future specifications action or framework adjustment. This includes the setting of an APL for 2020 that will be based on the 2019 annual scallop surveys.

**As a precautionary measure, the 2020 IFQ annual allocations are set at 75% of the 2019 IFQ Annual Allocations.

***The APL value reflects the Council's preferred alternatives for specifications from FW32.

4.1.2 Alternative 2 – Updated OFL and ABC for FY 2021 and FY 2022 (default)

Alternative 2 would specify OFLs and ABCs for FY 2021 and set default values for FY 2022 (Table 4). The fishing mortality rates for OFL and ABC would be based on the results of the 2020 Management Track Assessment for Atlantic Sea Scallops (2020). The fishing mortality rate associated with the OFL would be F=0.61, while the F associated with the ABC would be F=0.45.

Once OFL and ABC are established, associated ACLs for the fishery can be defined. Table 5 summarizes the various ACL allocations for the fishery based on decisions made in Amendment 15 when ACLs were implemented.

Rationale: This alternative utilizes the most recent scallop survey data and represents the most up-to-date scientific information available which is important when setting the OFL and ABC due to the dynamic nature of the scallop resource. While the scallop resource is considered healthy and has been relatively stable in recent years, some annual variability in exploitable biomass is anticipated. Accounting for this variability by using the most recent scientific information available is needed to prevent overfishing and improve yield-per-recruit for the fishery.

Table 4 – Alternative 2 OFL and ABC values for FY 2021 and FY 2022 (default).

Fishing Year	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards removed)
2021	45,392	35,627	5,110	30,517
2022	41,926	32,872	4,798	28,074

Table 5 - Alternative 2 ACL & APL related values for the scallop fishery based on 2021 and 2022 OFL and ABC.

	FY2021	FY2022
	mt	mt
OFL	45,392	41,926
ABC/ACL (discards removed)	30,517	28,074
Incidental Catch	23	23
RSA	567	567
Observer set-aside	305	281
ACL for fishery	29,622	27,203
Limited Access ACL	27,993	25,707
Limited Access ACT	24,260	22,279
LAGC Total ACL	1,629	1,496
LAGC IFQ ACL	1,481	1,360
LA w/ LAGC IFQ ACL (0.5% of ACL)	148	136
APL (after set-asides are removed)***		(*)
Limited Access Projected Landings (94.5% of APL)		(*)
Total IFQ Annual Allocation (5.5% of APL)		923
LAGC IFQ Annual Allocation (5% of APL)		839
Limited Access with LAGC IFQ Annual Allocation (0.5% of APL)		84

*The catch limits for the 2022 fishing year are subject to change through a future specifications action or framework adjustment. This includes the setting of an APL for 2022 that will be based on the 2021 annual scallop surveys.

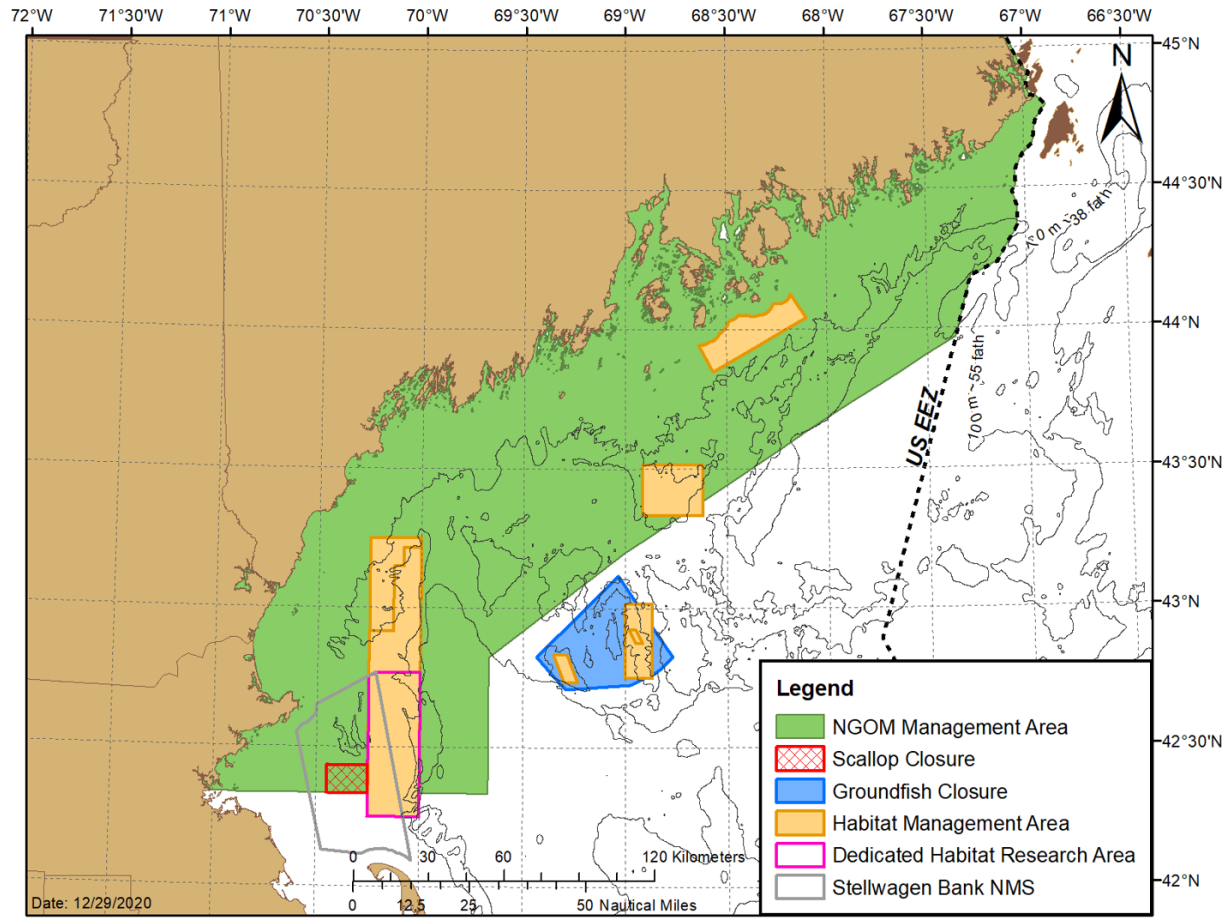
**As a precautionary measure, the 2022 IFQ annual allocations are set at 75% of the 2021 IFQ Annual Allocations.

***The APL value reflects the Council's preferred alternatives for specifications from FW33.

4.2 Action 2 – Northern Gulf of Maine TAC Setting

Action 2 addresses management in the Northern Gulf of Maine Management Area (Map 1). In Framework 33, the Council is considering TAC setting for the management unit using the temporary approach approved through Framework 29 and used in Framework 30 and Framework 32.

Map 1 – The Northern Gulf of Maine Management Area relative to scallop closures, groundfish closures, habitat management areas, and the Stellwagen Bank National Marine Sanctuary.



Alternatives in Framework 33 were developed to be consistent with the problem statement that the Council developed in Framework 29 and are consistent with measures implemented through FW29 (FY2018), FW30 (FY2019), and FW32 (FY2020):

> *Recent high landings and unknown biomass in the NGOM scallop management area underscore the critical need to initiate surveys and develop additional tools to better manage the area and fully understand the total removals from the management area.*

The Council also approved measures in Framework 29 that have enabled the tracking of total removals from the Northern Gulf of Maine management area since FY2018. The Council is in the process of submitting Amendment 21 to the Scallop FMP to NOAA Fisheries. If approved, this action would modify how the NGOM TAC is set in future framework or specification actions.

Method for setting NGOM TAC. Both Alternatives under consideration in this section (Alternative 1 and Alternative 2) would maintain the same approach to developing and splitting a total TAC for the NGOM that was implemented though Framework 29 for FY2018. The LAGC share would be calculated by applying the first 70,000 lbs to LAGC TAC, and then splitting the remaining pounds 50/50 between the LAGC and LA components. The LA share is only available to support RSA compensation fishing in the management unit. The rationale for this approach is that the NGOM TAC for the LAGC component was set at 70,000 pounds from FY 2008 – FY 2016. This TAC split is intended to be a short-term solution to allow controlled fishing in the NGOM management area until Amendment 21 can address NGOM issues more holistically. This approach—the first 70,000 pounds to the LAGC, then 50/50 split between LA and LAGC—is not intended to be permanent.

Under both Alternative 1 and Alternative 2, the LAGC and RSA shares are administered as separate TACs. The NGOM management area would remain open for each component until their TAC is projected to be harvested, even if the other component has reached its TAC. Any LA or LAGC vessels that are awarded NGOM RSA compensation pounds would be required to declare into the area and fish exclusively within the NGOM management area. An overage of the NGOM RSA harvest would be deducted from the LA share of the NGOM TAC in the following year.

4.2.1 Alternative 1 – No Action

The total NGOM TAC for FY2021 would be set at 265,000 pounds, which was specified in Framework 32. This TAC would be subject to a pound-for-pound payback from any fishery overages in FY2019. The overall TAC would be split between the LA and LAGC, with 97,500 pounds available to support RSA compensation fishing (LA share), and 167,500 pounds available for harvest by the LAGC component at 200 pounds a day. The management unit would open on April 1, 2020 with no change to the current management program. Stellwagen Bank closure would remain in effect for the entire 2021 fishing year.

The NGOM management area would remain open for each component until their TAC is projected to be harvested, even if the other component has reached its TAC. For example, if the LAGC component harvests its TAC before all NGOM RSA compensation pounds are harvested, the area would remain open for NGOM RSA compensation fishing.

Table 6 - The FY 2021 NGOM TAC under Alternative 1 - No Action (default measures from FW32).

Fishing Year	2021 TAC (lbs)
Overall TAC*	265,000
LA (RSA) TAC	97,500
LAGC TAC	167,500
*Subject to change after applying pound-for-pound payback of any 2019 fishery overages.	

Rationale: Specifying a total NGOM TAC at 265,000 pounds and capping removals is consistent with the Council's problem statement established through FW29 and are the default measures set through FW32. This approach is intended to be a short-term solution until Amendment 21 can be implemented to address NGOM issues more.

4.2.2 Alternative 2 - Set 2021 and 2022 NGOM TAC, with first 70,000 lbs to LAGC, then 50/50 split between LA and LAGC

As noted at the outset of this section, alternatives under consideration (Section 4.2.1 and Section 4.2.2) maintain the Council's preferred short-term approach to managing the NGOM that was developed through FW29. Since this is considered a temporary approach until Amendment 21 can be implemented, several key elements of the management strategy are restated here for clarity.

The NGOM TAC in FY 2021 would be set by applying a fishing mortality rate to the projected exploitable biomass from Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Seal Island. Stellwagen Bank would remain closed until the end of FY 2021. Default TACs for FY2022 would also be set by the Council.

The LA share of the NGOM TAC would be available for RSA compensation fishing only. This would not be in addition to the 1.25 million lbs set-aside for the RSA program. These pounds would not be exclusive to RSA research in the NGOM, but priority would be given to support research projects in the NGOM. Any LA or LAGC vessels that are awarded NGOM RSA compensation pounds would be required to declare into the area and fish exclusively within the NGOM management area. Any NGOM RSA harvest overages would be deducted from the following year's LA TAC.

The LAGC share would be calculated by applying the first 70,000 lbs to LAGC TAC, and then splitting the remaining pounds 50/50 between the LAGC and LA component. The LAGC and LA (RSA) would operate under separate TACs.

The NGOM management area would remain open for each component until their TAC is projected to be harvested, even if the other component has reached its TAC. For example, if the LAGC component harvests its TAC before all NGOM RSA compensation pounds are harvested, the area would remain open for NGOM RSA compensation fishing.

Rationale: Survey data reflects the most up-to-date scientific information for the scallop resource in the NGOM. Capping removals for all fishery components at the specified TAC addresses the Council's problem statement of fully understanding total removals from the management area.

4.2.2.1 FY2021 NGOM TAC

If the Council selects Alternative 2, 4.2.2, select one Option for the FY2021 NGOM TAC.

4.2.2.1.1 Option 1 – Set NGOM TAC at F=0.18

The overall NGOM TAC would be set by applying a fishing mortality rate of F=0.18 to the exploitable biomass in Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Seal Island. Stellwagen Bank would remain closed until the end of FY 2021. The FY 2021 overall TAC would be set at 160,000 lbs. The LAGC share of the FY 2021 NGOM TAC would be 45,000 lbs, while the LA/RSA share would be set at 115,000 lbs.

Rationale: The Gulf of Maine is relatively data-poor compared to Georges Bank and the Mid-Atlantic. In the absence of area specific reference points, the Council considered fishing the NGOM management area at an F rate (0.18) to use a conservative approach for managing this area. The fishing mortality rate is applied to the exploitable biomass in Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Sea Island because these areas are expected to be fished in FY2021.

4.2.2.1.2 Option 2 – Set NGOM TAC at F=0.20

The overall NGOM TAC would be set by applying a fishing mortality rate of F=0.20 to the exploitable biomass in Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Seal Island. Stellwagen Bank would

remain closed until the end of FY 2021. The FY 2021 overall TAC would be set at 175,000 lbs. The LAGC share of the FY 2021 NGOM TAC would be 122,500 lbs, while the LA/RSA share would be set at 52,500 lbs.

Rationale: The Gulf of Maine is relatively data-poor compared to Georges Bank and the Mid-Atlantic. In the absence of area specific reference points, the Council considered fishing the NGOM management area at an F rate (0.20) to use a conservative approach for managing this area. The fishing mortality rate is applied to the exploitable biomass in Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Sea Island because these areas are expected to be fished in FY2021.

4.2.2.1.3 Option 3 – Set NGOM TAC at F=0.25

The overall NGOM TAC would be set by applying a fishing mortality rate of F=0.25 to the exploitable biomass in Ipswich Bay, Jeffrey's Ledge, Platts Bank, and Machias Seal Island. Stellwagen Bank would remain closed until the end of FY 2021. The FY 2021 overall TAC would be set at 210,000 lbs. The LAGC share of the FY 2021 NGOM TAC would be 140,000 lbs, while the LA/RSA share would be set at 70,000 lbs.

Rationale: The Gulf of Maine is relatively data-poor compared to Georges Bank and the Mid-Atlantic. In the absence of area specific reference points, the Council considered fishing the NGOM management area at an F rate (0.25) to use a conservative approach for managing this area while allowing for increased fishing pressure on larger adult scallops relative to Options 1 and 2. The fishing mortality rate is applied to the exploitable biomass in Ipswich Bay, Jeffreys Ledge, Platts Bank, and Machias Sea Island because these areas are expected to be fished in FY2021.

Table 7 - Comparison of overall NGOM TAC Options for FY2021 in FW33

Alternative in FW33	F_{TARGET}	FY2021 TAC
A1		265,000
A2, o1	F=0.18	160,000
A2, o2	F=0.20	175,000
A2, o3	F=0.25	210,000

Table 8 - Comparison of Potential NGOM TACs for LA (RSA) and LAGC for FY 2021 (lbs) for each sub-option considered in Alternative 2 of Section 4.2

FW 33 Alternative	FW 33 Section	F	2021 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		265,000	97,500	167,500
2, Option 1	4.2.2.1.1	0.18	160,000	45,000	115,000
2, Option 2	4.2.2.1.2	0.20	175,000	52,500	122,500
2, Option 3	4.2.2.1.3	0.25	210,000	70,000	140,000

4.2.2.2 FY2022 NGOM TAC (Default Measure)

If the Council selects Alternative 2, 4.2.2, select one Option for the FY2022 NGOM TAC.

4.2.2.2.1 Sub-Option 1 – Set the NGOM TAC for 2022 using F rate selected for FY2021, close Stellwagen Bank

In the event of delayed implementation of future specifications, sub-option 1 would set the NGOM TAC for FY2022 using the F rate that the Council selects for FY2021 in Section 4.2.2.1. Stellwagen Bank

would remain closed until the end of FY 2022. The potential NGOM TACs for 2022 are shown in Table 9. If sub-Option 1 is selected, and there is a delay in implementation of FY2022 specifications replacing this TAC, a pound-for-pound payback would be applied to the incoming RSA set-aside (any RSA overage) and/or the NGOM set-aside (any LAGC overage) if Amendment 21 measures are implemented.

Rationale: Sub-Option 1 would allow continued fishing in parts of the NGOM at the start of the 2022 fishing year if there is a delay in implementing new specifications. The 2020 surveys suggest that a large cohort of scallops in the Stellwagen Bank region will be exploitable to the fishery in 2022, this area is currently closed to fishing to improve yield-per-recruit. Preliminary estimates suggest allocations to the NGOM will be much higher in 2022 compared to recent years, and LPUE is likely to be high in the Stellwagen area. The TACs associated with sub-Option 1 would likely be landed within a matter of days if Stellwagen is open. Setting the TAC at 0 closes the entire management unit until new measures recommended by the Council can be put into place.

Table 9 - Comparison of FY2022 (default) TACs for NGOM.

FW 33 Alternative	FW 33 Section	F	2022 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		0	0	0
2, Sub-Option 1	4.2.2.2.1	0.18	70,000	0	70,000
		0.20	74,000	2,000	72,000
		0.25	85,000	7,500	77,500
2, Sub-Option 2	4.2.2.2.2	0.0	0	0	0

4.2.2.2.2 Sub-Option 2 – Set the NGOM TAC for 2022 at zero

In the event of delayed implementation of future specifications, Sub-Option 2 would set the NGOM TAC at 0, effectively closing the entire area until new specifications for the area are implemented.

Rationale: In September 2020, the Council took final action on Amendment 21 to the Scallop FMP. This action, if approved, would establish a monitoring program and change the allocation structure in the NGOM and would be implemented for FY 2022. Setting the TAC at 0 would mean that fishing in the NGOM would not begin until a new framework action incorporating the changes proposed in Amendment 21 is implemented. The 2020 surveys suggest that a large cohort of scallops in the Stellwagen Bank region will be exploitable to the fishery in 2022, this area is currently closed to fishing to improve yield-per-recruit. Preliminary estimates suggest allocations to the NGOM will be much higher in 2022 compared to recent years, and LPUE is likely to be high in the Stellwagen area. The TACs associated with sub-Option 1 would likely be landed within a matter of days if Stellwagen is open. Setting the TAC at 0 closes the entire management unit until new measures recommended by the Council can be put into place.

4.3 ACTION 3 - FISHERY SPECIFICATIONS

The LA (94.5%) and LAGC IFQ (5.5%) allocations are based on Annual Projected Landings (APL).

Table 10 - Comparison of allocations and DAS associated with each specification alternative in FW33.

Alt. in FW33	Description	Overall F rate	Open area F	Annual Projected Landings (APL)	APL w/ set-asides removed	LA Share (94.5%)	LAGC IFQ Share (5.5%)
4.3.1	No Action	0.054	0.24	19,069,986	17,096,848	16,156,522	940,327
4.3.2.1	Alt2-24DAS	0.205	0.30	37,068,525	35,095,387	33,165,141	1,930,246
4.3.2.2	Alt2-26DAS	0.210	0.33	38,281,067	36,307,930	34,310,994	1,996,936
4.3.3.1	Alt3-24DAS	0.220	0.30	40,104,290	38,131,153	36,033,939	2,097,213
4.3.3.2	Alt3-26DAS	0.222	0.33	41,316,833	39,343,695	37,179,792	2,163,903
4.3.4.1	Alt4-24DAS	0.200	0.30	40,152,792	38,179,655	36,079,774	2,099,881
4.3.4.2	Alt4-26DAS	0.202	0.33	41,380,767	39,407,629	37,240,210	2,167,420
4.3.5.1	Alt5-24DAS	0.222	0.30	40,044,765	38,071,628	35,977,688	2,093,940
4.3.5.2	Alt5-26DAS	0.229	0.33	41,272,740	39,299,603	37,138,125	2,161,478
4.3.6*	sq	0.175	0.33	39,129,847	37,156,710	35,113,091	2,043,619

* "Status Quo" refers to Framework 32 preferred measures and is provided in the alternatives section of Framework 32 to provide continuity and context for the reader, but is not an option proposed for Council decision.

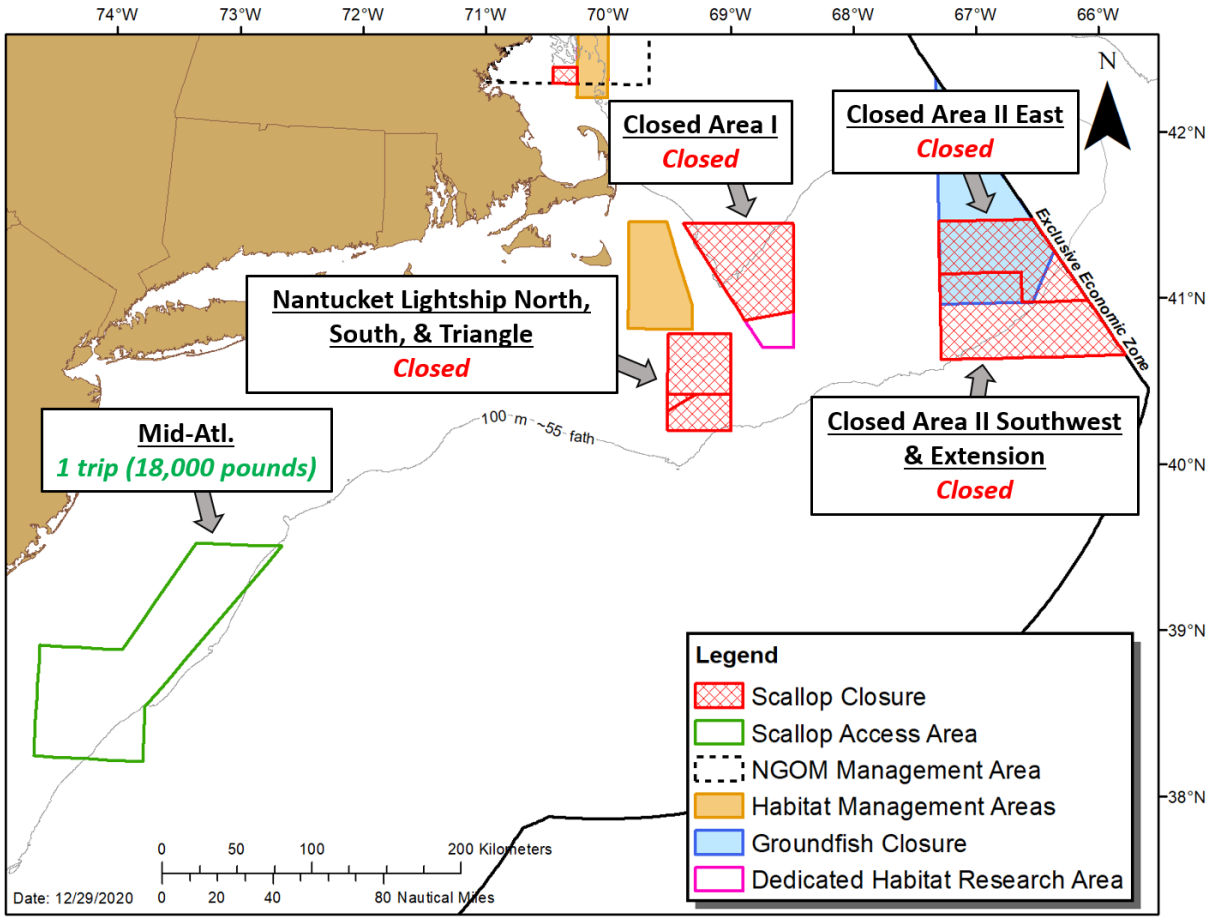
4.3.1 Alternative 1 – No Action (Default Measures)

Under Alternative 1 – No Action, the default specifications approved in Framework 32 would remain in place for the 2021 fishing year and there would be no allocations specified for the 2022 fishing year. Default measures approved in Framework 32 include full-time Limited Access DAS set at 18, which are 75% of the DAS allocated for FY2020. Part-time Limited Access vessels would receive 7.2 DAS, and Occasional Limited Access vessels would be allocated 1.5 DAS. The LA component would be allocated one 18,000-pound trip for FT vessels in the Mid-Atlantic Access Area (Map 2).

Under the FW32 default measures for FY 2021, the total LAGC IFQ allocation would be 923 mt (2,034,867 lbs) for LAGC IFQ and LA with LAGC IFQ quota, which is equivalent to 75% of the LAGC IFQ allocation for FY2020. LAGC IFQ vessels would also have access in the Mid-Atlantic Access Area on April 1, 2021 under default measures, with a fleet wide maximum of 571 trips to each area.

The target TAC for vessels with a LAGC Incidental permit is 50,000 pounds.

Map 2 – Spatial management under Alternative 1 (No Action).



4.3.2 Alternative 2 – 3.5 Access Area Trips, with 1.5 trips to Nantucket Lightship South

Alternative 2 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 3) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 63,000 pounds to the following access areas: Mid-Atlantic Access Area (18,000 pounds), Closed Area II (18,000 pounds), and the Nantucket Lightship South (27,000 pounds). There would be no direct allocations to the FT LA component to the Closed Area I Access Area, but the area would be available for RSA compensation fishing and for LAGC access area fishing.

Alternative 2 would utilize a new configuration for the Closed Area II Access Area by combining part of the traditional access area (CAII-Southwest) with the area to the south (CAII-Extension). The eastern portion of the area (i.e., CAII-East) would be closed to scallop fishing for the entire year (Map 3). Coordinates of the proposed Closed Area II Access Area (Southwest and Extension) are provided in Table 11 and coordinates of the proposed Closed Area II East closure are provided in Table 12.

Alternative 2 would maintain the small area between the NLS-North and NLS-South, designated as the "Nantucket Lightship Triangle" (NLS-Triangle), which would be closed to the fishery for FY2021. The

NLS-Triangle has an area of approximately 30 nmi^2 (101 km^2). Coordinates for the proposed NLS-Triangle closure are provided in Table 13.

The NLS-West was slated to become part of the open area in FY2020; however, the area was closed through emergency action in FY2020 and remains closed until changed through a Council action. In all FW33 alternatives, the NLS-West would become part of the open bottom and would be accessible to limited access vessels fishing open area DAS and LAGC IFQ vessels fishing open trips.

The specific allocations associated with Alternative 2:

- The FY2021 Annual Projected Landings (APL) for this alternative are 37.1 million pounds (open area F=0.3, 24 DAS), or 38.3 million pounds (open area F=0.33, 26 DAS) before set-asides are accounted for (i.e., RSA, observer). The total set-asides (i.e., RSA, and observer) and incidental catch for 2021 are 895 mt or 1.97 million pounds.
- Each full-time limited access vessel would be allocated a total of 63,000 access area pounds. The FT LA trip limit would be set at 18,000 lbs in all available access areas: Closed Area II (Closed Area II Southwest and Closed Area II Extension combined), the Mid-Atlantic Access Area, and the Nantucket Lightship South.
- FT LA vessels would be allowed to exchange access area allocations in all areas at increments of 9,000 pounds. All access area allocations could be exchanged at an increment of 9,000 pounds regardless of the initial allocation; for example, 9,000 pounds from the NLS-South could be exchanged for 9,000 pounds from CAII. There would be no change to how part-time vessels can exchange trips – those exchanges would still be done as 1:1 at the possession limit for this alternative (i.e., 12,600 pounds).
- For access area trips in the NLS-S, crew limits for LA vessels could be increased by 2 from the maximum crew limit in regulation. Full-time vessels could have a maximum of 10 crew and part-time vessels could have a maximum of 8 crew when fishing in the NLS-South.
- Access area allocations would be set at 25,200 pounds for PT LA vessels, and 5,250 pounds for Occasional LA vessels. The LA PT trip limit would be set at 12,600 pounds and PT vessels would receive one (1) MAAA trip and one (1) trip to either Nantucket Lightship South or Closed Area II. The LA Occ trip limit would be set at 5,250 pounds, and Occ vessels would be able to fish in their allocation in the MAAA.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated Limited Access access area trips would be available in the same access areas defined by Framework 33 for FY2021 and the first 60 days of FY2022, even if the area is scheduled to close in FY 2022 (Map 4, Map 5). Vessels planning to fish FY2021 access area allocation must start their trip (i.e., position on their VMS unit seaward of the demarcation line) by 23:59 on May 30, 2022. For example, trips allocated to the NLS-S Access Area could only be fished in the access area boundary defined by FW33 during FY2021 or in the first 60 days of FY2022.
- FY2022 default measures under Alternative 2 would allocate FT LA vessels one (1) 18,000-pound access area trip to the Mid-Atlantic Access Area and one (1) 18,000-pound trip to the Nantucket Lightship South. PT LA vessels would be allocated one (1) 7,200-pound access area trip to the Mid-Atlantic Access Area and one 7,200-pound access area trip to the Nantucket Lightship South. For both full-time and part-time vessels, the NLS-South default trip would be available on April 1, 2022 and the Mid-Atlantic Access Area default trip would be available on May 1, 2022. The LAGC IFQ component would also receive default access area trips to the MAAA and NLS-South, proportional to 5.5% of the default access area allocations to each area (i.e., 571 trips to the MAAA and 571 trips to the NLS-South). The LAGC IFQ and LA DAS allocations would be set at 75% of the FY2021 allocations. The FY2022 default trips may be fished within the access areas as defined by FW33 (Map 4, Map 5).

Rationale: Modifications to rotational areas of Closed Area II are in response to the multiple year classes observed in this part of the resource in 2020. The closure of CAII-East is due to exploitable biomass not being enough to support rotational harvest by the full-time limited access fleet in FY2021 and because a large year class of juvenile scallops was observed in the eastern extent of the access area in 2020. Closing CAII-East for FY2021 will allow the juvenile scallops to grow in the absence of fishing and continue to be monitored through annual surveys. A highly concentrated aggregation of scallops was observed along the shared border of Closed Area II Southwest and Extension in 2020; while there are several cohorts present in these two areas, the majority of scallops are part of the three-year-old class which grew faster than expected between the 2019 and 2020 surveys and are expected to recruit to the fishery in FY2021. Combining CAII-Southwest with CAII-Extension allows for additional spatial flexibility given the dense aggregation of exploitable biomass that straddles the shared boundary.

Exploitable biomass in the MAAA has continued to decline as the large 2012-year-class is fished down and due to a lack of incoming recruitment. Allocating one trip to the MAAA in FY2021 represents a reduction in effort compared to the past several years and is expected to balance effort so that the MAAA can support rotational harvest again in FY2022.

While the NLS-South scallops are sub-optimal operationally due to the slow growth and smaller size at age of scallops in this area, the NLS-South holds one of the largest exploitable biomass aggregations in the resource. Considering the high level of biomass in the area and acknowledging that the scallops will be 8 years old, harvesting these scallops is necessary given the risk of foregoing exploitable biomass due to old age. The NLS-Triangle closure comprises a small area with low scallop densities that could be used for research purposes in the absence of fishing. Continuation of the NLS-Triangle rotational area closure does not bind the Council to facilitating or supporting research in this area in any way. There is effectively no exploitable biomass remaining in the NLS-West – reverting this area to open bottom is not expected to have any effect on fishing behavior or open area DAS utilization because little to no open area fishing is anticipated for this area in FY2021.

There is not enough exploitable biomass in CAI to support a full or partial trip for the full-time limited access fleet in FY2021. Maintaining the CAI boundary and making it eligible for only LAGC IFQ AA trips and RSA compensation fishing will give both the LA and LAGC components an opportunity to fish there at a limited level if vessels elect to do so. This also creates a foundation for several alternatives in Section 4.4, which consider redistributing some or all CAII LAGC AA trips to Closed Area I.

Allocating partial trips and allowing access area allocations to be exchanged at the lowest increment of allocation (i.e., 9,000 pounds) is viewed as an equitable, alternative approach to a lottery system. Lottery systems have been employed by the Council in the past to allocate access to areas with not enough exploitable biomass to support effort of a full trip. The lottery has been characterized by some as inequitable because the resulting allocations can be advantageous for some but not others. Allowing trip exchanges at 9,000-pound increments does not change the level of harvest expected from each access area, but does allow additional flexibility to vessels that may wish to exchange access area allocations at a lower increment than the access area possession limit. Part time and occasional vessels were not included in this option because they would receive equal trip allocations to the NLS-South/Closed Area II and the MAAA.

Map 3 – Spatial management under Alternative 2.

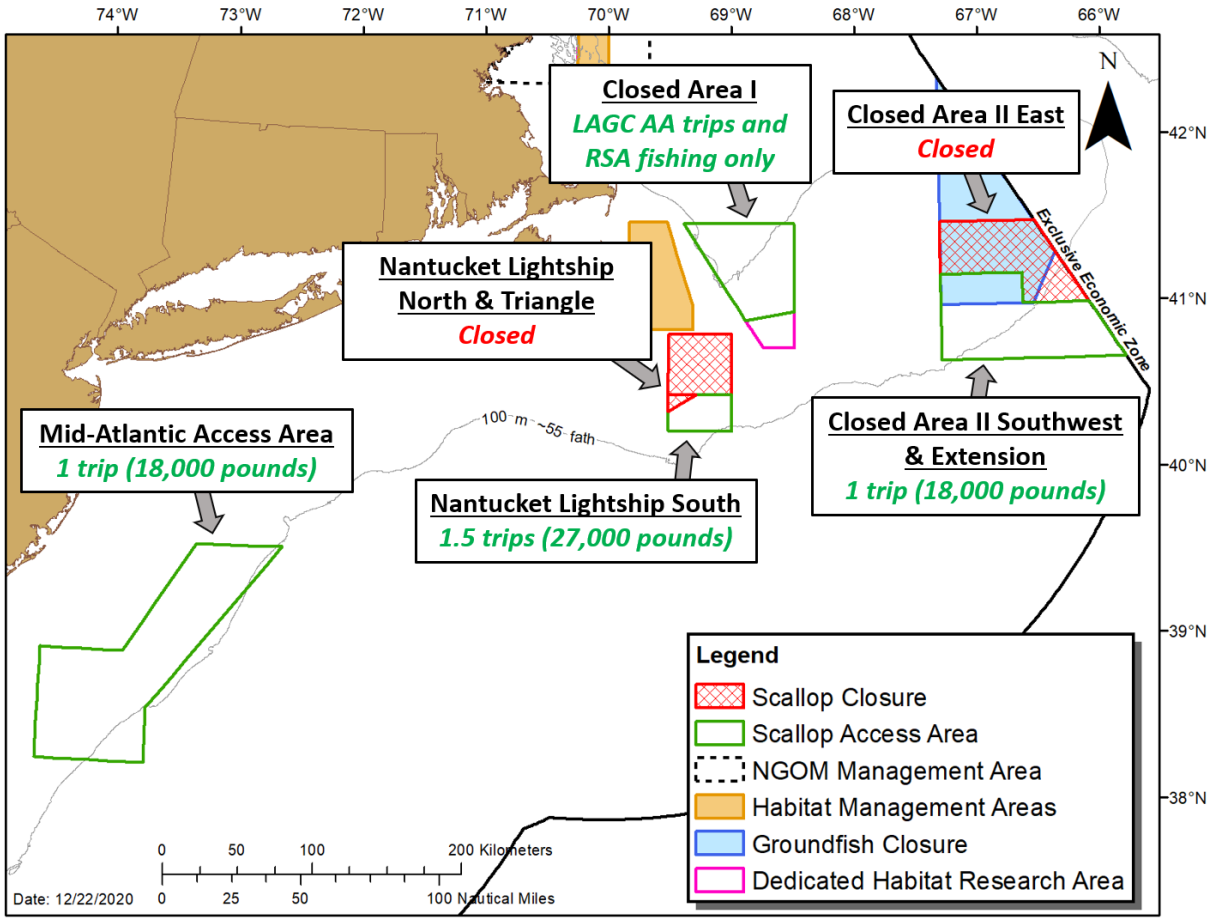


Table 11 – Coordinates of the CAII-Southwest and Extension access area proposed under Alternative 2, Alternative 3, Alternative 4, and Alternative 5.

Point	Latitude	Longitude
1	41° 11' 0" N	67° 20' 0" W
2	41° 11' 0" N	66° 41' 0" W
3	41° 0' 0" N	66° 41' 0" W
4	41° 0' 0" N	(1)
5	40° 40' 0" N	(2)
6	40° 40' 0" N	67° 20' 0" W
7	41° 11' 0" N	67° 20' 0" W
(1) intersection of 41° 0' N and US-Canada Maritime Boundary (2) intersection of 40° 40' N and US-Canada Maritime Boundary		

Table 12 – Coordinates of the Closed Area II East closure proposed under Alternative 2, Alternative 3, Alternative 4, and Alternative 5.

Point	Latitude	Longitude
1	41° 30' 0" N	67° 20' 0" W
2	41° 30' 0" N	(1)
3	41° 0' 0" N	(2)
4	41° 0' 0" N	66° 41' 0" W
5	41° 11' 0" N	66° 41' 0" W
6	41° 11' 0" N	67° 20' 0" W
7	41° 30' 0" N	67° 20' 0" W
(1) intersection of 41° 30' N and US-Canada Maritime Boundary (2) intersection of 41° 0' N and US-Canada Maritime Boundary		

Table 13 – Coordinates of the Nantucket Lightship Triangle closure proposed under Alternative 2, Alternative 3, Alternative 4, and Alternative 5.

Point	Latitude	Longitude
1	40° 28' 0" N	69° 30' 0" W
2	40° 28' 0" N	69° 17' 0" W
3	40° 22' 0" N	69° 30' 0" W
4	40° 28' 0" N	69° 30' 0" W

4.3.2.1 Option 1 – Open Areas Fished at F=0.3 (24 DAS)

Option 1 would set the full-time Limited Access DAS at 24, which is expected to result in an average open area fishing mortality rate of F=0.3 in open areas. The specific allocations associated with Alternative 2 Option 1 are described below:

- The APL after set-asides are removed would be 35,095,387 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,930,246 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,754,769 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,447,685 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 14.

Table 14 – Summary of LA DAS allocations for each permit type at 24 DAS for FT LA vessels.

	FY 2021	**FY 2022**
FT LA	24	18
PT LA	9.6	7.2
Occasional	2	1.5

4.3.2.2 Option 2 – Open Areas Fished at F=0.33 (26 DAS)

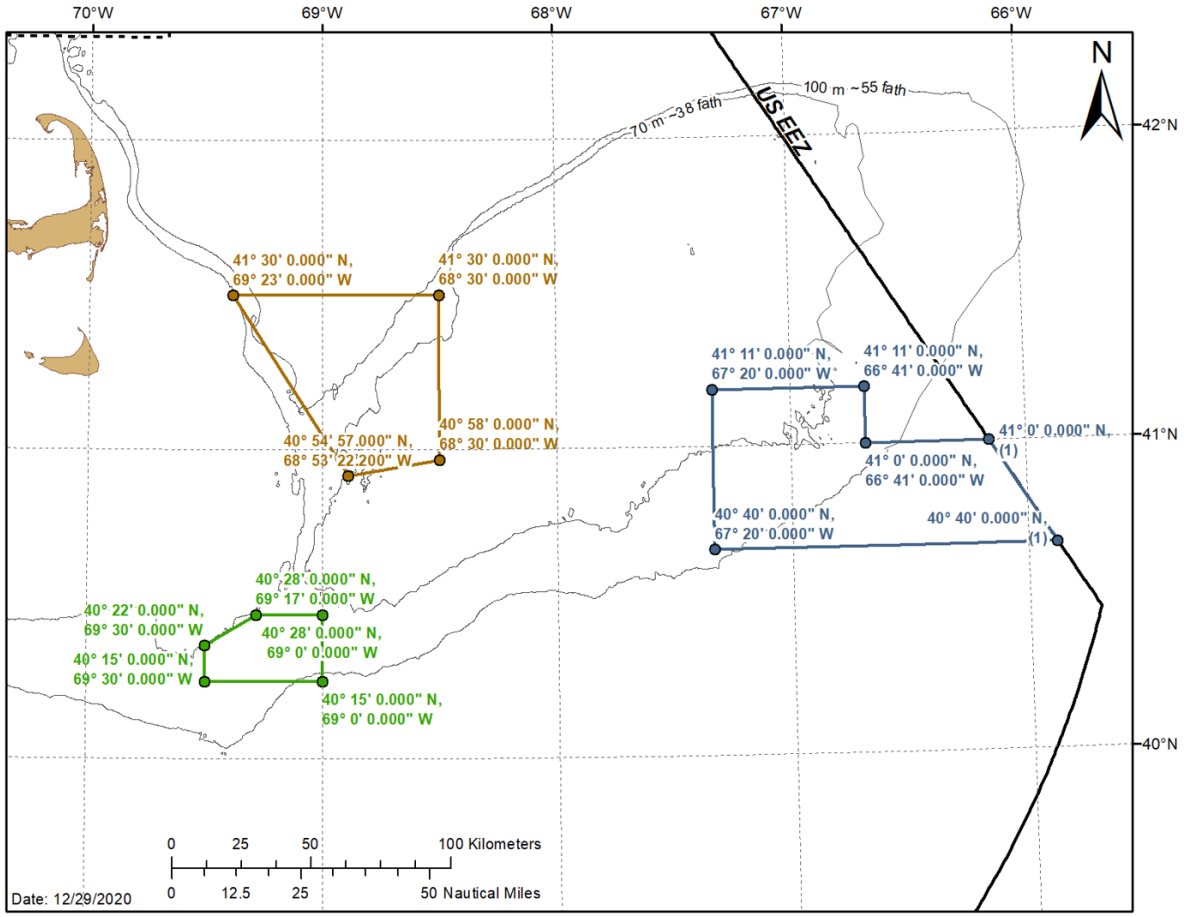
Option 2 would set the full-time Limited Access DAS at 26, which is expected to result in an average open area fishing mortality rate of F=0.33 in open areas. The specific allocations associated with Alternative 2 Option 1 are described below:

- The APL after set-asides are removed would be 36,307,930 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,996,936 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,815,396 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,497,702 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 15.

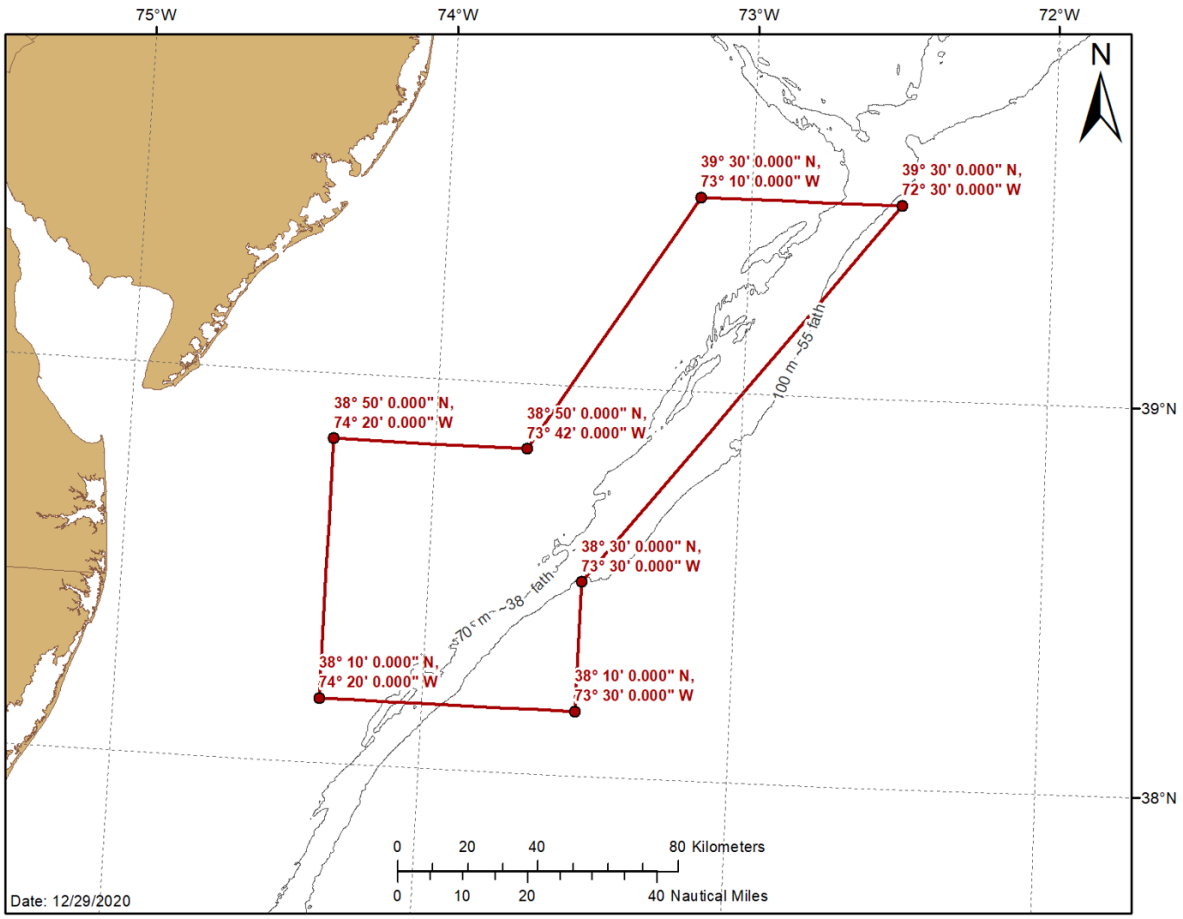
Table 15 - Summary of LA DAS allocation for each permit type at 26 DAS for FT LA vessels.

	FY 2021	**FY 2022**
FT LA	26	19.5
PT LA	10.4	7.8
Occasional	2.2	1.6

Map 4 – Proposed rotational management configuration for areas on Georges Bank in Framework 33. Access area trips may be fished within the defined boundaries of FW33 for FY2021 and the first 60 days of FY2022.



Map 5 – Proposed rotational management configuration for the Mid-Atlantic Access Area in Framework 33. Access area trips may be fished within the defined boundaries of FW33 for FY2021 and the first 60 days of FY2022.



4.3.3 Alternative 3 – Four Access Area Trips, with 1 trip in Closed Area II

Alternative 3 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 6) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (27,000 pounds), Closed Area II (18,000 pounds), and the Nantucket Lightship South (27,000 pounds). There would be no direct allocations to the FT LA component to the Closed Area I Access Area, but the area would be available for RSA compensation fishing and for LAGC access area fishing.

Alternative 3 would utilize a new configuration for the Closed Area II Access Area by combining part of the traditional access area (CAII-Southwest) with the area to the south (CAII-Extension). The eastern portion of the area (i.e., CAII-East) would be closed to scallop fishing for the entire year (Map 6).

Coordinates of the proposed Closed Area II Access Area (Southwest and Extension) are provided in Table 11 and coordinates of the proposed Closed Area II East closure are provided in Table 12.

Alternative 3 would maintain the small area between the NLS-North and NLS-South, designated as the "Nantucket Lightship Triangle" (NLS-Triangle), which would be closed to the fishery for FY2021. The NLS-Triangle has an area of approximately 30 nmi^2 (101 km^2). Coordinates for the proposed NLS-Triangle closure are provided in Table 13.

The NLS-West was slated to become part of the open area in FY2020; however, the area was closed through emergency action in FY2020 and remains closed until changed through a Council action. In all FW33 alternatives, the NLS-West would become part of the open bottom and would be accessible to limited access vessels fishing open area DAS or to LAGC IFQ vessels fishing open trips.

The specific allocations associated with Alternative 3:

- The FY2021 Annual Projected Landings (APL) for this alternative are 40.1 million pounds (open area F=0.3, 24 DAS), or 41.3 million pounds (open area F=0.33, 26 DAS) before set-asides are accounted for (i.e., RSA, observer). The total set-asides (i.e., RSA, and observer) and incidental catch for 2021 are 895 mt or 1.97 million pounds.
- Each full-time limited access vessel would be allocated a total of 72,000 access area pounds. The FT LA trip limit would be set at 18,000 lbs in all available access areas: Closed Area II (Closed Area II Southwest and Closed Area II Extension combined), the Mid-Atlantic Access Area, and the Nantucket Lightship South.
- FT LA vessels would be allowed to exchange access area allocations in all areas at increments of 9,000 pounds. All access area allocations could be exchanged at an increment of 9,000 pounds regardless of the initial allocation; for example, 9,000 pounds from the NLS-South could be exchanged for 9,000 pounds from CAII. There would be no change to how part-time vessels can exchange trips – those exchanges would still be done as 1:1 at the possession limit for this alternative (i.e., 14,400 pounds).
- For access area trips in the NLS-S, crew limits for LA vessels could be increased by 2 from the maximum crew limit in regulation. Full-time vessels could have a maximum of 10 crew and part-time vessels could have a maximum of 8 crew when fishing in the NLS-South.
- Access area allocations would be set at 28,800 pounds for PT LA vessels, and 6,000 pounds for Occasional LA vessels. The LA PT trip limit would be set at 14,400 pounds and PT vessels would receive one (1) MAAA trip and one (1) trip to either Nantucket Lightship South or Closed Area II. The LA Occ trip limit would be set at 6,000 pounds, and Occ vessels would be able to fish in their allocation in the MAAA.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated Limited Access access area trips would be available in the same access areas defined by Framework 33 for FY2021 and the first 60 days of FY2022, even if the area is scheduled to close in FY 2022 (Map 4, Map 5). Vessels planning to fish FY2021 access area allocation must start their trip (i.e., position on their VMS unit seaward of the demarcation line) by 23:59 on May 30, 2022. For example, trips allocated to the NLS-S Access Area could only be fished in the access area boundary defined by FW33 during FY2021 or in the first 60 days of FY2022.
- FY2022 default measures under Alternative 2 would allocate FT LA vessels one (1) 18,000-pound access area trip to the Mid-Atlantic Access Area and one (1) 18,000-pound trip to the Nantucket Lightship South. PT LA vessels would be allocated one (1) 7,200-pound access area trip to the Mid-Atlantic Access Area and one 7,200-pound access area trip to the Nantucket Lightship South. For both full-time and part-time vessels, the NLS-South default trip would be available on April 1, 2022 and the Mid-Atlantic Access Area default trip would be available on May 1, 2022. The LAGC IFQ component would also receive default access area trips to the MAAA and NLS-South, proportional to 5.5% of the default access area allocations to each area

(i.e., 571 trips to the MAAA and 571 trips to the NLS-South). The LAGC IFQ and LA DAS allocations would be set at 75% of the FY2021 allocations. The FY2022 default trips may be fished within the access areas as defined by FW33 (Map 4, Map 5).

Rationale: Modifications to rotational areas of Closed Area II are in response to the multiple year classes observed in this part of the resource in 2020. The closure of CAII-East is due to exploitable biomass not being enough to support rotational harvest by the full-time limited access fleet in FY2021 and because a large year class of juvenile scallops was observed in the eastern extent of the access area in 2020. Closing CAII-East for FY2021 will allow the juvenile scallops to grow in the absence of fishing and continue to be monitored through annual surveys. A highly concentrated aggregation of scallops was observed along the shared border of Closed Area II Southwest and Extension in 2020; while there are several cohorts present in these two areas, the majority of scallops are part of the three-year-old class which grew faster than expected between the 2019 and 2020 surveys and are expected to recruit to the fishery in FY2021. Combining CAII-Southwest with CAII-Extension allows for additional spatial flexibility given the dense aggregation of exploitable biomass that straddles the shared boundary.

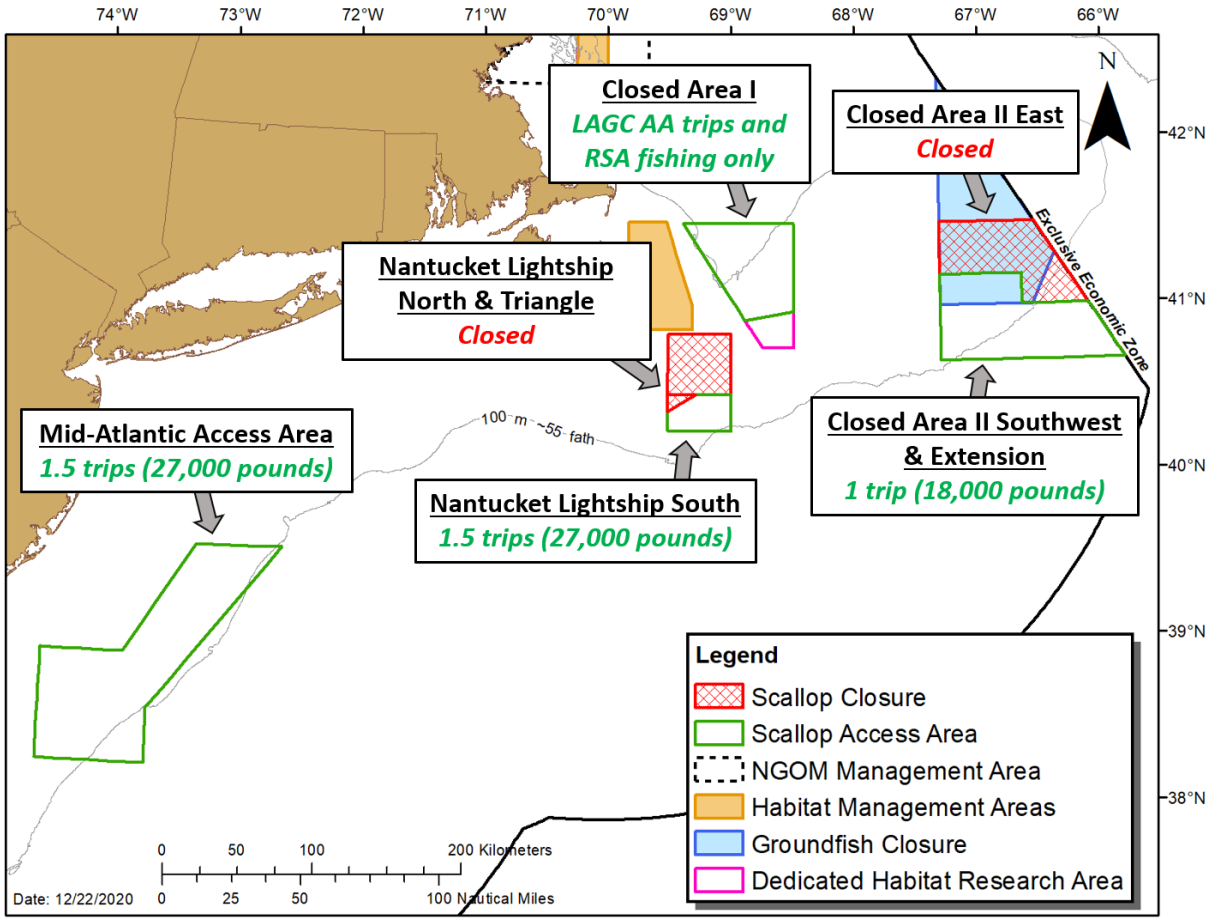
Exploitable biomass in the MAAA has continued to decline as the large 2012-year-class is fished down and due to a lack of incoming recruitment. Allocating one and a half trips to the MAAA in FY2021 represents a reduction in effort compared to the past several years and is expected to balance effort so that the MAAA can support rotational harvest again in FY2022.

While sub-optimal operationally due to the slow growth and smaller size at age of scallops in this area, the NLS-South holds one of the largest exploitable biomass aggregations in the resource. Considering the high level of biomass in the area and acknowledging that the scallops will be 8 years old, harvesting these scallops is necessary given the risk of foregoing exploitable biomass due to old age. The NLS-Triangle closure comprises a small area with low scallop densities that could be used for research purposes in the absence of fishing. Continuation of the NLS-Triangle rotational area closure does not bind the Council to facilitating or supporting research in this area in any way. There is effectively no exploitable biomass remaining in the NLS-West – reverting this area to open bottom is not expected to have any effect on fishing behavior or open area DAS utilization because little to no open area fishing is anticipated for this area in FY2021.

There is not enough exploitable biomass in CAI to support a full or partial trip for the full-time limited access fleet in FY2021. Maintaining the CAI boundary and making it eligible for only LAGC IFQ AA trips and RSA compensation fishing will give both the LA and LAGC components an opportunity to fish there at a limited level if vessels elect to do so. This also creates a foundation for several alternatives in Section 4.4, which consider redistributing some or all CAII LAGC AA trips to Closed Area I.

Allocating partial trips and allowing access area allocations to be exchanged at the lowest increment of allocation (i.e., 9,000 pounds) is viewed as an equitable, alternative approach to a lottery system. Lottery systems have been employed by the Council in the past to allocate access to areas with not enough exploitable biomass to support effort of a full trip. The lottery has been characterized by some as inequitable because the resulting allocations can be advantageous for some but not others. Allowing trip exchanges at 9,000-pound increments does not change the level of harvest expected from each access area, but does allow additional flexibility to vessels that may wish to exchange access area allocations at a lower increment than the access area possession limit. Part time and occasional vessels were not included in this option because they would receive equal trip allocations to the NLS-South/Closed Area II and the MAAA.

Map 6 – Spatial management under Alternative 3.



4.3.3.1 Option 1 – Open Area Fished at F=0.3 (24 DAS)

Option 1 would set the full-time Limited Access DAS at 24, which is expected to result in an average open area fishing mortality rate of F=0.3 in open areas. The specific allocations associated with Alternative 3 Option 1 are described below:

- The APL after set-asides are removed would be 38,131,151 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,097,213 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,906,558 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,572,910 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 16.

Table 16 – Summary of LA DAS allocations for each permit type at 24 DAS for FT LA vessels.

	FY 2021	FY 2022
FT LA	24	18
PT LA	9.6	7.2
Occasional	2	1.5

4.3.3.2 Option 2 – Open Area Fished at F=0.33 (26 DAS)

Option 2 would set the full-time Limited Access DAS at 26, which is expected to result in an average open area fishing mortality rate of F=0.33 in open areas. The specific allocations associated with Alternative 3 Option 1 are described below:

- The APL after set-asides are removed would be 37,179,792 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,163,903 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,967,185 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,622,927 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 17.

Table 17 - Summary of LA DAS allocation for each permit type at 26 DAS for FT LA vessels.

	FY 2021	**FY 2022**
FT LA	26	19.5
PT LA	10.4	7.8
Occasional	2.2	1.6

4.3.4 Alternative 4 – Four Access Area Trips, with 1 trip in Nantucket Lightship South

Alternative 4 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 7) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (27,000 pounds), Closed Area II (27,000 pounds), and the Nantucket Lightship South (18,000 pounds). There would be no direct allocations to the FT LA component to the Closed Area I Access Area, but the area would be available for RSA compensation fishing and for LAGC access area fishing.

Alternative 4 would utilize a new configuration for the Closed Area II Access Area by combining part of the traditional access area (CAII-Southwest) with the area to the south (CAII-Extension). The eastern portion of the area (i.e., CAII-East) would be closed to scallop fishing for the entire year (Map 7). Coordinates of the proposed Closed Area II Access Area (Southwest and Extension) are provided in Table 11 and coordinates of the proposed Closed Area II East closure are provided in Table 12.

Alternative 4 would maintain the small area between the NLS-North and NLS-South, designated as the "Nantucket Lightship Triangle" (NLS-Triangle), which would be closed to the fishery for FY2021. The NLS-Triangle has an area of approximately 30 nmi^2 (101 km^2). Coordinates for the proposed NLS-Triangle closure are provided in Table 13.

The NLS-West was slated to become part of the open area in FY2020; however, the area was closed through emergency action in FY2020 and remains closed until changed through a Council action. In all FW33 alternatives, the NLS-West would become part of the open bottom and would be accessible to limited access vessels fishing open area DAS or to LAGC IFQ vessels fishing open trips.

The specific allocations associated with Alternative 4:

- The FY2021 Annual Projected Landings (APL) for this alternative are 40.2 million pounds (open area F=0.3, 24 DAS), or 41.4 million pounds (open area F=0.33, 26 DAS) before set-asides are

accounted for (i.e., RSA, observer). The total set-asides (i.e., RSA, and observer) and incidental catch for 2021 are 895 mt or 1.97 million pounds.

- Each full-time limited access vessel would be allocated a total of 72,000 access area pounds. The FT LA trip limit would be set at 18,000 lbs in all available access areas: Closed Area II (Closed Area II Southwest and Closed Area II Extension combined), the Mid-Atlantic Access Area, and the Nantucket Lightship South.
- FT LA vessels would be allowed to exchange access area allocations in all areas at increments of 9,000 pounds. All access area allocations could be exchanged at an increment of 9,000 pounds regardless of the initial allocation; for example, 9,000 pounds from the NLS-South could be exchanged for 9,000 pounds from CAII. There would be no change to how part-time vessels can exchange trips – those exchanges would still be done as 1:1 at the possession limit for this alternative (i.e., 14,400 pounds).
- For access area trips in the NLS-S, crew limits for LA vessels could be increased by 2 from the maximum crew limit in regulation. Full-time vessels could have a maximum of 10 crew and part-time vessels could have a maximum of 8 crew when fishing in the NLS-South.
- Access area allocations would be set at 28,800 pounds for PT LA vessels, and 6,000 pounds for Occasional LA vessels. The LA PT trip limit would be set at 14,400 pounds and PT vessels would receive one (1) MAAA trip and one (1) trip to either Nantucket Lightship South or Closed Area II. The LA Occ trip limit would be set at 6,000 pounds, and Occ vessels would be able to fish in their allocation in the MAAA.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated Limited Access access area trips would be available in the same access areas defined by Framework 33 for FY2021 and the first 60 days of FY2022, even if the area is scheduled to close in FY 2022 (Map 4, Map 5). Vessels planning to fish FY2021 access area allocation must start their trip (i.e., position on their VMS unit seaward of the demarcation line) by 23:59 on May 30, 2022. For example, trips allocated to the NLS-S Access Area could only be fished in the access area boundary defined by FW33 during FY2021 or in the first 60 days of FY2022.
- FY2022 default measures under Alternative 2 would allocate FT LA vessels one (1) 18,000-pound access area trip to the Mid-Atlantic Access Area and one (1) 18,000-pound trip to the Nantucket Lightship South. PT LA vessels would be allocated one (1) 7,200-pound access area trip to the Mid-Atlantic Access Area and one 7,200-pound access area trip to the Nantucket Lightship South. For both full-time and part-time vessels, the NLS-South default trip would be available on April 1, 2022 and the Mid-Atlantic Access Area default trip would be available on May 1, 2022. The LAGC IFQ component would also receive default access area trips to the MAAA and NLS-South, proportional to 5.5% of the default access area allocations to each area (i.e., 571 trips to the MAAA and 571 trips to the NLS-South). The LAGC IFQ and LA DAS allocations would be set at 75% of the FY2021 allocations. The FY2022 default trips may be fished within the access areas as defined by FW33 (Map 4, Map 5).

Rationale: Modifications to rotational areas of Closed Area II are in response to the multiple year classes observed in this part of the resource in 2020. The closure of CAII-East is due to there not being enough exploitable biomass to support rotational harvest by the full-time limited access fleet in FY2021 and because a large year class of juvenile scallops was observed in the eastern extent of the access area in 2020. Closing CAII-East for FY2021 will allow the juvenile scallops to grow in the absence of fishing and continue to be monitored through annual surveys. A highly concentrated aggregation of scallops was observed along the shared border of Closed Area II Southwest and Extension in 2020; while there are several cohorts present in these two areas, the majority of scallops are part of the three-year-old class which grew faster than expected between the 2019 and 2020 surveys and are expected to recruit to the

fishery in FY2021. Combining CAII-Southwest with CAII-Extension allows for additional spatial flexibility given the dense aggregation of exploitable biomass that straddles the shared boundary.

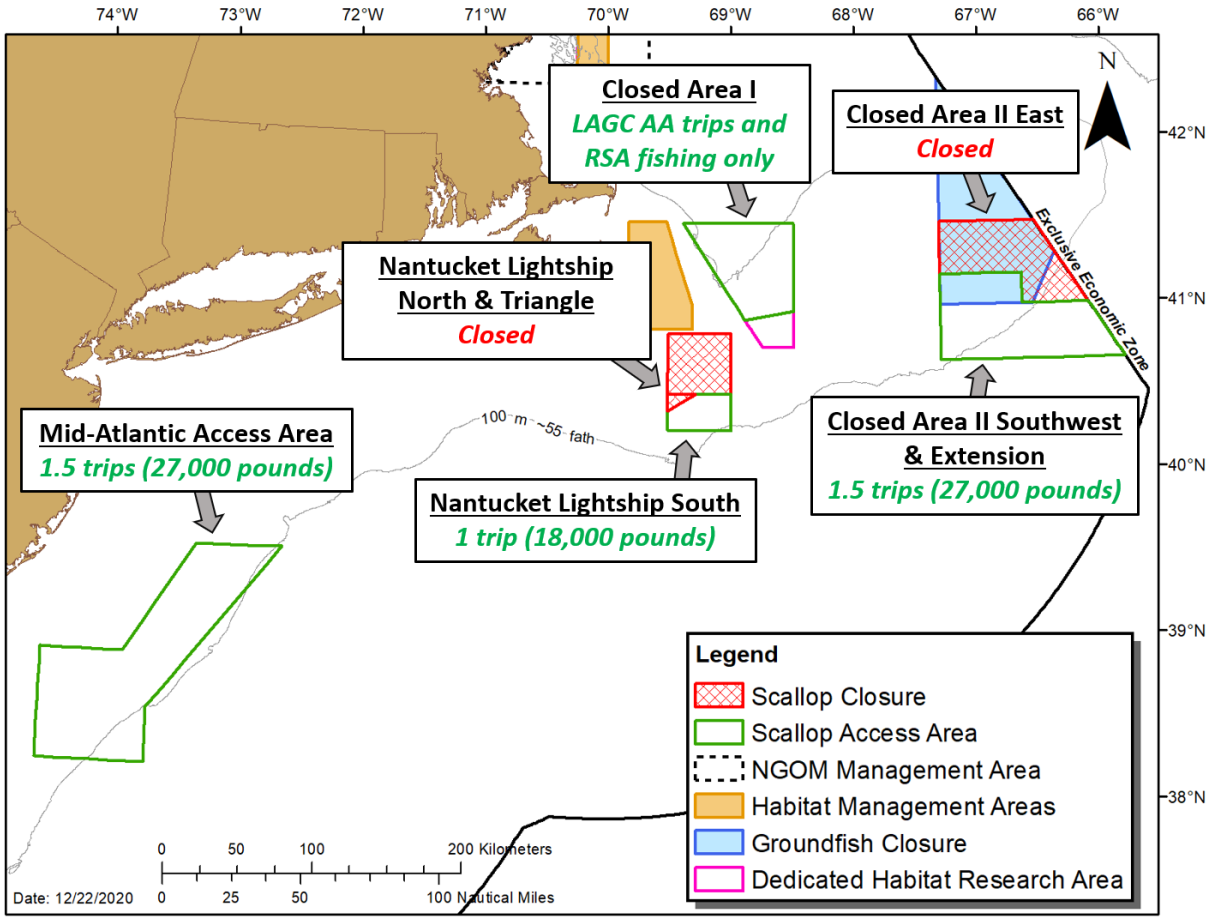
Exploitable biomass in the MAAA has continued to decline as the large 2012-year-class is fished down and due to a lack of incoming recruitment. Allocating one and a half trips to the MAAA in FY2021 represents a reduction in effort compared to the past several years and is expected to balance effort so that the MAAA can support rotational harvest again in FY2022.

While sub-optimal operationally due to the slow growth and smaller size at age of scallops in this area, the NLS-South holds one of the largest exploitable biomass aggregations in the resource. Considering the high level of biomass in the area and acknowledging that the scallops will be 8 years old, harvesting these scallops is necessary given the risk of foregoing exploitable biomass due to old age. The NLS-Triangle closure comprises a small area with low scallop densities that could be used for research purposes in the absence of fishing. Continuation of the NLS-Triangle rotational area closure does not bind the Council to facilitating or supporting research in this area in any way. There is effectively no exploitable biomass remaining in the NLS-West – reverting this area to open bottom is not expected to have any effect on fishing behavior or open area DAS utilization because little to no open area fishing is anticipated for this area in FY2021.

There is not enough exploitable biomass in CAI to support a full or partial trip for the full-time limited access fleet in FY2021. Maintaining the CAI boundary and making it eligible for only LAGC IFQ AA trips and RSA compensation fishing will give both the LA and LAGC components an opportunity to fish there at a limited level if vessels elect to do so. This also creates a foundation for several alternatives in Section 4.4, which consider redistributing some or all CAII LAGC AA trips to Closed Area I.

Allocating partial trips and allowing access area allocations to be exchanged at the lowest increment of allocation (i.e., 9,000 pounds) is viewed as an equitable, alternative approach to a lottery system. Lottery systems have been employed by the Council in the past to allocate access to areas with not enough exploitable biomass to support effort of a full trip. The lottery has been characterized by some as inequitable because the resulting allocations can be advantageous for some but not others. Allowing trip exchanges at 9,000-pound increments does not change the level of harvest expected from each access area, but does allow additional flexibility to vessels that may wish to exchange access area allocations at a lower increment than the access area possession limit. Part time and occasional vessels were not included in this option because they would receive equal trip allocations to the NLS-South/Closed Area II and the MAAA.

Map 7 – Spatial management under Alternative 4.



4.3.4.1 Option 1 – Open Area Fished at F=0.30 (24 DAS)

Option 1 would set the full-time Limited Access DAS at 24, which is expected to result in an average open area fishing mortality rate of F=0.3 in open areas. The specific allocations associated with Alternative 4 Option 1 are described below:

- The APL after set-asides are removed would be 38,179,655 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,099,881 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,908,983 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,574,911 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 18.

Table 18 – Summary of LA DAS allocations for each permit type at 24 DAS for FT LA vessels.

	FY 2021	FY 2022
FT LA	24	18
PT LA	9.6	7.2
Occasional	2	1.5

4.3.4.2 Option 2 – Open Areas Fished at F=0.33 (26 DAS)

Option 2 would set the full-time Limited Access DAS at 26, which is expected to result in an average open area fishing mortality rate of F=0.33 in open areas. The specific allocations associated with Alternative 3 Option 1 are described below:

- The APL after set-asides are removed would be 39,407,629 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,167,420 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,970,381 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,625,565 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 19.

Table 19 - Summary of LA DAS allocation for each permit type at 26 DAS for FT LA vessels.

	FY 2021	**FY 2022**
FT LA	26	19.5
PT LA	10.4	7.8
Occasional	2.2	1.6

4.3.5 Alternative 5 – Four Access Area Trips, with 1 trip to the Mid-Atlantic Access Area

Alternative 5 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 8) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (18,000 pounds), Closed Area II (27,000 pounds), and the Nantucket Lightship South (27,000 pounds). There would be no direct allocations to the FT LA component to the Closed Area I Access Area, but the area would be available for RSA compensation fishing and for LAGC access area fishing.

Alternative 5 would utilize a new configuration for the Closed Area II Access Area by combining part of the traditional access area (CAII-Southwest) with the area to the south (CAII-Extension). The eastern portion of the area (i.e., CAII-East) would be closed to scallop fishing for the entire year (Map 8). Coordinates of the proposed Closed Area II Access Area (Southwest and Extension) are provided in Table 11 and coordinates of the proposed Closed Area II East closure are provided in Table 12.

Alternative 5 would maintain the small area between the NLS-North and NLS-South, designated as the "Nantucket Lightship Triangle" (NLS-Triangle), which would be closed to the fishery for FY2021. The NLS-Triangle has an area of approximately 30 nmi^2 (101 km^2). Coordinates for the proposed NLS-Triangle closure are provided in Table 13.

The NLS-West was slated to become part of the open area in FY2020; however, the area was closed through emergency action in FY2020 and remains closed until changed through a Council action. In all FW33 alternatives, the NLS-West would become part of the open bottom and would be accessible to limited access vessels fishing open area DAS or to LAGC IFQ vessels fishing open trips.

The specific allocations associated with Alternative 5:

- The FY2021 Annual Projected Landings (APL) for this alternative are 40.1 million pounds (open area F=0.3, 24 DAS), or 41.3 million pounds (open area F=0.33, 26 DAS) before set-asides are

accounted for (i.e., RSA, observer). The total set-asides (i.e., RSA, and observer) and incidental catch for 2021 are 895 mt or 1.97 million pounds.

- Each full-time limited access vessel would be allocated a total of 72,000 access area pounds. The FT LA trip limit would be set at 18,000 lbs in all available access areas: Closed Area II (Closed Area II Southwest and Closed Area II Extension combined), the Mid-Atlantic Access Area, and the Nantucket Lightship South.
- FT LA vessels would be allowed to exchange access area allocations in all areas at increments of 9,000 pounds. All access area allocations could be exchanged at an increment of 9,000 pounds regardless of the initial allocation; for example, 9,000 pounds from the NLS-South could be exchanged for 9,000 pounds from CAII. There would be no change to how part-time vessels can exchange trips – those exchanges would still be done as 1:1 at the possession limit for this alternative (i.e., 14,400 pounds).
- For access area trips in the NLS-S, crew limits for LA vessels could be increased by 2 from the maximum crew limit in regulation. Full-time vessels could have a maximum of 10 crew and part-time vessels could have a maximum of 8 crew when fishing in the NLS-South.
- Access area allocations would be set at 28,800 pounds for PT LA vessels, and 6,000 pounds for Occasional LA vessels. The LA PT trip limit would be set at 14,400 pounds and PT vessels would receive one (1) MAAA trip and one (1) trip to either Nantucket Lightship South or Closed Area II. The LA Occ trip limit would be set at 6,000 pounds, and Occ vessels would be able to fish in their allocation in the MAAA.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated Limited Access access area trips would be available in the same access areas defined by Framework 33 for FY2021 and the first 60 days of FY2022, even if the area is scheduled to close in FY 2022 (Map 4, Map 5). Vessels planning to fish FY2021 access area allocation must start their trip (i.e., position on their VMS unit seaward of the demarcation line) by 23:59 on May 30, 2022. For example, trips allocated to the NLS-S Access Area could only be fished in the access area boundary defined by FW33 during FY2021 or in the first 60 days of FY2022.
- FY2022 default measures under Alternative 2 would allocate FT LA vessels one (1) 18,000-pound access area trip to the Mid-Atlantic Access Area and one (1) 18,000-pound trip to the Nantucket Lightship South. PT LA vessels would be allocated one (1) 7,200-pound access area trip to the Mid-Atlantic Access Area and one 7,200-pound access area trip to the Nantucket Lightship South. For both full-time and part-time vessels, the NLS-South default trip would be available on April 1, 2022 and the Mid-Atlantic Access Area default trip would be available on May 1, 2022. The LAGC IFQ component would also receive default access area trips to the MAAA and NLS-South, proportional to 5.5% of the default access area allocations to each area (i.e., 571 trips to the MAAA and 571 trips to the NLS-South). The LAGC IFQ and LA DAS allocations would be set at 75% of the FY2021 allocations. The FY2022 default trips may be fished within the access areas as defined by FW33 (Map 4, Map 5).

Rationale: Modifications to rotational areas of Closed Area II are in response to the multiple year classes observed in this part of the resource in 2020. The closure of CAII-East is due to there not being enough exploitable biomass to support rotational harvest by the full-time limited access fleet in FY2021 and because a large year class of juvenile scallops was observed in the eastern extent of the access area in 2020. Closing CAII-East for FY2021 will allow the juvenile scallops to grow in the absence of fishing and continue to be monitored through annual surveys. A highly concentrated aggregation of scallops was observed along the shared border of Closed Area II Southwest and Extension in 2020; while there are several cohorts present in these two areas, the majority of scallops are part of the three-year-old class which grew faster than expected between the 2019 and 2020 surveys and are expected to recruit to the

fishery in FY2021. Combining CAII-Southwest with CAII-Extension allows for additional spatial flexibility given the dense aggregation of exploitable biomass that straddles the shared boundary.

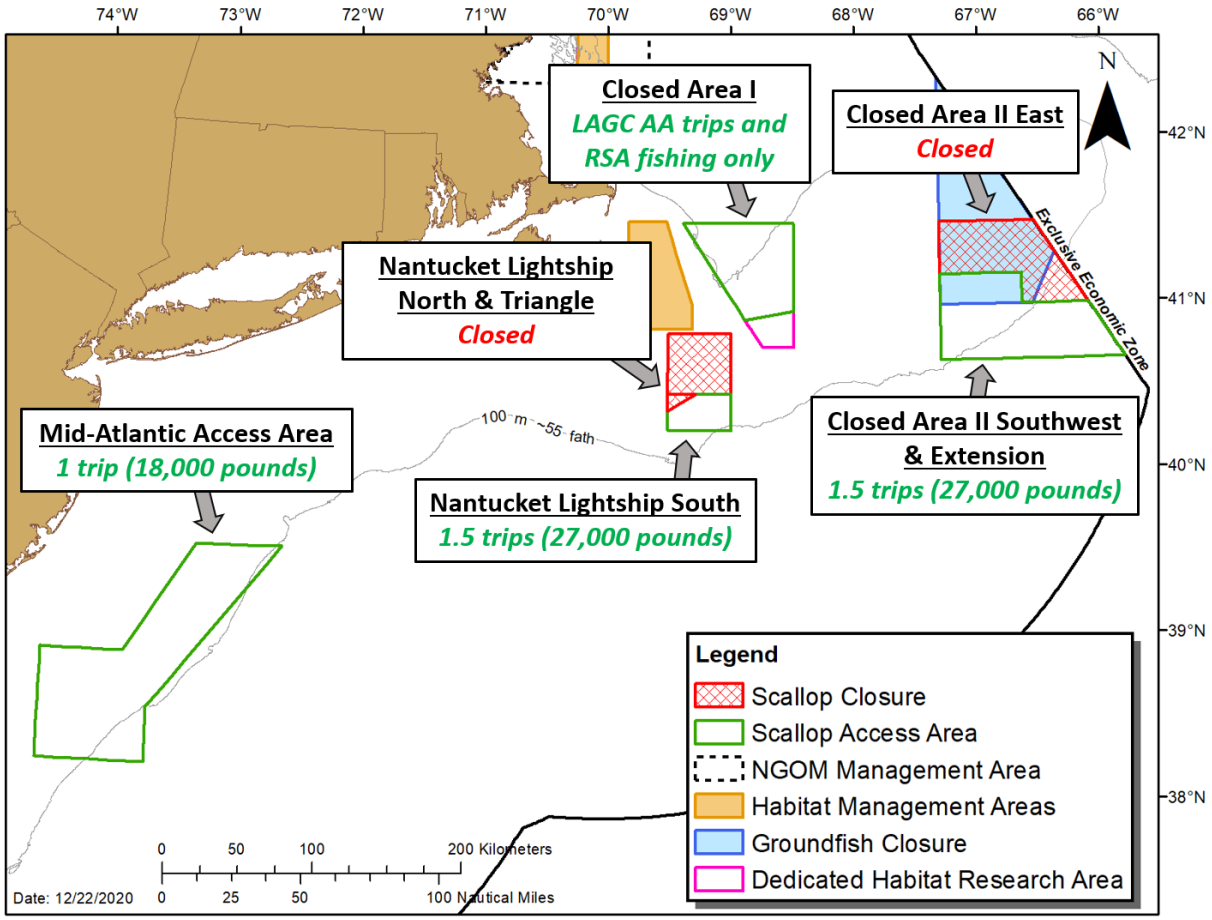
Exploitable biomass in the MAAA has continued to decline as the large 2012-year-class is fished down and due to a lack of incoming recruitment. Allocating one trip to the MAAA in FY2021 represents a reduction in effort compared to the past several years and is expected to balance effort so that the MAAA can support rotational harvest again in FY2022.

While sub-optimal operationally due to the slow growth and smaller size at age of scallops in this area, the NLS-South holds one of the largest exploitable biomass aggregations in the resource. Considering the high level of biomass in the area and acknowledging that the scallops will be 8 years old, harvesting these scallops is necessary given the risk of foregoing exploitable biomass due to old age. The NLS-Triangle closure comprises a small area with low scallop densities that could be used for research purposes in the absence of fishing. Continuation of the NLS-Triangle rotational area closure does not bind the Council to facilitating or supporting research in this area in any way. There is effectively no exploitable biomass remaining in the NLS-West – reverting this area to open bottom is not expected to have any effect on fishing behavior or open area DAS utilization because little to no open area fishing is anticipated for this area in FY2021.

There is not enough exploitable biomass in CAI to support a full or partial trip for the full-time limited access fleet in FY2021. Maintaining the CAI boundary and making it eligible for only LAGC IFQ AA trips and RSA compensation fishing will give both the LA and LAGC components an opportunity to fish there at a limited level if vessels elect to do so. This also creates a foundation for several alternatives in Section 4.4, which consider redistributing some or all CAII LAGC AA trips to Closed Area I.

Allocating partial trips and allowing access area allocations to be exchanged at the lowest increment of allocation (i.e., 9,000 pounds) is viewed as an equitable, alternative approach to a lottery system. Lottery systems have been employed by the Council in the past to allocate access to areas with not enough exploitable biomass to support effort of a full trip. The lottery has been characterized by some as inequitable because the resulting allocations can be advantageous for some but not others. Allowing trip exchanges at 9,000-pound increments does not change the level of harvest expected from each access area, but does allow additional flexibility to vessels that may wish to exchange access area allocations at a lower increment than the access area possession limit. Part time and occasional vessels were not included in this option because they would receive equal trip allocations to the NLS-South/Closed Area II and the MAAA.

Map 8 – Spatial management under Alternative 5.



4.3.5.1 Option 1 – Open Area Fished at F=0.30 (24 DAS)

Option 1 would set the full-time Limited Access DAS at 24, which is expected to result in an average open area fishing mortality rate of F=0.3 in open areas. The specific allocations associated with Alternative 4 Option 1 are described below:

- The APL after set-asides are removed would be 38,071,628 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,093,940 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,903,581 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,570,455 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 20.

Table 20 – Summary of LA DAS allocations for each permit type at 24 DAS for FT LA vessels.

	FY 2021	FY 2022
FT LA	24	18
PT LA	9.6	7.2
Occasional	2	1.5

4.3.5.2 Option 2 – Open Area Fished at F=0.33 (26 DAS)

Option 2 would set the full-time Limited Access DAS at 26, which is expected to result in an average open area fishing mortality rate of F=0.33 in open areas. The specific allocations associated with Alternative 3 Option 1 are described below:

- The APL after set-asides are removed would be 39,299,603 pounds.
- The LAGC IFQ (5.5%) allocation would be 2,161,478 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,964,980 pounds. The FY 2022 default LAGC IFQ quota (5.5%) would be set at 75% of the FY 2021 value, which would be 1,621,109 pounds.
- DAS allocations for full-time, part-time, and occasional permits are shown in Table 21.

Table 21 - Summary of LA DAS allocation for each permit type at 26 DAS for FT LA vessels.

	FY 2021	FY 2022
FT LA	26	19.5
PT LA	10.4	7.8
Occasional	2.2	1.6

4.3.6 Status Quo

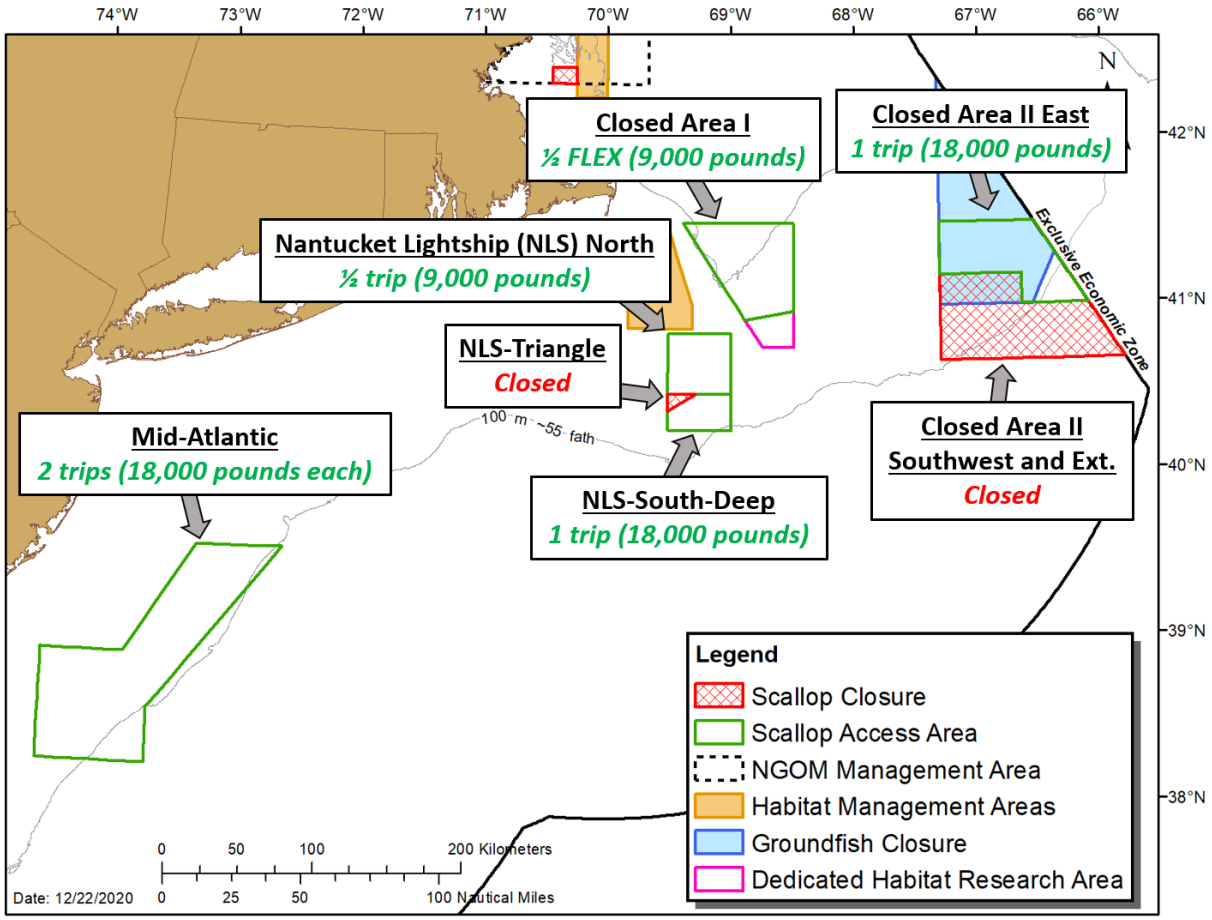
The allocations and spatial management measures that were approved for FY 2020 though Framework 32 are presented for a "status quo" comparison with updated spatial management alternatives. The impact analyses in this action (Section 6.0) include the impacts of "no change" to the spatial management scenarios because it is a more realistic comparison than to No Action (Section 4.3.1), which only captures trade-offs between the default measures approved in FW32 (i.e. partial allocations). A description of the Framework 32 preferred measures is provided in the alternatives section of Framework 33 to provide continuity and context for the reader, but is not an option proposed for Council decision.

In Framework 33, the Status Quo run that is presented deviates from the modeling assumptions made in FW32 due to changes in scallop biomass and observations of incoming year classes. Therefore, Status Quo should not be considered a perfect comparison to the FY2020 approach to spatial management.

Framework 32 allocated full-time limited access vessels a total access area allocation of 90,000 pounds per vessel and set the access area possession limit at 18,000 pounds per trip. The Council allocated trips to: the Mid-Atlantic Access Area (2 FT LA trips), Closed Area II Access Area (1 FT LA trip), Closed Area I Access Area (1/2 FT LA FLEX trip), the Nantucket Lightship North Access Area (1/2 FT LA trips), and the Nantucket Lightship South Deep Access Area (1 FT LA trip) (Map 9). The Flex trip allocation (9,000 pounds) could be fished within Closed Area I or the Mid-Atlantic Access Area. This option was developed and selected so that LA vessels could redirect effort outside of Closed Area I if the biomass projection for this area was overly optimistic. All FT LA access area allocations were allowed to be exchanged in 9,000-pound increments (i.e., the lowest access area increment considered in FW32).

Fishing the open bottom at an F=0.33 would result in an allocation of 26 DAS in FY2021 (vs. 24 DAS in FY2020). Applying status quo spatial management in FY 2021 would be expected to result in a total APL of 39.1 million pounds, which is roughly 13% less than the 44.8 million pound APL associated with the same spatial management and open area F applied for FY2020.

Map 9 – Status Quo spatial management (FW32 allocations for FY2020).



4.4 Action 4 - Access Area Trip Allocations to the LAGC IFQ Component

4.4.1 Alternative 1 – No Action (Default measures from FW32)

Alternative 1 would set LAGC IFQ access area trips at 571 trips to the Mid-Atlantic Access Area, which is the number of trips specified through default measures in Framework 32. As noted above, the LAGC IFQ fishery is allocated a fleet wide total number of access area trips. Individual vessels are not required to take trips in specific areas. Instead, a maximum number of trips is identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year.

Rationale: Framework 32 specified a set number of LAGC IFQ access area trips in default measures to provide LAGC IFQ vessels fishing opportunities should updated specifications for FY2021 be delayed. Default access area trip allocations for the LAGC IFQ component reflects the trip equivalent of 5.5% of the default access area allocation to the FT LA fleet.

4.4.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Allocation to CAI Only

Under Alternative 2, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2), and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e., either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips or 1,998 trips with a 600-pound trip limit. This method has been used in previous actions.

Alternative 2 would allocate LAGC IFQ access are trips proportional to the LA allocations in each access area (Table 22) and would distribute the LAGC IFQ Closed Area II trip allocation exclusively to Closed Area I. As shown in Table 22, this would result in either 571 or 856 LAGC access areas trips to Closed Area I, depending on the alternative that is selected as preferred in Section 4.2.2.2. LAGC IFQ access area trip allocations to the MAAA and NLS-S would be proportional to the LA allocations in each access area.

Rationale: The Closed Area II LAGC IFQ trip allocation would be distributed to the Closed Area I access area. This option would keep LAGC IFQ trips on Georges Bank proportional to the total FT LA access area allocation for Georges Bank. This approach leads to more opportunity for the LAGC IFQ to harvest scallops from access areas that can be fished by the day-boat fleet.

Allocations would follow the 94.5% and 5.5% split, as specified in Amendment 11.

Table 22 - Potential LAGC IFQ Access Area Trips by Area for FY 2021 under Alternative 2.

Specifications alternative in Section 4.3	Alt. 1 – No Action	Alt. 2	Alt. 3	Alt. 4	Alt. 5
MAAA	571	571	856	856	571
NLS-S	0	856	856	571	856
CAI	0	571	571	856	856

4.4.3 Alternative 3 - Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Allocation evenly across the Mid-Atlantic Access Area, NLS-South, and Closed Area I

Under Alternative 3, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2), and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e. either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips or 1,998 trips with a 600-pound trip limit. This method has been used in previous actions.

Alternative 2 would allocate LAGC IFQ access are trips proportional to the LA allocations in each access area (Table 22) and would distribute the LAGC IFQ Closed Area II trip allocation evenly across Closed Area I, NLS-South, and the MAAA. The number of LAGC IFQ access area trips varies depending on

whether 1 or 1.5 FT LA AA trips are allocated to Closed Area II. Table 23 shows the number of 600-pound trips associated with each of the alternative in Section 4.2.2.2.

Rationale: The Closed Area II LAGC IFQ trip allocation would be distributed evenly across Closed Area I, NLS-South, and the MAAA. This option would increase the number of access area trips to in-shore access area across in the Mid-Atlantic and on Georges Bank. This approach leads to more opportunity for the LAGC IFQ to harvest scallops from access areas that can be fished by the day-boat fleet.

Table 23 – Potential LAGC IFQ access area trips allocated under Alternative 3.

Specifications alternative in Section 4.3	Alt. 1 – No Action	Alt. 2	Alt. 3	Alt. 4	Alt. 5
MAAA	571	761	1046	1141	856
NLS-S	0	1046	1046	856	1141
CAI	0	191	191	286	286

4.5 Action 5 - Additional Measures to Reduce Fishery Impacts

4.5.1 RSA Compensation Fishing

4.5.1.1 Alternative 1 – No Action

Under No Action, Research Set-Aside (RSA) compensation fishing would be restricted to areas open to LA DAS fishing only. Vessels with RSA poundage would not be allowed to harvest RSA compensation from access areas.

4.5.1.2 Alternative 2 – Allow RSA compensation fishing in the Mid-Atlantic Access Area, NLS-South, Closed Area II, and Closed Area I, with limited RSA compensation fishing in the NGOM Management Area

Under Alternative 2, RSA compensation fishing would be permitted in the following areas in FY2021 (Map 10):

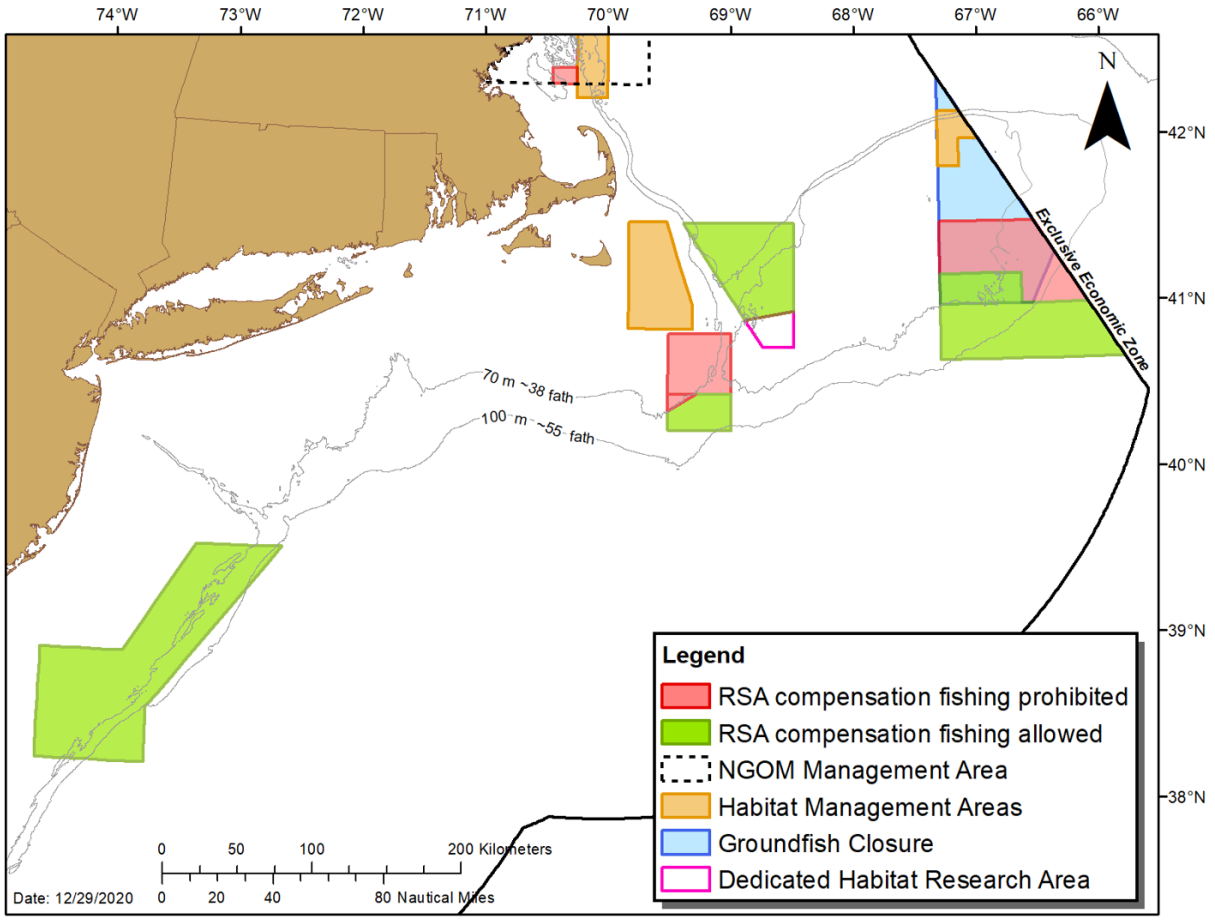
- Areas open to Limited Access DAS fishing (i.e., open bottom)
- Mid-Atlantic Access Area
- Closed Area II, as defined in Section 4.2.2.2, from June 1, 2021 – August 15, 2021
- Closed Area I
- Nantucket Lightship-South
- NGOM Management area (up to the LA TAC in this area)

RSA compensation fishing would be permitted in the NGOM management area, per NGOM alternatives as specified in Section 4.2. RSA compensation fishing would be permitted in the NGOM management area up to the poundage specified in the Council's preferred alternative for the Limited Access share of the NGOM TAC, and only by vessels that are awarded NGOM RSA compensation pounds.

Vessels fishing RSA compensation seasonally in Closed Area II would not be permitted to fish in the area after 11:59 pm on August 14, 2021.

Rationale: This provision is intended to 1) Accurately account for scallop removals in the NGOM by restricting RSA compensation fishing to vessels that receive a portion of the LA TAC; 2) Facilitate access to high densities of scallops in access areas; 3) allow seasonal fishing in Closed Area II to reduce impacts on Northern windowpane flounder and Georges Bank yellowtail flounder; 4) Allowing vessels to conduct compensation fishing in several areas is expected to distribute impacts of fishing more broadly, and provide vessels with flexibility.

Map 10 – Rotational access areas where RSA compensation fishing can and cannot occur in FY2021 under Alternative 2.



4.5.2 Seasonal Closure of Closed Area II Access Area to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

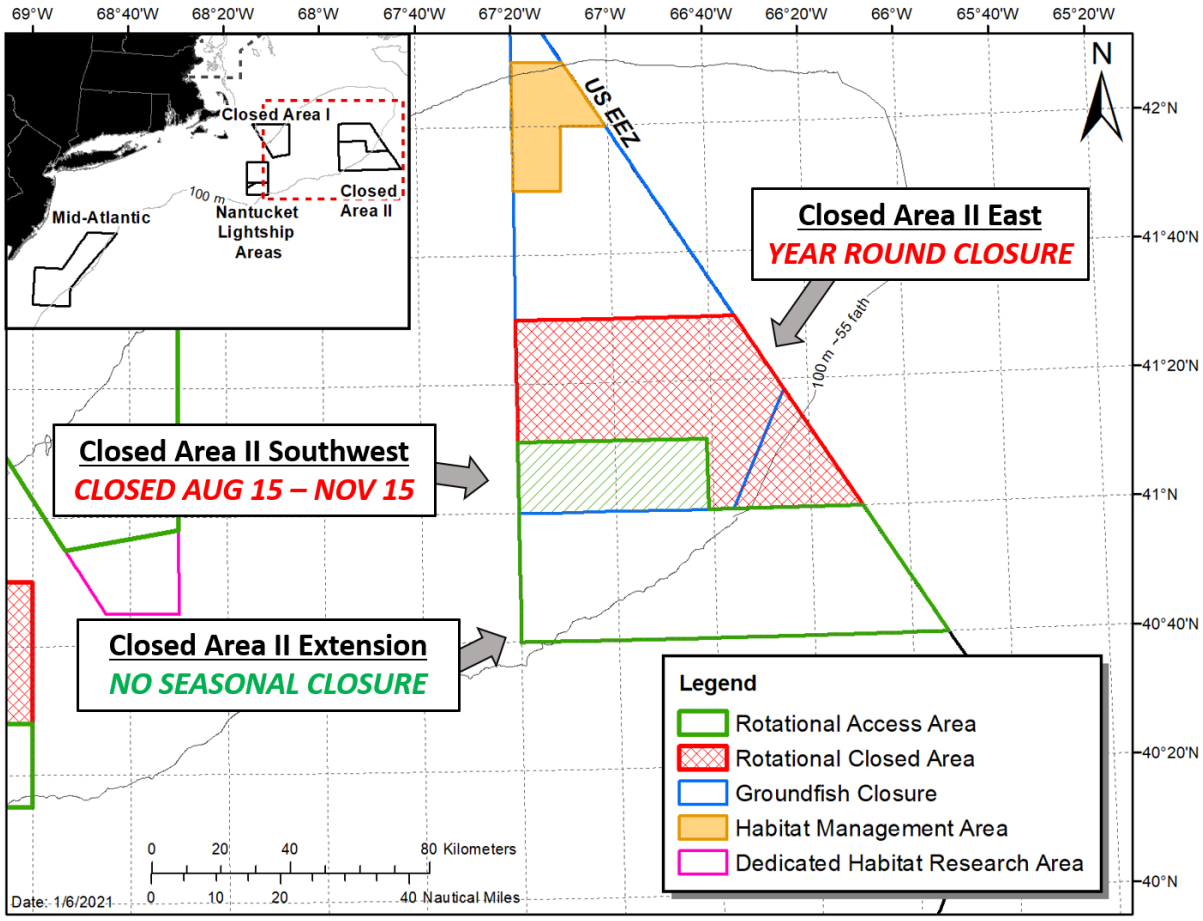
4.5.2.1 Alternative 1 – No Action

There would be no change to when scallop vessels could access the Closed Area II Access Area. The existing seasonal closure to protect flatfish would remain in place from August 15 – November 15 of each

year. The closure would apply to Closed Area II Southwest (part of the traditional CAII Access Area not subject to the year-round scallop closure) but would not apply to Closed Area II Extension (Map 11).

Rationale: The existing seasonal closure of Closed Area II Access Area is targeted around a time of year when GB yellowtail bycatch rates are known to be relatively high.

Map 11 – The seasonal closure of Closed Area II under Alternative 1 (No Action).



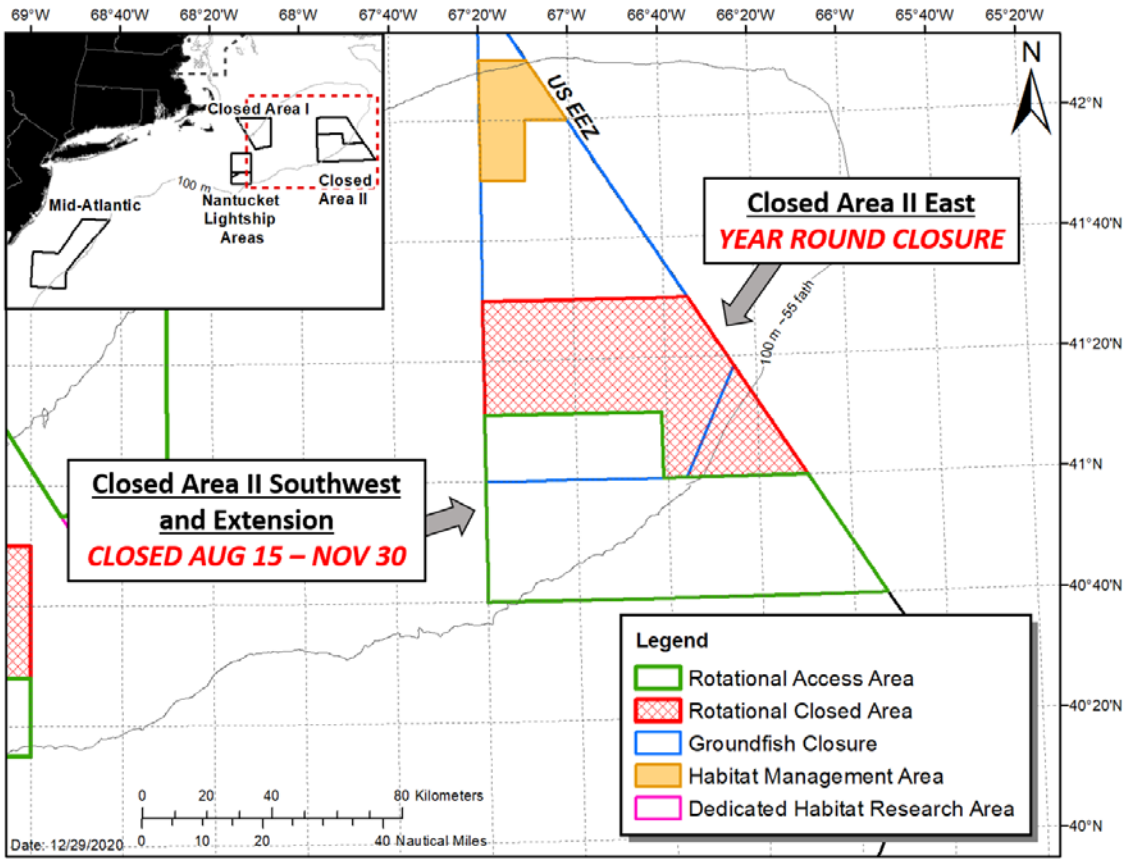
4.5.2.2 Alternative 2 – Extend Seasonal Closures of Closed Area II Access Area through November 30th in FY 2021, Include CAII-Ext in Seasonal Closure

Alternative 2 would extend the Closed Area II Access Area seasonal closure by two weeks in November and would include the Closed Area II Extension, making the newly configured area closed from August 15 until November 30 (Map 12). The closure area boundary for this alternative is the same as the Closed Area II Access Area boundary identified for FY2021 (i.e., CAII-Southwest and CAII-Extension as one

continuous area, as defined in Section 4.2.2.2). Closed Area II Access Area would re-open to access area fishing on December 1, 2021. This measure would be in place for one year and would expire after the 2021 fishing year.

Rationale: Historically, GB yellowtail and Northern windowpane d/K ratios have been higher in November compared to the summer months in CAII Access Area and Closed Area II Extension, which is now part of the CAII access area in fishing year 2021. Though scallop landings from CAII Access Area have been lower in November than the late-spring early-summer months, the bycatch savings expected by extending the existing closure an additional two weeks are anticipated to reduce catch of both GB yellowtail and Northern windowpane flatfish stocks. Additionally, extending the seasonal closure in CAII compliments other measures that are expected to reduce bycatch in this action, such as the year-round closure of a portion of Closed Area II AA (i.e. Closed Area II Southeast), and restricting RSA compensation fishing in Closed Area II to a short seasonal window in the summer months when bycatch is low.

Map 12 - Area coverage of the extended CAII seasonal closure under Alternative 2 (Aug. 15 – Nov. 30, 2020). The area now includes CAII-Southwest and CAII-Extension.



4.6 CONSIDERED BUT REJECTED ALTERNATIVES

5.0 AFFECTED ENVIRONMENT

5.1 INTRODUCTION

The Affected Environment is described in this action based on valued ecosystem components (VECs), including target species, non-target species, predator species, physical environment and Essential Fish Habitat (EFH), protected resources, and human communities. VECs represent the resources, areas and human communities that may be affected by the alternatives under consideration in this amendment. VECs are the focus, since they are the "place" where the impacts of management actions occur.

5.2 ATLANTIC SEA SCALLOP RESOURCE

5.2.1 Stock Status

The sea scallop resource was assessed through a management track assessment in 2020 (NEFSC, 2018). The summary of the management track assessment can be found at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/population-assessments/2020-management-track-assessments

Overfishing is occurring if F is above F_{MSY}, and the stock is considered overfished if biomass is less than ½ B_{MSY}. 2020 Management Track updated reference points and increased F_{MSY} to 0.61 and increased B_{MSY} to 102,675 mt (½ B_{MSY} = 51,329 mt). The 2020 management track assessment concluded that the scallop stock is neither overfished nor did it experience overfishing in 2019 (i.e. the terminal year of the assessment).

Figure 2 - Fully recruited annual fishing mortality rate for scallop from 1975 - 2019

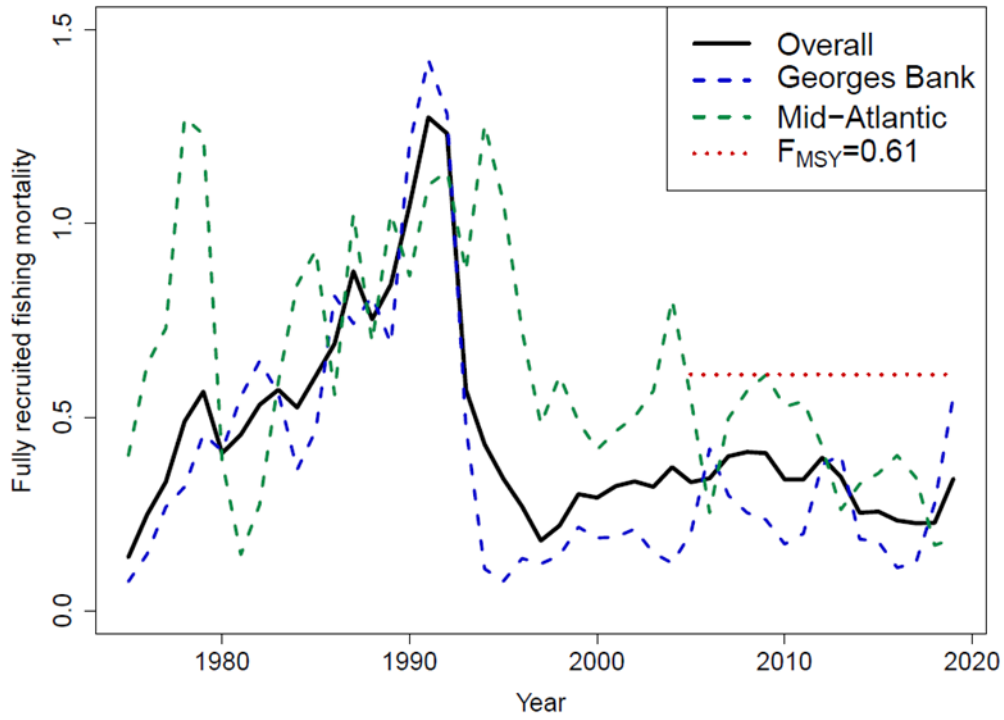


Table 24 - Atlantic sea scallop stock status from recent assessments.

	Definition in Scallop FMP	SARC 50 (2010)	SARC 59 (2014)	SARC 65 (2018)	2020 Management Track
OFL	F_{MSY}	F=0.38	F=0.48	F=0.64	F=0.61
ABC=ACL	25% probability of exceeding the OFL	F=0.32	F=0.38	F=0.51	F=0.45
B_{MSY}	B_{TARGET}	125,358 mt	96,480 mt	116,766 mt	102,657 mt
1/2 B_{MSY}	$B_{THRESHOLD}$	62,679 mt	48,240 mt	58,383 mt	51,329 mt
MSY		24,975 mt	23,798 mt	46,531 mt	32,079 mt
Overfished?	$B < B_{THRESHOLD}$	No	No	No	No
Overfishing?	$F < F_{THRESHOLD}=F_{MSY}$	No	No	No	No

5.2.2 Northern Gulf of Maine

In 2020, SMAST completed surveys of Ipswich Bay, Jeffreys Ledge, Platts Bank, and Stellwagen Bank within the NGOM management unit. Results of the

Table 25 –Projections of biomass, exploitable biomass, and landings associated with the range of F rates considered for 2021.

Area & Year	Bms (lbs)	ExpBms (lbs)	F=0.25 Landings (lbs)	F=0.2 Landings (lbs)	F=0.18 Landings (lbs)
Ipswich (2020 SMAST Drop Camera)					
2021	123,679	80,248	20,062	16,821	15,432
2022	119,491	81,791	20,437	17,681	16,424
Jeffreys (2020 SMAST Drop Camera)					
2021	293,215	252,209	63,052	52,889	48,502
2022	231,265	204,369	51,059	44,776	41,800
Machias Seal Island (2019 ME DMR dredge survey)					
2021	429,681	427,697	106,946	89,905	82,541
Platts (2020 SMAST Drop Camera)					
2021	82,673	69,446	17,350	14,573	13,382
2022	68,123	52,470	13,095	11,464	10,714
Stellwagen Bank in NGOM, closed in FY2020 & FY2021 (2020 SMAST Drop Camera)					
2022	4,306,069	3,936,574	984,144	824,595	756,009

5.2.3 Summary of 2020 Scallop Surveys

The Atlantic sea scallop resource was surveyed by the following groups/methods in 2020: the Virginia Institute of Marine Science (VIMS) dredge survey of the Mid-Atlantic Bight, Nantucket Lightship Area, Closed Area I, and Closed Area II and surrounds and the Great South Channel; the University of Massachusetts Dartmouth School for Marine Science and Technology (SMAST) high-resolution drop camera survey of the Elephant Trunk area, Nantucket Lightship, the Great South Channel, and Closed Area II and surrounds; the Coonamessett Farm Foundation (CFF) HabCam survey of the Nantucket Lightship, Closed Area II, Southern Flank, Block Island, Long Island, New York Bight and the Elephant Trunk.

The survey information below is detailed at the spatial resolution of Scallop Area Management Simulation (SAMS model) areas. 2020 SAMS area boundaries are shown in Figure 3 for Georges Bank and Figure 4 for the Mid-Atlantic Bight.

Figure 3 – The 2020 Georges Bank SAMS areas used for projections in FW33.

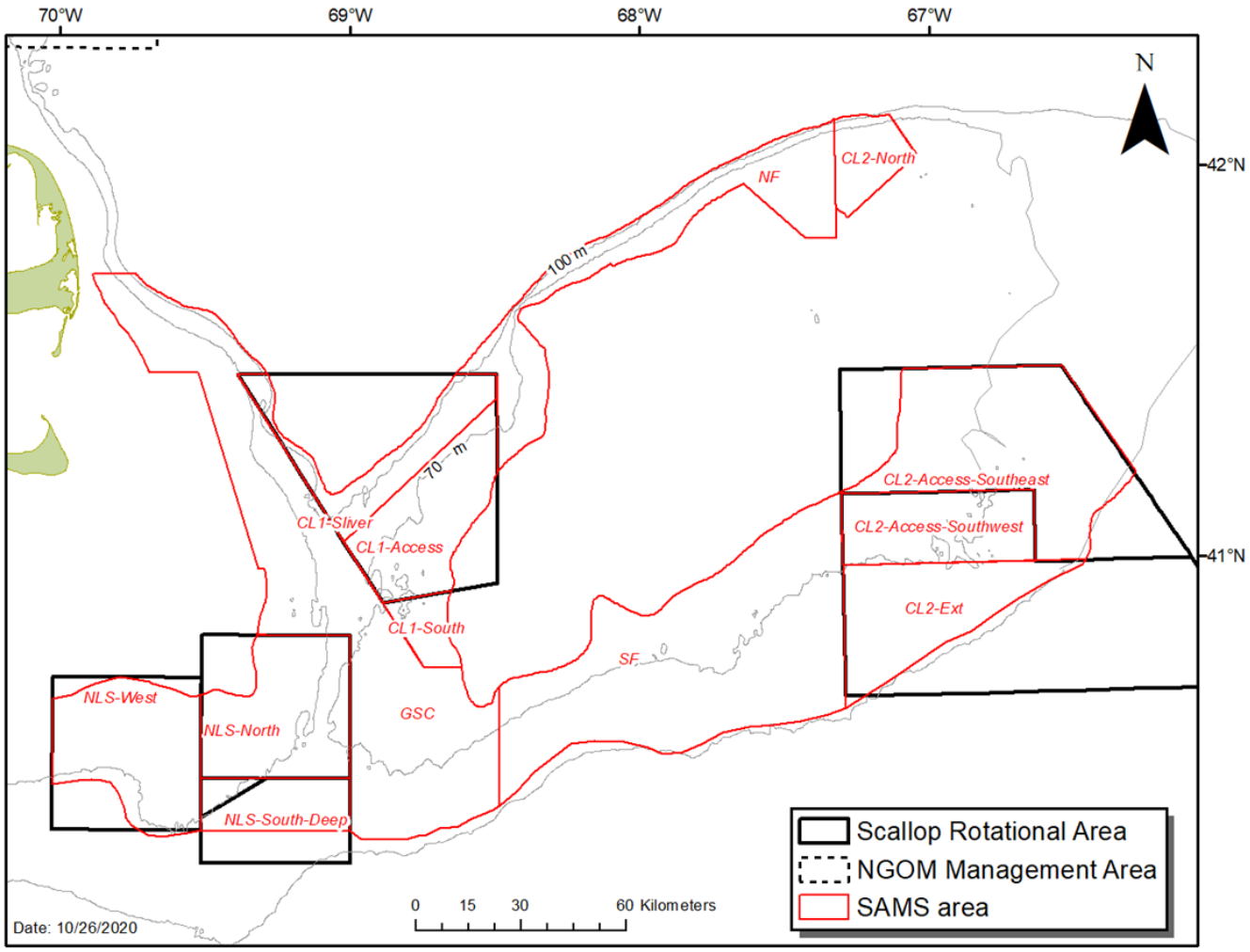
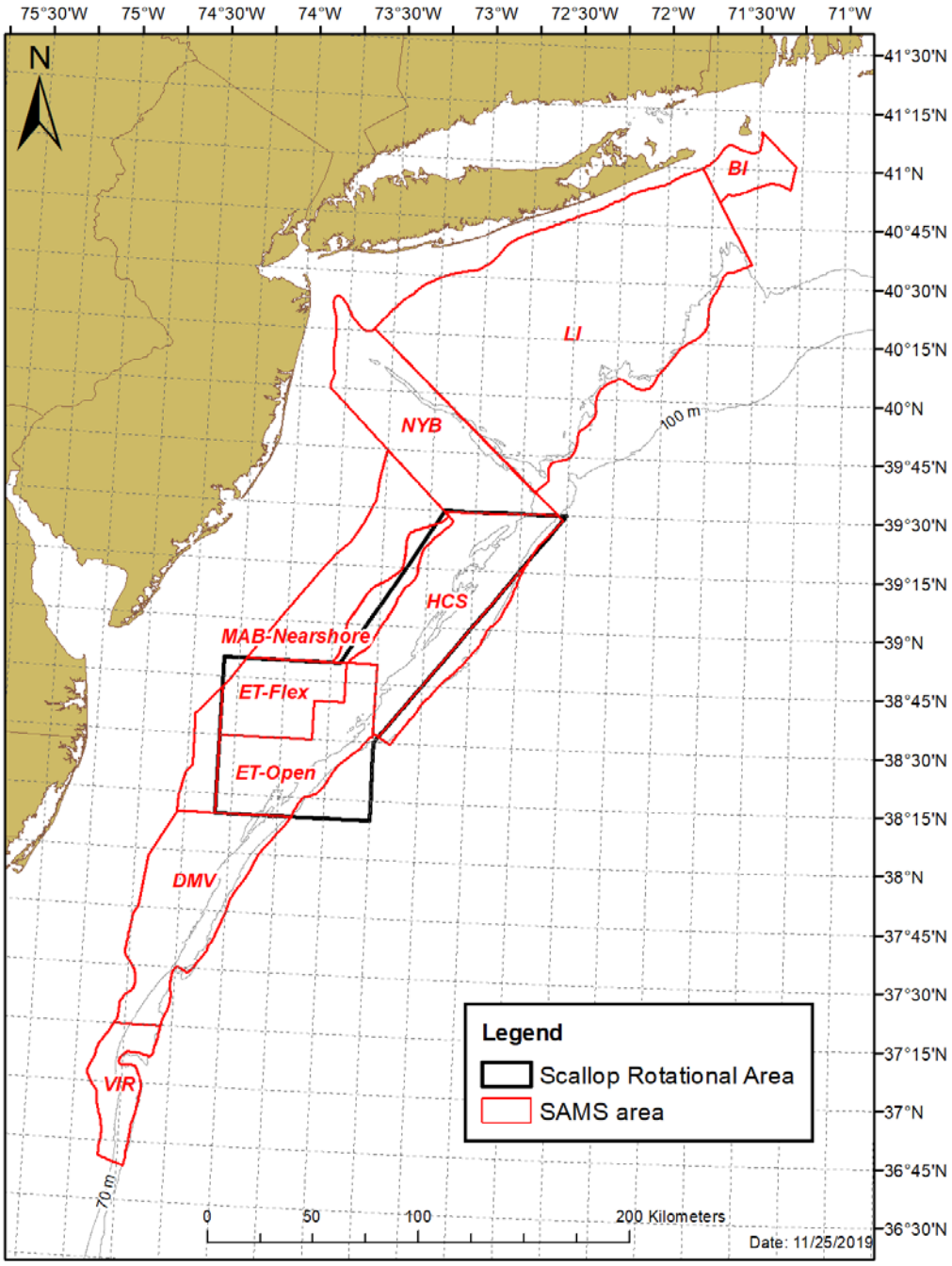


Figure 4 – The 2020 Mid-Atlantic SAMS Areas used for projections in FW33.



5.2.4 2021 Biomass Projections

Projections for 2021:

1. Model configured the same as in Framework 32, with 8 areas in MA and 12 in GB. In 2019, the Closed Area II access area was partitioned into CAII-SW and CAII-SE.
2. Initialized using the average (mean) of available 2020 survey data. In areas where no new survey data was available, projection for 2020 from the 2019 model were applied (CAI-Mid, NF, CA2-N). In Block Island, only dredge estimate was used.
3. L_∞ in NLS-S-deep was set to 110 mm to match observed growth (SARC 65).
4. L_∞ was reduced in all SAMS areas except CAII-SW and NLS-South to match observed growth.

Table 26 – 2021 projected exploitable biomass by SAMS area.

SAMS Area	**2021 Exploitable Biomass**
HCS	3,589
Etop	7,720
ETFlex	4,259
Dmv	209
NYB	3,901
LI	8,602
Vir	14
BI+Inshore	1,132
Total	**29,426**
CL1-N	498
CL1-mid	378
CL2-N	3,186
CL2-SE	1,777
CL2-SW	14,630
NLS-W	225
NLS-N	1,292
NLS-S	12,594
CL2-Ext	10,697
GSC	2,737
NF	743
SF	6,989
Total	**55,746**

5.3 NON-TARGET SPECIES

Non-target species (sometimes referred to as incidental catch or bycatch) include species caught by scallop gear that are both landed and not landed, including small scallops. There are several measures in place that were designed to reduce bycatch including gear modifications, limits on effort, seasonal restrictions etc. In general, rotational area management is designed to improve and maintain high scallop yield, while minimizing impacts on groundfish mortality and other finfish catches. Access programs may even reduce fishing mortality for some finfish species, because the total amount of fishing time in access areas is low compared with fishing time in open areas due to differences in LPUE. Incidental catch is sometimes higher in access areas compared to open areas, but in general total scallop landings are also usually higher in access areas.

Potential non-target species caught incidentally in the scallop fishery were identified in Amendment 15 and previous scallop framework actions based primarily on discard information from the 2009 SBRM report (NEFSC 2009) and various assessments such as GARM III and the Skates Data-poor Workshop. See Table 27 for the current status of these species, which has been updated based on assessment results summarized in the NEFSC operational Groundfish assessment through 2018 (NEFSC 2019), Skate FW3 (see Section 6.1.2), and Monkfish FW9 (see Section 6.1.2).

Table 27 – Status of non-target species known to be caught in scallop fishing gear, updated with assessment results through 2018.

Species or FMP	*Stock*	*Overfished?*	*Overfishing?*
Summer flounder (fluke)	Mid-Atlantic Coast	No	No
Monkfish	GOM/Northern GB	No	No
Monkfish	Southern GB/MA	No	No
Northeast Skate Complex	Barndoor skate	No	No
Northeast Skate Complex	Clearnose skate	No	No
Northeast Skate Complex	Little skate	No	No
Northeast Skate Complex	Rosette skate	No	No
Northeast Skate Complex	Smooth skate	No	No
Northeast Skate Complex	Thorny skate	Yes	No
Northeast Skate Complex	Winter skate	No	No
Multispecies	*Windowpane - GOM/GB	Yes	Yes
Multispecies	*Windowpane - SNE/MA	No	No
Multispecies	Winter flounder - GB	Yes	No
Multispecies	Winter flounder - GOM	Unknown	No
Multispecies	Winter flounder - SNE/MA	Yes	No
Multispecies	Yellowtail flounder - CC/GOM	No	No
Multispecies	*Yellowtail flounder - GB	Unknown	Unknown
Multispecies	*Yellowtail flounder - SNE/MA	Yes	No
Atlantic Surfclam	Mid-Atlantic Coast	No	No
Ocean Quahog	Atlantic Coast	No	No

* stock has scallop fishery sub-ACL.

Updates available through NMFS's Status of U.S. Fisheries Quarterly Reports

http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm

5.3.1 Bycatch Species with sub-ACL Allocations

The only bycatch species with sub-ACLs for the scallop fishery are in the Northeast Multispecies plan: Georges Bank yellowtail flounder (GB yellowtail), Southern New England/Mid-Atlantic yellowtail flounder (SNE/MA yellowtail), Southern windowpane flounder, and Northern windowpane flounder. Table 28 summarizes anticipated catch limits of these four flatfish stocks for FY2021 as well as projected scallop fishery bycatch for FY2021. Table 29 describes a summary of sub-ACLs, projected bycatch, and realized bycatch from the scallop fishery from FY2013 – FY2020, as well as projected catch and allocations for FY2021. Out year projected catch estimates can be uncertain because they are based on anticipated fishing behavior provided by SAMS model outputs; considering this, projections should be reviewed cautiously as past estimates have been both overestimated and underestimated relative to actual catch. A complete summary of all catch in the multispecies fishery can be found at: http://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/nemultispecies.html

Table 28 - Comparison of 2021 Scallop Fishery flatfish sub-ACLs (mt) with bycatch projections.

	OFL	US ABC	Scallop ABC	Scallop sub-ACL	2021 Bycatch Projections
Stock	**2021**	**2021**			
GB Yellowtail Flounder		80		12	12-17 mt
SNE/MA Yellowtail Flounder	71	22		2	2-3 mt
Northern Windowpane Flounder		160		31	26-31 mt
Southern Windowpane Flounder	513	384		129	66-80 mt

Table 29 – Comparison of recent flatfish sub-ACLs, scallop bycatch projections, and realized catch, with 2019 projections. Values are shown in mt.

FY		GBYT	SNE/MA YT	SWP	NWP
2013	sub-ACL	41.5	43.6	183	
	Projected	85.3	66	N/A	
	Actual	37.5	48.6	129.1	
2014	sub-ACL	50.9	66	183	
	Projected	62.4 - 103.7	61.1 - 67.7	74.4	
	Actual	59	63	136	
2015	sub-ACL	38	66	183	n/a
	Projected	27.9 - 48.6	54	134	45 - 94
	Actual	29.8	34.6	210.6	114.6
2016	sub-ACL	42	32	209	n/a
	Projected	26.3	40.4	179.2	88.1
	Actual	2	10.8	84.4	n/a
2017	sub-ACL	32	34	209	36
	Projected	62.8 - 63.2	10.66 - 11.9	77.85 - 85.08	102.1 - 103.33
	Actual	52.6	4.3	143.9	44.1
2018	sub-ACL	33	5	158	18
	Projected	11.7	4.2	261.7	50.7
	Actual	12.7	2.6	157.1	22.3
2019	sub-ACL	17	15	158	18
	Projected	11.48	2.9	64.03	8.02
	Actual	1.7	2.1	57.7	25.4

5.4 PROTECTED SPECIES

The following protected species are found in the environment in which the sea scallop fishery is prosecuted. Several are listed under the Endangered Species Act of 1973 (ESA) as endangered or threatened, while others are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA). An update and summary are in Table 30 to facilitate consideration of the species most likely to interact with the scallop fishery relative to the preferred alternative.

Table 30 – Protected species that may occur in the affected environment of the sea scallop fishery.

Species	**Status**	**Potentially impacted by this action?**
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)	No
Pilot whale (*Globicephala spp.*)[1]	Protected(MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected(MMPA)	No
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected(MMPA)	No
Short Beaked Common dolphin (*Delphinus delphis*)	Protected(MMPA)	No
Spotted dolphin (*Stenella frontalis*)	Protected(MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected(MMPA)	No
Bottlenose dolphin (*Tursiops truncatus*)[2]	Protected(MMPA)	No
Harbor porpoise (*Phocoena phocoena*)	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*) (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	No
Atlantic sturgeon *(Acipenser oxyrinchus)*		
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
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected(MMPA)	No
Gray seal (*Halichoerus grypus*)	Protected(MMPA)	No
Harp seal (*Phoca groenlandicus*)	Protected(MMPA)	No

Hooded seal (Cystophora cristata)	Protected(MMPA)	No
Critical Habitat		
North Atlantic Right Whale	Protected (ESA)	No
Northwest Atlantic Ocean DPS of Loggerhead Sea Turtle	Protected(ESA)	No

***Notes*:**

[1] 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 just referred to as *Globicephala spp.*

[2] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

In Table 30, note that cusk, a NMFS "candidate species" under the ESA, occur in the affected environment of the scallop fishery. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. Once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, cusk will not be discussed further in this section. However, additional information on cusk can be found at: https://www.fisheries.noaa.gov/endangered-species-conservation/candidate-species-under-endangered-species-act.

5.4.1 Species and Critical Habitat Not Likely to be Impacted by the Alternatives Under Consideration

Based on available information, it has been determined that this action is not likely to impact any ESA listed or non-listed species of marine mammals (cetaceans or pinnipeds), shortnose sturgeon, or Atlantic salmon. Further, this action is not likely to adversely modify or destroy the Northwest Atlantic Ocean DPS of loggerhead sea turtle or North Atlantic right whale critical habitats. This determination has been made because either the occurrence of the species is not known to overlap with the scallop fishery and/or there have never been documented interactions between the species and the scallop fishery (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NMFS NEFSC FSB 2019). In the case of critical habitat, this determination has been made because the scallop fishery will not impact the essential physical or biological features of North Atlantic right whale or loggerhead (Northwest Atlantic Ocean DPS) critical habitat, and therefore, will not result in the destruction or adverse modification of either species designated critical habitat (NMFS 2014; NMFS 2015a,b). For additional details on the rationale behind these conclusions, please see Section 4.3.1 of Framework 26 to the Scallop FMP (http://s3.amazonaws.com/nefmc.org/Final-FW26_submission_150217.pdf).

5.4.2 Species Potentially Impacted by the Alternatives Under Consideration

As noted in Table 30, ESA listed species of sea turtles and Atlantic sturgeon are the only protected species that occur in the affected environment of the scallop fishery and have the potential to be impacted by this fishery and the proposed Alternatives. To assist in making this determination, the 2012 Biological Opinion issued by NMFS on the operation of the scallop fishery was referenced (NMFS, 2012). The 2012 Opinion, which considered the best available information on ESA listed species and observed or documented ESA listed species interactions with gear types used to prosecute the scallop fishery (e.g., scallop dredge and bottom trawl), concluded that the scallop fishery, as authorized under the scallop FMP, may adversely affect, but was not likely to jeopardize the continued existence of the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, and green sea turtles, as well as the five listed DPSs of Atlantic sturgeon. The Opinion included an incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles and Atlantic sturgeon. Reasonable and prudent measures and terms and conditions were also issued with the incidental take statement to minimize impacts of any incidental take.

Up until recently, the 2012 Opinion remained in effect; however, new information indicates that the scallop fleet exceeded the ITS trigger of a two-year average of 359,797 dredge hours for 2015-2016 and 2016-2017. This new information is different from that considered and analyzed in the 2012 Opinion and therefore, may reveal effects from this fishery that were not previously considered. As a result, per a February 19, 2020, memo issued by NMFS, the 2012 Opinion has been reinitiated. However, pursuant to the ESA 7(a)(2)/7(d) memo issued by NMFS on March 4, 2020, it has been determined that, for the consultation being reinitiated, allowing the scallop fishery to continue during the reinitiation period will not increase the likelihood of interactions with listed species of sea turtles or Atlantic sturgeon above the amount that would otherwise occur if consultation had not been reinitiated, because allowing the scallop fishery to continue does not entail making any changes to this fishery during the reinitiation period that would cause an increase in interactions with these listed species. Because of this, the continuation of the scallop fishery during the reinitiation period would not be likely to jeopardize the continued existence of any species of sea turtle or Atlantic sturgeon. Until replaced, the scallop FMP is currently covered by the March 4, 2020 memo.

To understand the potential risks these Alternatives pose to these listed species, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) records of protected species interaction with particular fishing gear types. In the sections below, information on sea turtle and Atlantic sturgeon occurrence in the affected environment of the scallop fishery, in addition to species interactions with scallop fishery gear, will be provided.

5.4.2.1 Sea Turtles

5.4.2.1.1 Occurrence and Distribution

During the development of Framework 26 to the Scallop FMP, the PDT used various sources of information to describe the occurrence and distribution of sea turtles in the affected environment of the scallop fishery. Below, the PDT provides a summary of the information provided in FW 26, with any updates since the issuance of the framework provided. For additional details on the sources of information used to develop this section, please refer to Section 4.3.2.1 of Framework 26. Further, additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (Conant et al., 2009; Hirth, 1997; NMFS & USFWS, 1995,

2007a, 2007b, 2013, 2015; Seminoff et al., 2015; TEWG, 1998, 2000, 2007, 2009), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS & USFWS, 2008), leatherback sea turtle (NMFS & USFWS, 1992, 1998b), Kemp's ridley sea turtle (NMFS & USFWS, 2011), and green sea turtle (NMFS & USFWS, 1991, 1998a).

- **Hard-shelled sea turtles**

Distribution. In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (J. Braun-McNeill, Epperly, Avens, Snover, & Taylor, 2008; Braun & Epperly, 1996; S. P. Epperly, Braun, & Chester, 1995; S. P. Epperly, Braun, Chester, et al., 1995; Mitchell, Kenney, Farak, & Campbell, 2003; Shoop & Kenney, 1992; TEWG, 2009). While hard-shelled turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine, feeding as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7°C to 30°C, but water temperatures ≥11°C are most favorable (S. P. Epperly, Braun, Chester, et al., 1995; Shoop & Kenney, 1992). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Blumenthal et al., 2006; J Braun-McNeill & Epperly, 2004; Griffin et al., 2013; Hawkes et al., 2006; Hawkes et al., 2011; Mansfield, Saba, Keinath, & Mauick, 2009; McClellan & Read, 2007; Mitchell et al., 2003; Morreale & Standora, 2005).

Seasonality. Hard-shelled sea turtles occur year-round in waters off of, and south of, Cape Hatteras, North Carolina. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (J Braun-McNeill & Epperly, 2004; S. P. Epperly, Braun, & Chester, 1995; S. P. Epperly, Braun, Chester, et al., 1995; S. P. Epperly, Braun, & Veishlow, 1995; Griffin et al., 2013; Morreale & Standora, 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & Kenney, 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, most sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further (S. P. Epperly, Braun, Chester, et al., 1995; Griffin et al., 2013; Hawkes et al., 2011; Shoop & Kenney, 1992). Based on this information, as well as review of observed sea turtle interactions with bottom tending gear in the affected environment of the scallop fishery (see Figure 23), hard-shelled sea turtles are most likely to be present in areas that overlap with the scallop fishery in the Mid-Atlantic between May and October and to a lesser extent, November and December (see Section 4.3.2.1 of Framework 26 for complete summary of information).

- **Leatherback sea turtles**

Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (Dodge, Galuardi, Miller, & Lutcavage, 2014; M. James, Myers, & Ottenmeyer, 2005; M. C. James, Sherrill-Mix, Martin, & Myers, 2006; NMFS & USFWS, 1992). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (Dodge et al., 2014; Eckert et al., 2006; M. James et al., 2005; Murphy, Murphy, Griffin, & Hope, 2006). Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (Dodge et al., 2014; M. James et al., 2005; M. C. James et al., 2006).

5.4.2.1.2 Gear Interactions

As in Section 5.4.2.1.1, sea turtles are widely distributed in the waters of the Northwest Atlantic, although their presence varies with the seasons due to changes in water temperature (J Braun-McNeill & Epperly,

2004; J. Braun-McNeill et al., 2008; Braun & Epperly, 1996; Dodge et al., 2014; S. P. Epperly, Braun, & Chester, 1995; S. P. Epperly, Braun, Chester, et al., 1995; Griffin et al., 2013; M. James et al., 2005; M. C. James et al., 2006; Mitchell et al., 2003; Morreale & Standora, 2005; NMFS & USFWS, 1992; Shoop & Kenney, 1992; TEWG, 2009). As a result, sea turtles often occupy many of the same ocean areas utilized for commercial fishing and therefore, interactions with fishing gear is possible. In the sea scallop fishery, dredge and trawl gear are used to target scallops and are known to pose a risk to sea turtles (S. Epperly et al., 2002; Haas, LaCasella, LeRoux, Milliken, & Hayward, 2008; Henwood & Stuntz, 1987; Lutcavage, Plotkin, Witherington, Lutz, & Musick, 1997; Murray, 2011; NMFS, 2012; Sasso & Epperly, 2006; Warden, 2011a, 2011b).

Although sea turtle interactions with scallop trawl and dredge gear have been observed in the Gulf of Maine, Georges Bank, and the Mid-Atlantic, most of the observed interactions have occurred in the Mid-Atlantic (FSB, 2019). There is insufficient data available to conduct a robust model-based analysis to estimate sea turtle interactions with scallop trawl or dredge gear outside the Mid-Atlantic. As a result, the bycatch estimates and most of the discussion below are based on observed sea turtle interactions in scallop trawl and dredge gear in the Mid-Atlantic.

- **Sea Scallop Dredge Gear**

Kemp's ridley, green, loggerhead, and unknown sea turtle species have been documented interacting with sea scallop dredge gear; loggerhead sea turtles are the most commonly taken species (FSB, 2016, 2017, 2018; Murray, 2015a) . Two regulations have been implemented to reduce serious injury and mortalities to sea turtles resulting from interactions with sea scallop dredges:

- (1) **Chain mat modified dredge** (71 FR 50361, August 25, 2006; 71 FR 66466, November 15, 2006; 73 FR18984, April 8, 2008; 74 FR 20667, May 5, 2009; 76 FR 22119, April 21, 2015): Requires federally permitted scallop vessels fishing with dredge gear to modify their gear by adding an arrangement of horizontal and vertical chains (referred to as a "chain mat"). The purpose of the chain mat is to prevent captures in the dredge bag and injury and mortality that results from such capture. It should be noted, however, that although the chain mat is expected to reduce the impact of sea turtle takes in dredge gear, it does not eliminate the take of sea turtles; and

- (2) **Turtle Deflector Dredge** (77 FR 20728, April 6, 2012; 76 FR 22119, April 21, 2015)**:** All limited access scallop vessels, as well as Limited Access General Category vessels with a dredge width of 10.5 feet or greater, must use a Turtle Deflector Dredge (TDD) to deflect sea turtles over the dredge frame and bag rather than under the cutting bar, so as to reduce sea turtle injuries due to contact with the dredge frame on the ocean bottom (including being crushed under the dredge frame).

As of May 2015, both gear modifications are now required in waters west of 71°W from May 1 through November 30 each year (76 FR 22119, April 21, 2015). It should be noted, although the chain mat and TDD modifications are designed to reduce the serious injury and mortality to sea turtles interacting with dredge gear, it does not eliminate the take of sea turtles.

Using Northeast Fisheries Observer Program data, Murray (2011) assessed loggerhead and hard-shell turtle interactions in the Mid-Atlantic sea scallop fishery from 2001-2008. After the implementation of the chain-mat requirements, the average annual observable interactions of hard-shelled sea turtles and scallop dredge gear dropped to 20 turtles (95% CI=3-42; 3 adult equivalents; Table 31). Further, as stated by Murray (2011), "if the rate of observable interactions from dredges without chain mats had been applied to trips with chain mats, the estimated number of observable and inferred interactions of hard-shelled species after chain mats were implemented would have been 125 turtles per year (95% CI: 88–

163; 22 adult equivalents[1]; Table 31)." Most recently, Murray (2015a) estimated loggerhead interactions in the Mid-Atlantic scallop dredge fishery from 2009-2014. The average annual estimate of observable turtle interactions in scallop dredge gear was 11 loggerhead sea turtles per year (95% CI: 3-22; Murray, 2015a). When the observable interaction rate from dredges without chain mats, was applied to trips that used chain mats and TDDs, the estimated number of loggerhead interactions (observable and unobservable but quantifiable) was 22 loggerheads per year (95% CI: 4-67; Murray, 2015a). These 22 loggerheads equate to 2 adult equivalents per year, and 1-2 adult equivalent mortalities (Murray, 2015a).

Table 31 - Average annual estimated interactions of hard-shelled (unidentified and loggerhead species pooled) and loggerhead turtles in the Mid-Atlantic scallop dredge fishery before and after chain mats were required on dredges (CV and 95% Confidence Interval).

AE = adult equivalent estimated interactions. **A**= estimated interactions from dredges without chain mats; **B** = estimated observed interactions from dredges with or without chain mats; **C** = estimated observed and unobserved, quantifiable interactions from dredges without chain mats, to estimate the mat's maximum conservation value (Source: Murray, 2011).

	Interactions		**Interactions**	
Time Period	Hard-shelled (including loggerheads)	AE	Loggerhead	AE
(A) 2001-25 Sept 2006	288 (0.14, 209-363)	49	218 (0.16, 149-282)	37
(B) 26 Sept 2006-2008	20 (0.48, 3-42)	3	19 (0.52, 2-41)	3
(C) 26 Sept 2006-2008	125 (0.15, 88-163)	22	95 (0.18, 63-130)	16

- **Sea Scallop Trawl Gear**

Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[2] was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but being released through a Turtle Excluder Device.[3] The 292 average annual observable loggerhead interactions equates to approximately 44 adult equivalent (Warden, 2011a). Most recently, Murray (2015b) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[4] was 231 (CV=0.13, 95% CI=182-298; this equates to approximately 33 adult equivalents (Murray, 2015b). These latter estimates are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated to be 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). Based on data collected by observers for reported sea turtle captures in bottom otter trawl gear from

[1] Adult equivalence considers the reproductive value of the animal (Murray, 2013; Warden, 2011a), providing a "common currency" of expected reproductive output from the affected animals (Wallace, Heppell, Lewison, Kelez, & Crowder, 2008), and is an important metric for understanding population level impacts (Haas, 2010).

[2] Warden (2011a) defined the Mid-Atlantic as south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border.

[3] Warden (2011a) and Murray (2013, 2015b) define the Mid-Atlantic slightly differently, but both include waters north to Massachusetts. See the respective papers for a more complete description of these areas.

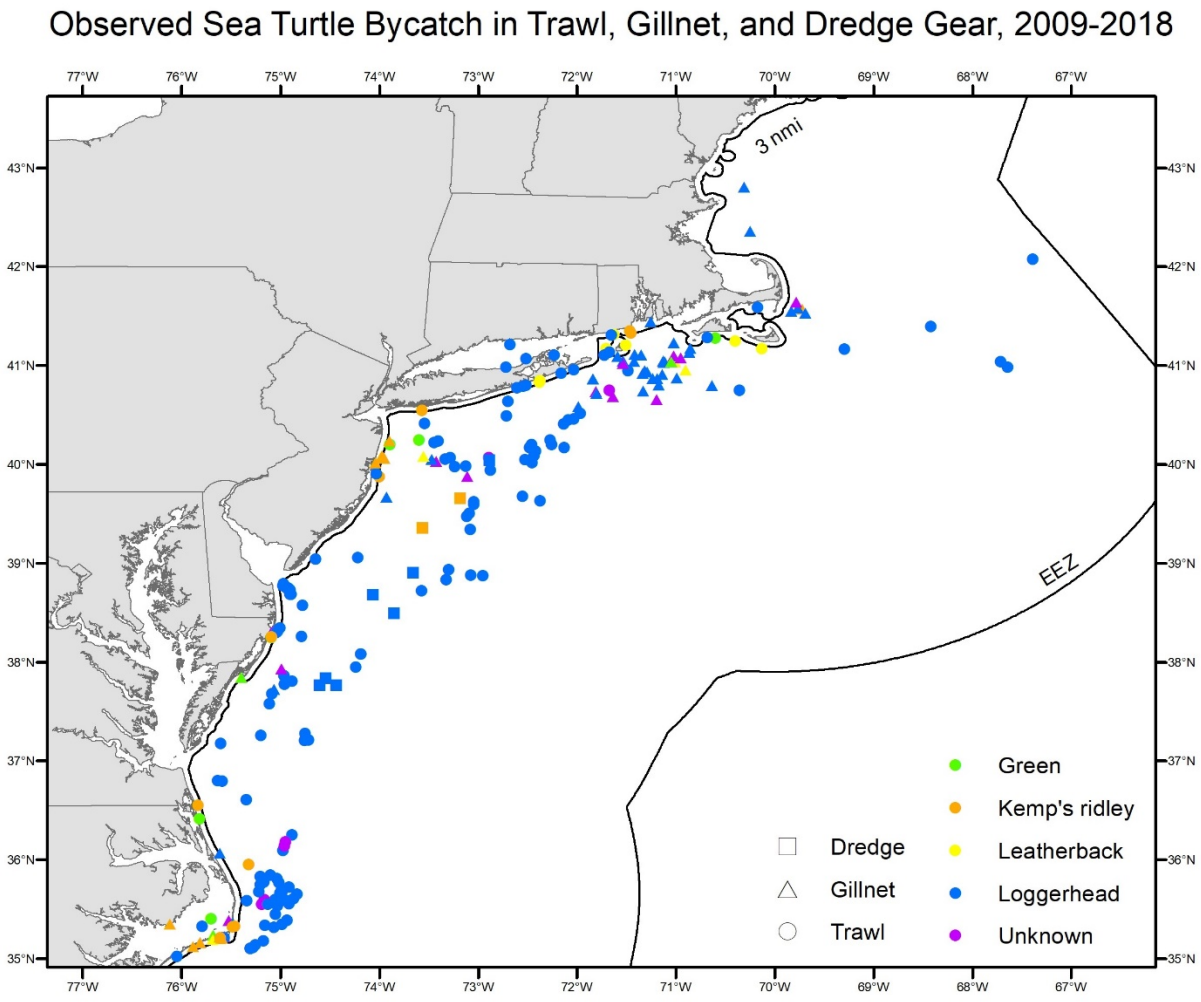
[4] Murray (2015a) defined the Mid-Atlantic as the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71°W to the North Carolina/South Carolina border)

2005-2008, Warden (2011b), using species landed, also estimated total loggerhead interactions attributable to managed species. The estimated average annual bycatch of loggerhead sea turtles in bottom otter trawl gear for trips primarily landing scallops during 2005-2008 was 95 loggerheads (95% CI =60-140; Warden, 2011b). Murray (2015b) provided similar estimates of loggerhead interactions by managed fished species from 2009-2013. Specifically, an estimated average annual take of six loggerheads (95% CI=0-23) were attributed to the scallop fishery.

Summary of Observed Locations of Turtle Interactions with Scallop Dredge, Bottom Trawl, and Gillnet Gear

Figure 5 depicts the overall observed locations of sea turtle interactions with gillnet, bottom trawl (fish, scallop, and twin), and sea scallop dredge (bottom tending) gear in the Northeast Region from 2009-2018. For additional information on observed sea turtle bycatch in years preceding 2009, please see Section 4.3 of Framework 26 of the Scallop FMP.

Figure 5 – Observed location of turtle interactions in bottom tending gears in the Northeast Region (2009-2018).



5.4.2.2 Atlantic Sturgeon

5.4.2.2.1 Atlantic Sturgeon Distribution

During the development of Framework 26 to the Scallop fishery, the PDT used various sources of information to describe the occurrence and distribution of Atlantic sturgeon DPSs in the affected environment of the scallop fishery. Below, the PDT provides a summary of the information provided in FW 26, with any updates (i.e., literature) since the issuance of the framework provided. For additional details on the information below please refer to Section 4.3.2.2.2 of Framework 26. Additional information on the biology, status, and range wide distribution of each distinct population segment of Atlantic sturgeon can be found in 77 FR 5880 and 77 FR 5914 (finalized February 6, 2012), as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT, 2007) and the Atlantic States Marine Fisheries Commission 2017 Atlantic Sturgeon Benchmark Stock Assessment and Peer Review Report (ASMFC, 2017).

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASMFC, 2017; ASSRT, 2007; Dadswell, 2006; Dadswell, Taubert, Squires, Marchette, & Buckley, 1984; Dovel & Berggren, 1983; Dunton et al., 2012; Dunton et al., 2015; Dunton, Jordaan, McKown, Conover, & Frisk, 2010; Erickson et al., 2011; Kynard, Horgan, Kieffer, & Seibel, 2000; Laney et al., 2007; O'Leary, Dunton, King, Frisk, & Chapman, 2014; Stein, Friedland, & Sutherland, 2004b; Waldman et al., 2013; Wirgin, Breece, et al., 2015; Wirgin, Maceda, Grunwald, & King, 2015; Wirgin et al., 2012). In fact, several genetic studies, have been conducted to address DPS distribution and composition in marine waters (Dunton et al., 2012; O'Leary et al., 2014; Waldman et al., 2013; Wirgin, Breece, et al., 2015; Wirgin, Maceda, et al., 2015; Wirgin et al., 2012). These studies show that Atlantic sturgeon from multiple DPSs can be found at any single location along the Northwest Atlantic coast, with the Mid-Atlantic locations consistently comprised of all five DPSs (Damon-Randall, Colligan, & Crocker, 2013; Dunton et al., 2012; O'Leary et al., 2014; Waldman et al., 2013; Wirgin, Breece, et al., 2015; Wirgin, Maceda, et al., 2015; Wirgin et al., 2012). Although additional studies are needed to further clarify the DPS distribution and composition in non-natal estuaries and coastal locations, these studies provide some initial insight on DPS distribution and co-occurrence in particular areas along the U.S. eastern seaboard.

Based on fishery independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Dunton et al., 2010; Erickson et al., 2011; Stein, Friedland, & Sutherland, 2004a; Stein et al., 2004b); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Collins & Smith, 1997; Dunton et al., 2010; Erickson et al., 2011; Stein et al., 2004a, 2004b; Timoshkin, 1968). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon undertake seasonal movements along the coast (Dunton et al., 2010; Erickson et al., 2011). In general, analysis of fishery-independent survey data indicates a coastwide distribution of Atlantic sturgeon from the spring through the fall, with Atlantic sturgeon being more centrally located (e.g., Long Island to Delaware) during the summer months; and a more southerly (e.g., North Carolina, Virginia) distribution during the winter (Dunton et al., 2010; Erickson et al., 2011). Although studies such as Erickson et al. (2011) and Dunton et al. (2010) provide some indication that Atlantic sturgeon are undertaking seasonal movements horizontally and vertically

along the U.S. eastern coastline, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

5.4.2.2.2 Gear Interactions

According to the NMFS Biological Opinion on the sea scallop fishery issued on July 12, 2012, it was determined that some small level of bycatch may occur in the scallop fishery; however, the incidence rate is likely to be very low. Review of available observer data from 1989-2018 confirms this determination. No Atlantic sturgeon have been reported as caught in scallop bottom trawl gear where the haul target or trip target is scallop. However, NEFOP and ASM observer data have recorded one (1) Atlantic sturgeon interaction with scallop dredge gear targeting Atlantic sea scallops; this sturgeon was released alive (FSB, 2019).

5.5 PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

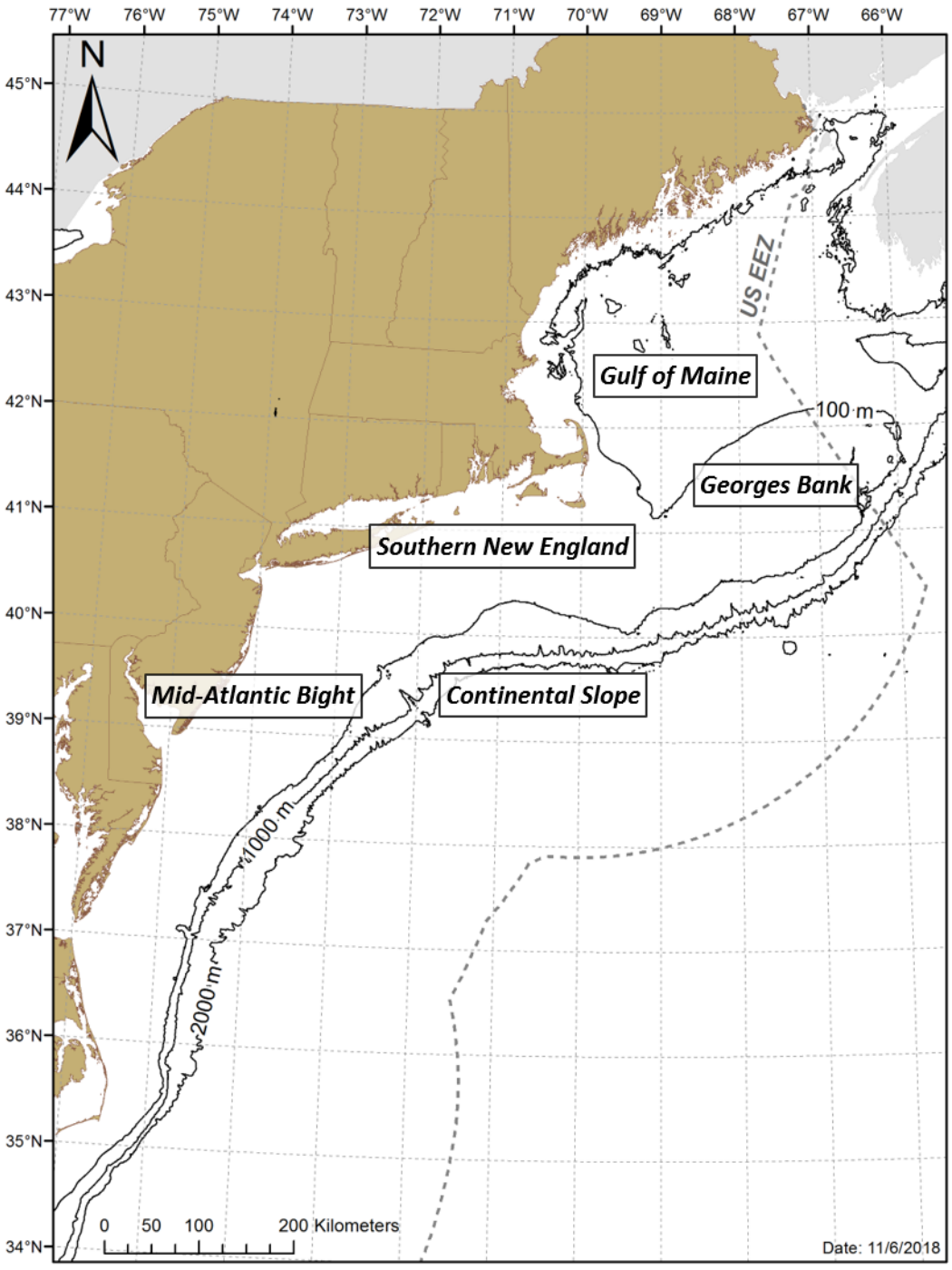
The Northeast U.S. Shelf Ecosystem includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream to a depth of 2,000 m (Map 13) (Sherman, Jaworski, & Smayda, 1996). Four distinct sub-regions are identified: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The physical oceanography and biota of these regions were described in the Scallop Amendment 11. Much of this information was extracted from Stevenson et al. (2004), and the reader is referred to this document and sources referenced therein for additional information. Primarily relevant to the scallop fishery are Georges Bank and the Mid-Atlantic Bight, although some fishing also occurs in the Gulf of Maine.

The Atlantic sea scallop fishery is primarily prosecuted in concentrated areas in and around Georges Bank and off the Mid-Atlantic coast, in waters extending from the near-coast out to the edge of the continental shelf. Atlantic sea scallops occur primarily in depths less than 110 meters on sand, gravel, shells, and cobble substrates (Hart & Chute, 2004). This area, which could potentially be affected by the preferred alternative, has been identified as EFH for various species. These species include American plaice, Atlantic cod, Atlantic halibut, Atlantic herring, Atlantic sea scallop, Atlantic surf clam, Atlantic wolfish, barndoor skate, black sea bass, clearnose skate, haddock, little skate, longfin squid, monkfish, ocean pout, ocean quahog, pollock, red hake, redfish, rosette skate, scup, silver hake, spiny dogfish, summer flounder, thorny skate, white hake, windowpane flounder, winter flounder, witch flounder, winter skate, and yellowtail flounder. Table 32 describes information on the geographic area, depth, and EFH description for each applicable life stage of these species. Map 14 displays the updated year-round and seasonal EFH areas for all NEFMC species and is consistent with the OHA2 measures approved by the NMFS on January 3, 2018. For more detailed descriptions of the approved OHA2 areas the reader is referred to the Council website (OHA2 FEIS, Vol. 2).

Another purpose of OHA2 was to evaluate existing habitat management areas and develop new habitat management areas. To assist with this effort, an analytical approach was developed to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities. This body of work, termed the Swept Area Seabed Impact approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH. The approach is detailed in this document, available on the Council webpage:

http://www.nefmc.org/habitat/planamen/efh_amend_2/appendices%20-%20dec2013/Appendix%20D%20-%20Swept%20Srea%20Seabed%20Impact%20approach.pdf.

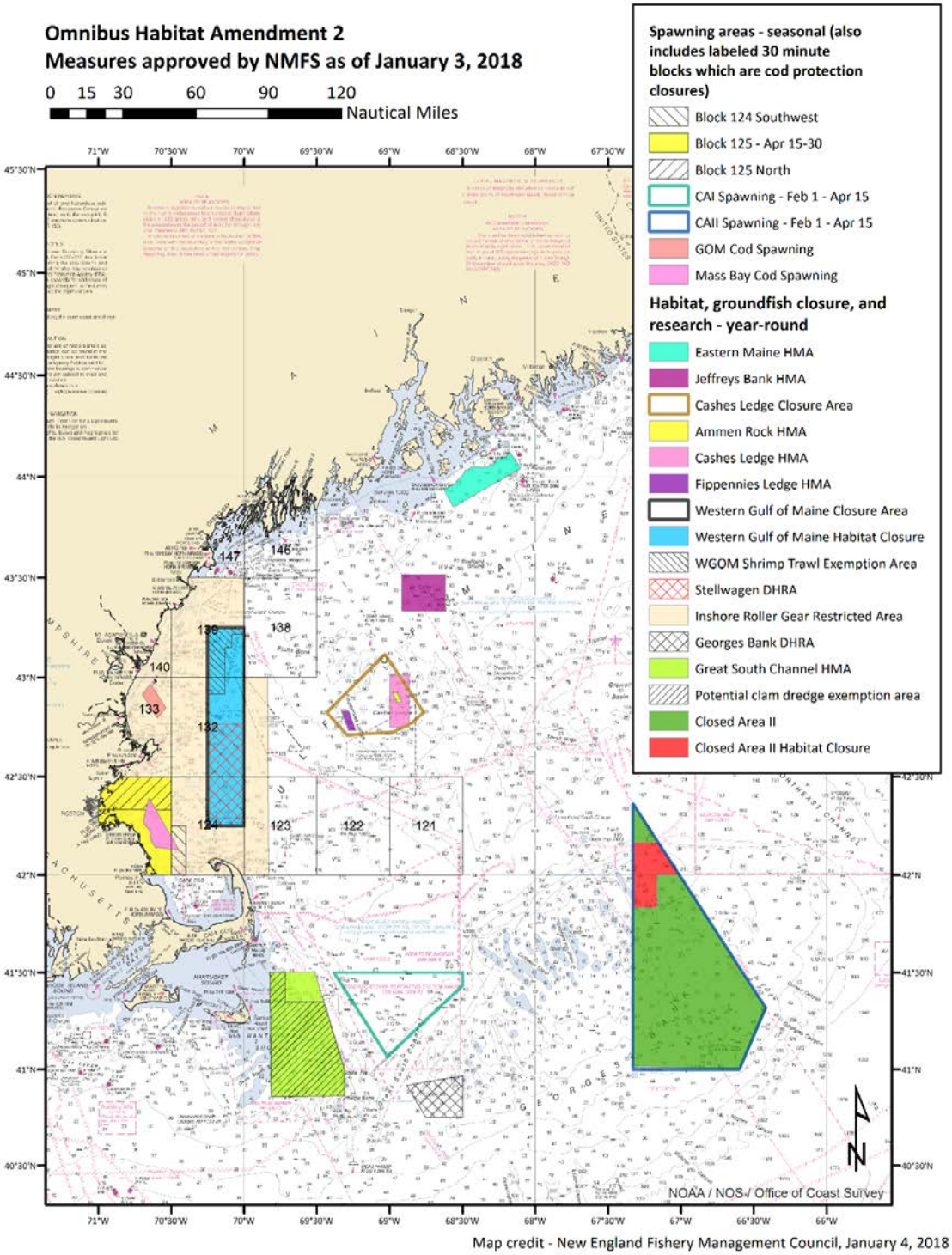
Map 13 – Northeast U.S. Shelf Ecosystem and geographic extent of the US sea scallop fishery.



The Council identified final recommendations for modifications to habitat management areas over two Council meetings, April 2015 and June 2015. On October 6, 2017 the NMFS published a notice of availability of OHA2 and requested public comments for the agency to consider in the approval/disapproval decision on the amendment (50 CFR §648, 2017), and a proposed rule for OHA2 was published on November 6, 2017 (50 CFR §648, 2017). A final decision regarding OHA2 was

published by the NMFS on January 3, 2018, with implementation of the amendment on April 9, 2018. A summary of the Council's preferred recommendations can be found at www.nefmc.org, and Map 14 is included below with the approved habitat management areas and seasonal spawning areas.

Map 14 – Approved OHA2 measures, including year-round spatial management areas and seasonal spawning areas. Note the scallop fishery is exempt from the Inshore Roller Gear Restricted Area (shown in tan blocks) and CAI seasonal closure.



Map credit - New England Fishery Management Council, January 4, 2018

Table 32 – Geographic distributions and habitat characteristics of Essential Fish Habitat designations for benthic fish and shellfish species managed by the New England and Mid-Atlantic fishery management councils in depths less than 100 meters in the Greater Atlantic region, up-dated January 2018.

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Acadian redfish	Juveniles	Gulf of Maine and the continental slope north of 37°38'N	50-200 in Gulf of Maine, to 600 on slope	Sub-tidal coastal and offshore rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals), and soft sediments with cerianthid anemones
Acadian redfish	Adults	Gulf of Maine and the continental slope north of 37°38'N	140-300 in Gulf of Maine, to 600 on slope	Offshore benthic habitats on finer grained sediments and on variable deposits of gravel, silt, clay, and boulders
American plaice	Juveniles	Gulf of Maine and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-180	Sub-tidal benthic habitats on mud and sand, also found on gravel and sandy substrates bordering bedrock
American plaice	Adults	Gulf of Maine, Georges Bank and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-300	Sub-tidal benthic habitats on mud and sand, also gravel and sandy substrates bordering bedrock

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Atlantic cod	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including nearshore waters from eastern Maine to Rhode Island and the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay	Mean high water-120	Structurally-complex intertidal and sub-tidal habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna
Atlantic cod	Adults	Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic to Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay	30-160	Structurally complex sub-tidal hard bottom habitats with gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae, also sandy substrates and along deeper slopes of ledges
Atlantic halibut	Juveniles & Adults	Gulf of Maine, Georges Bank, and continental slope south of Georges Bank	60-140 and 400-700 on slope	Benthic habitats on sand, gravel, or clay substrates
Atlantic herring	Eggs	Coastal Gulf of Maine, Georges Bank, and Southern New England	5-90	Sub-tidal benthic habitats on coarse sand, pebbles, cobbles, and boulders and/or macroalgae

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Atlantic sea scallop	Eggs	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Inshore and offshore benthic habitats (see adults)
Atlantic sea scallop	Larvae	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	No information	Inshore and offshore pelagic and benthic habitats: pelagic larvae ("spat"), settle on variety of hard surfaces, including shells, pebbles, and gravel and to macroalgae and other benthic organisms such as hydroids
Atlantic sea scallop	Juveniles	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats initially attached to shells, gravel, and small rocks (pebble, cobble), later free-swimming juveniles found in same habitats as adults

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Atlantic sea scallop	Adults	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats with sand and gravel substrates
Atlantic surfclams	Juveniles and adults	Continental shelf from southwestern Gulf of Maine to Cape Hatteras, North Carolina	Surf zone to about 61, abundance low >38	In substrate to depth of 3 ft
Atlantic wolffish	Eggs	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<100	Sub-tidal benthic habitats under rocks and boulders in nests
Atlantic wolffish	Juveniles	U.S. waters north of 41˚N latitude and east of 71˚W longitude	70-184	Sub-tidal benthic habitats
Atlantic wolffish	Adults	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<173	A wide variety of sub-tidal sand and gravel substrates once they leave rocky spawning habitats, but not on muddy bottom
Barndoor skate	Juveniles and adults	Primarily on Georges Bank and in Southern New England and on the continental slope	40-400 on shelf and to 750 on slope	Sub-tidal benthic habitats on mud, sand, and gravel substrates

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Black sea bass	Juveniles and adults	Continental shelf and estuarine waters from the southwestern Gulf of Maine and Cape Hatteras, North Carolina	Inshore in summer and spring	Benthic habitats with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, also offshore clam beds and shell patches in winter
Clearnose skate	Juveniles	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-30	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Clearnose skate	Adults	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-40	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Haddock	Juveniles	Inshore and offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in the Mid-Atlantic region	40-140 and as shallow as 20 in coastal Gulf of Maine	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Haddock	Adults	Offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in Southern New England	50-160	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel and adjacent to boulders and cobbles along the margins of rocky reefs
Little skate	Juveniles	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-80	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Little skate	Adults	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-100	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Longfin inshore squid	Eggs	Inshore and offshore waters from Georges Bank southward to Cape Hatteras	Generally <50	Bottom habitats attached to variety of hard bottom types, macroalgae, sand, and mud

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Monkfish	Juveniles	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on a variety of habitats, including hard sand, pebbles, gravel, broken shells, and soft mud, also seek shelter among rocks with attached algae
Monkfish	Adults	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on hard sand, pebbles, gravel, broken shells, and soft mud, but seem to prefer soft sediments, and, like juveniles, utilize the edges of rocky areas for feeding
Ocean pout	Eggs	Georges Bank, Gulf of Maine, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	<100	Sub-tidal hard bottom habitats in sheltered nests, holes, or rocky crevices
Ocean pout	Juveniles	Gulf of Maine, on the continental shelf north of Cape May, New Jersey, on the southern portion of Georges Bank, and including certain bays and estuaries in the Gulf of Maine	Mean high water-120	Intertidal and sub-tidal benthic habitats on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Ocean pout	Adults	Gulf of Maine, Georges Bank, on the continental shelf north of Cape May, New Jersey, and including certain bays and estuaries in the Gulf of Maine	20-140	Sub-tidal benthic habitats on mud and sand, particularly in association with structure forming habitat types; i.e. shells, gravel, or boulders
Ocean quahogs	Juveniles and adults	Continental shelf from southern New England and Georges Bank to Virginia	9-244	In substrate to depth of 3 ft
Pollock	Juveniles	Inshore and offshore waters in the Gulf of Maine (including bays and estuaries in the Gulf of Maine), the Great South Channel, Long Island Sound, and Narragansett Bay, Rhode Island	Mean high water-180 in Gulf of Maine, Long Island Sound, and Narragansett Bay; 40-180 on Georges Bank	Intertidal and sub-tidal pelagic and benthic rocky bottom habitats with attached macroalgae, small juveniles in eelgrass beds, older juveniles move into deeper water habitats also occupied by adults
Pollock	Adults	Offshore Gulf of Maine waters, Massachusetts Bay and Cape Cod Bay, on the southern edge of Georges Bank, and in Long Island Sound	80-300 in Gulf of Maine and on Georges Bank; <80 in Long Island Sound, Cape Cod Bay, and Narragansett Bay	Pelagic and benthic habitats on the tops and edges of offshore banks and shoals with mixed rocky substrates, often with attached macro algae

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Red hake	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including Passamaquoddy Bay to Cape Cod Bay in the Gulf of Maine, Buzzards Bay and Narragansett Bay, Long Island Sound, Raritan Bay and the Hudson River, and lower Chesapeake Bay	Mean high water-80	Intertidal and sub-tidal soft bottom habitats, esp those that provide shelter, such as depressions in muddy substrates, eelgrass, macroalgae, shells, anemone and polychaete tubes, on artificial reefs, and in live bivalves (e.g., scallops)
Red hake	Adults	In the Gulf of Maine, the Great South Channel, and on the outer continental shelf and slope from Georges Bank to North Carolina, including inshore bays and estuaries as far south as Chesapeake Bay	50-750 on shelf and slope, as shallow as 20 inshore	Sub-tidal benthic habitats in shell beds, on soft sediments (usually in depressions), also found on gravel and hard bottom and artificial reefs
Rosette skate	Juveniles and adults	Outer continental shelf from approximately 40˚N to Cape Hatteras, North Carolina	80-400	Benthic habitats with mud and sand substrates
Scup	Juveniles	Continental shelf between southwestern Gulf of Maine and Cape Hatteras, North Carolina and in nearshore and estuarine waters between Massachusetts and Virginia	No information	Benthic habitats, in association with inshore sand and mud substrates, mussel and eelgrass beds
Scup	Adults	Continental shelf and nearshore and estuarine waters between southwestern Gulf of Maine and Cape Hatteras, North Carolina	No information, generally overwinter offshore	Benthic habitats

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Silver hake	Juveniles	Gulf of Maine, including certain bays and estuaries, and on the continental shelf as far south as Cape May, New Jersey	40-400 in Gulf of Maine, >10 in Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats in association with sand-waves, flat sand with amphipod tubes, shells, and in biogenic depressions
Silver hake	Adults	Gulf of Maine, including certain bays and estuaries, the southern portion of Georges Bank, and the outer continental shelf and some shallower coastal locations in the Mid-Atlantic	>35 in Gulf of Maine, 70-400 on Georges Bank and in the Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats, often in bottom depressions or in association with sand waves and shell fragments, also in mud habitats bordering deep boulder reefs, on over deep boulder reefs in the southwest Gulf of Maine
Summer flounder	Juveniles	Continental shelf and estuaries from Cape Cod, Massachusetts, to Cape Canaveral, Florida	To maximum 152	Benthic habitats, including inshore estuaries, salt marsh creeks, seagrass beds, mudflats, and open bay areas
Summer flounder	Adults	Continental shelf from Cape Cod, Massachusetts, to Cape Canaveral, Florida, including shallow coastal and estuarine waters during warmer months	To maximum 152 in colder months	Benthic habitats
Spiny dogfish	Juveniles	Primarily the outer continental shelf and slope between Cape Hatteras and Georges Bank and in the Gulf of Maine	Deep water	Pelagic and epibenthic habitats

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Spiny dogfish	Female sub-adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male sub-adults	Primarily in the Gulf of Maine and on the outer continental shelf from Georges Bank to Cape Hatteras	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Female adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Thorny skate	Juveniles	Offshore Gulf of Maine, some coastal bays in the Gulf of Maine, and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
Thorny skate	Adults	Offshore Gulf of Maine and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
White hake	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including bays and estuaries in the Gulf of Maine	Mean high water - 300	Intertidal and sub-tidal estuarine and marine habitats on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats
White hake	Adults	Gulf of Maine, including coastal bays and estuaries, and the outer continental shelf and slope	100-400 offshore Gulf of Maine, >25 inshore Gulf of Maine, to 900 on slope	Sub-tidal benthic habitats on fine-grained, muddy substrates and in mixed soft and rocky habitats

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Windowpane flounder	Juveniles	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to northern Florida, including bays and estuaries from Maine to Maryland	Mean high water - 60	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Windowpane flounder	Adults	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to Cape Hatteras, North Carolina, including bays and estuaries from Maine to Maryland	Mean high water - 70	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Winter flounder	Eggs	Eastern Maine to Absecon Inlet, New Jersey (39° 22´N) and Georges Bank	0-5 south of Cape Cod, 0-70 Gulf of Maine and Georges Bank	Sub-tidal estuarine and coastal benthic habitats on mud, muddy sand, sand, gravel, submerged aquatic vegetation, and macroalgae
Winter flounder	Juveniles	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 60	Intertidal and sub-tidal benthic habitats on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, tidal wetlands, and eelgrass; young-of-the-year juveniles on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Winter flounder	Adults	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 70	Intertidal and sub-tidal benthic habitats on muddy and sandy substrates, and on hard bottom on offshore banks; for spawning adults, also see eggs
Winter skate	Juveniles	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries from eastern Maine to Chincoteague Bay, Virginia, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-90	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Winter skate	Adults	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries in Maine and New Hampshire, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-80	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Witch flounder	Juveniles	Gulf of Maine and outer continental shelf and slope	50-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Witch flounder	Adults	Gulf of Maine and outer continental shelf and slope	35-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates

Species	Life Stage	Geographic Area	Depth (m)	Habitat Type and Description
Yellowtail flounder	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	20-80	Sub-tidal benthic habitats on sand and muddy sand
Yellowtail flounder	Adults	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	25-90	Sub-tidal benthic habitats on sand and sand with mud, shell hash, gravel, and rocks
* Unless otherwise noted, common temperature and salinity ranges were derived primarily from inshore and offshore trawl survey data (mostly fall and spring). Temperature and salinity information is meant to supplement the EFH text descriptions; it is not prescriptive. ** See Appendix B in Northeast FMC (2016) for additional information on other preferred habitat features for Atlantic salmon				

5.6 HUMAN COMMUNITIES

5.6.1 Economic Trends in the Sea Scallop Fishery

See Section 5.6.1 of Framework 32: https://s3.amazonaws.com/nefmc.org/Framework-32-Final-Submission_signed-FONSI.pdf

5.6.1.1 Trip and Fixed costs

Trip and fixed cost and estimate for the LA and IFQ vessels are provided in Appendix for Economic Model.

5.6.2 Fishing Communities

There are over 200 communities that have been a homeport or landing port to one or more active sea scallop vessels since 2010. These ports occur throughout the coastal northeast and Mid-Atlantic, primarily from Massachusetts to Virginia. The level of activity in the sea scallop fishery has varied across time. This section identifies the communities for which sea scallops are particularly important. While the involvement of communities in the sea scallop fishery is described, individual vessel participation may vary.

Consideration of the socioeconomic impacts on these communities from proposed fishery regulations is required under NEPA and the MSFCMA. In particular, National Standard 8 of the MSFCMA stipulates that "conservation and management measures shall, consistent with the conservation requirements of this

Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. § 1851(a)(8)). A "fishing community" is defined in the MSFCMA, as "substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802(17)). Determining which fishing communities are "substantially" dependent on or engaged in a fishery can be difficult.

Although it is useful to narrow the focus to individual communities in the analysis of fishing dependence, there are several potential issues with data confidentiality. There are privacy concerns with presenting the data in such a way that proprietary information (landings, revenue, etc.) can be attributed to an individual vessel or a small group of vessels. This is particularly difficult when presenting information on small ports and communities that may only have a small number of vessels and data can easily be attributed to a vessel, dealer, or individual. The fishery data in this action are thus aggregated to at least three reporting units, to preserve confidentiality. To report landings activity to a specific geographic location (e.g., port, state), the landings must be attributed to at least three fishing permit numbers and the landings must be sold to at least three dealer numbers. However, the dealers do not necessarily have to be in the same specific geographic location.

Communities dependent on the sea scallop resource are categorized into primary and secondary port groups. Because geographical shifts in the distribution of sea scallop fishing activity have occurred, the characterization of some ports as "primary" or "secondary" may not reflect their historical participation in and dependence on the fishery.

Primary ports. The sea scallop fishery primary ports are those that are substantially dependent on or engaged in the fishery, and which are likely to be the most impacted by the alternatives under consideration. The primary ports meet at least one of the following criteria:

- At least $5M average annual revenue of sea scallops, 2010-2017 (Table 33);
- At least 50% of average annual fishing revenue was from sea scallops, 2010-2017 (with $500K as a minimum scallop revenue); or
- A top 10 port by percent of landings each year for either the limited access or the limited access general category scallop permit categories, fishing years 2013-2017.

Secondary ports. The sea scallop fishery secondary ports are those that may not be as engaged in or dependent on the fishery as the primary ports but are involved to a lesser extent. The secondary ports meet the following criterion:

- At least $500K average annual revenue of sea scallops during 2010-2017.

Communities identified. Based on these criteria, there are 11 primary ports and 12 secondary ports in the sea scallop fishery (Table 34); confidential ports have been combined with adjacent non-confidential ports). The primary and secondary ports comprise about 92% and 4% of total fishery revenue, respectively, during 2010-2017. Most of the fishery revenue is from landings in New Bedford, and arguably New Bedford and Fairhaven, Massachusetts, could be considered one fishing community, separated only by the Acushnet River. As Hampton/Seaford and Newport News, Virginia are all located in the Hampton Roads metropolitan area, they could also be considered one fishing community. In both cases, the communities are distinguished because reporting their fishing activity is permissible within data confidentiality standards. Scallop fishing activity occurs along a spectrum across ports, rather than in the neat categories of "primary, secondary and other." For example, while Chatham, Massachusetts is considered secondary here, its contribution to the fishery closely matches Provincetown, its neighbor to the north and primary scallop port.

Because of the size and diversity of the sea scallop fishery, it is unpractical to examine each secondary port individually. However, they are listed here to provide a broader scope of potential communities impacted by scallop management measures. There are about 175 other ports that have had more minor participation (4%) in the fishery recently. Descriptions of the communities involved in the sea scallop fishery and all Northeast fishing communities are on the NEFSC website: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

Table 33 – Fishing revenue in primary and secondary sea scallop ports, calendar years 2010-2017.

Port	Average revenue, 2010-2017		
	All fisheries	Sea scallops only	% sea scallops
Primary Ports			
New Bedford, MA	$333.9M	$265.6M	80%
Cape May, NJ	$66.4M	$53.8M	81%
Hampton/Seaford, VA	$27.7M	$23.5M	85%
Newport News, VA	$26.2M	$23.3M	89%
Barnegat Light/Long Beach, NJ	$25.2M	$19.4M	77%
Fairhaven, MA	$17.3M	$12.5M	73%
Pt. Pleasant, NJ	$25.4M	$11.6M	46%
Narragansett/Pt. Judith, RI	$42.1M	$7.2M	17%
Wildwood/Avalon, NJ	$6.5M	$6.3M	97%
Stonington, CT	$6.9M	$4.8M	69%
Provincetown, MA	$4.7M	$2.2M	47%
Secondary Ports			
New London, CT	$4.9M	$2.2M	45%
Chatham, MA	$10.8M	$2.1M	19%
Atlantic City, NJ	$19.2M	$1.9M	10%
Gloucester, MA	$45.2M	$1.7M	4%
Harwichport/Barnstable, MA	$3.3M	$1.5M	45%
Montauk, NY	$16.4M	$1.3M	8%
Ocean City, MD	$5.9M	$0.9M	16%
Hampton Bays/Shinnecock, NY	$6.4M	$0.9M	14%
Sandwich, MA	$4.0M	$0.5M	14%
Total (n=approx. 200)	**$1,046.3M**	**$460.4M**	**44%**

Note: Inflation adjusted to 2017 dollars.
Source: NMFS dealer data, accessed October 2018.

Table 34 – Communities of Interest (primary and secondary ports) in the sea scallop fishery.

State	Community	Average revenue, 2010-2017[a]			Top 10 landing port, 2013-2017[b]		Primary/ Secondary
		>$500K	>$5M	% scallops	LA	LAGC	
MA	Gloucester	√					Secondary
	Sandwich	√					Secondary
	Provincetown	√				√	Primary
	Chatham	√					Secondary
	Harwich/Harwichport/ Barnstable	√					Secondary
	Fairhaven	√	√	√			Primary
	New Bedford	√	√	√	√	√	Primary
RI	Narragansett/Pt. Judith	√	√		√		Primary
CT	Stonington	√	√	√	√		Primary
	New London	√					Secondary
NY	Montauk	√					Secondary
	Hampton Bays/Shinnecock	√					Secondary
NJ	Point Pleasant	√	√		√	√	Primary
	Barnegat Light/Long Beach	√	√	√	√	√	Primary
	Atlantic City	√					Secondary
	Wildwood/Avalon	√	√	√			Primary
	Cape May	√	√	√	√	√	Primary
MD	Ocean City	√					Secondary
VA	Hampton/Seaford	√	√	√	√		Primary
	Newport News	√	√	√			Primary

Notes:
[a] Inflation adjusted to 2017 dollars.
[b] A top 10 port by percent of landings each year for either the LA or LAGC permits, 2013-2017.

6.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

The impacts of the alternatives under consideration are evaluated herein relative to the valued ecosystem components (VECs) described in the Affected Environment (Section 5.0) and to each other.

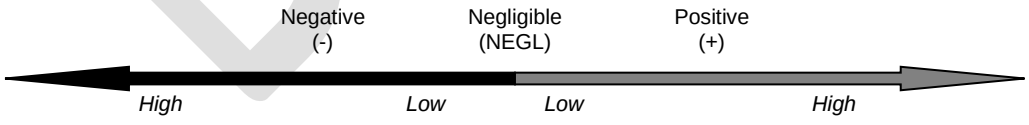
6.1 INTRODUCTION

6.1.1 Evaluation Criteria

This action evaluates the potential impacts using the criteria in Table 35.

Table 35. Terms used to summarize impacts on VECs

VEC	Direction		
	Positive (+)	**Negative (-)**	**Neutral/Negligible**
Allocated target species, other landed species, and protected species	Actions that increase stock/population size for stocks in rebuilding. For stocks that are rebuilt, actions that maintain stock population sizes at rebuilt levels. For protected species, actions that increase the population size, or decrease gear interactions.	Actions that decrease stock/population sizes for overfished stocks. Actions that would cause a rebuilt stock to become overfished. For protected species, actions that decrease the population size, or increase or maintain gear interactions.	Actions that have little or no positive or negative impacts to stocks or populations.
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
	Impact Qualifiers:		
	All VECs: Mixed	**both positive and negative**	
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree (not significant)		
Likely	Some degree of uncertainty associated with the impact		



6.1.2 Approach to Impacts Analysis

6.2 IMPACTS ON ATLANTIC SEA SCALLOPS (BIOLOGICAL IMPACTS)

The Atlantic sea scallop resource is considered healthy; the stock is not overfished and overfishing was not occurring as of 2019. Additionally, after a period of very high fishing mortality during the mid-1980's

and early-1990's, management measures reduced fishing mortality and the stock responded positively. The overall impact of management on this resource has been positive from a biological perspective. As noted in Table 36, the updated OFL for 2020 is nearly 24% greater than ABC/ACL for the fishery, while the actual allocations to fishery are around half of the total ABC (~100 million lb ABC vs. 50-60 million lb. APL). The impact analysis should be considered in the context of a successful management regime, and a large buffer between the OFL and allocations, with a low risk of exceeding the OFL.

6.2.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

The Magnuson-Stevens Act requires that annual catch limits (ACLs) and accountability measures (AMs) be set in all fishery management plans to prevent overfishing. Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan.

Table 36 - Comparison of the No Action OFL/ABC from FW32 with updated OFL and ABC estimates for 2020 and 2021 (Alternative 2).

	FY	OFL	ABC including discards	Discards	ABC with discards removed
Alt. 1 – No Action	2021	47,503	40,430	3,995	36,435
Alt. 2 – Updated OFL and ABC	2021	45,392	35,627	5,110	30,517
	2022	41,926	32,872	4,798	28,074

6.2.1.1 Alternative 1 – No Action for OFL and ABC

Under "No Action", the overall OFL and ABC would be set at the default values for FY 2021, which were adopted by the Council through FW32. The No Action ABC including discards is 40,430 mt, or about 89 million pounds. The OFL values for No Action and Alternative 2 are very similar (2,111 mt difference). The proposed ABC for FY2021 included discards is 35,627 mt, or about 78.5 million pounds. This is a roughly 10 million pound decrease in the ABC from the 2020 default measures.

As in past years, both alternatives (Alternative 1 and Alternative 2) could be expected to result in a healthy scallop biomass in the short and long term, and should be considered to have a low positive impact. The best available data should be used to set ABC, which would include updated survey and fishery data from 2020 that is used in Alternative 2 compared to older data used in the No Action ABC (Alternative 1).

6.2.1.2 Alternative 2 – Updated OFL and ABC for FY 2021 and FY 2022 (default)

The FY 2021 and FY 2022 OFL and ABC values that were approved by the SSC and recommended to the Council are summarized in Table 36.

While the FY 2021 OFL and ABC estimates are nearly the same as No Action, the 2022 default values decline, reflecting anticipated mortality (both F and M) in high density areas of the Nantucket Lightship South Deep and in the Mid-Atlantic Access Areas. Some recruitment was detected on eastern Georges Bank in the 2020 surveys; however, after several years of below-average recruitment, the fishery will continue mining the two exceptional year classes in the Mid-Atlantic and Nantucket Lightship regions. The estimated LPUE in open bottom decreased substantially for 2021 and 2022 in the absence of strong recruitment. There are several cohorts on eastern Georges Bank, including pre-recruits, recruits, and adult scallops. In 2021, this region is projected to hold the largest share of exploitable biomass across the scallop resource.

Overall, the OFL and ABC values in Alternative 2 are based on the most updated survey information and model configurations; therefore, there should be low positive impacts on the scallop resource from setting fishery limits with updated data for two years. Since fishing targets for the majority of the fishery are set lower than these limits, the plan reduces the risk of overfishing and optimizes overall yield from the fishery over the long term. As compared to Alternative 1, using the best available science to set the specification should have low-positive impacts.

6.2.2 Action 2 – Northern Gulf of Maine TAC Setting

Management: Both Alternative 1 and Alternative 2 would continue to implement measures developed through Framework 29 to fully account for removals from the NGOM management area by closing the NGOM management area to LA DAS fishing, and restricting harvest by LA vessels to NGOM RSA compensation awards. Both Alternative 1 and Alternative 2 could be expected to result in a complete accounting of removals from the NGOM management area. This is considered to be positive for the resource in the area.

Under both alternatives, separate NGOM TACs would be established for the LA and LAGC components, and the area would close to a component once its respective TAC was projected to be achieved. For example, if the LA TAC was attained but the LAGC TAC was not, LA vessels would no longer be allowed to fish in the NGOM, whereas the LAGC component would be allowed to continue fishing until the LAGC TAC was reached. To manage LA removals from the area, the LA share of the TAC would be awarded as NGOM RSA compensation fishing, and count as part of the 1.25 million lb scallop research set-aside (not in addition to). LA vessels would declare into the area and be limited to fishing within the area to harvest any NGOM RSA pounds they may be awarded. There would be no change in how LAGC vessels operate in the NGOM management area.

Assessment/TAC Setting: The NGOM is data-poor relative to the rest of the scallop resource (ex: no annual survey) and is not included within the CASA assessment model. There are no established biological reference points for this area. While the NGOM is not part of the determination of stock status, annual surveys have been conducted in the area since 2016. Machias/Seal Island to Stellwagen Bank was surveyed by UMaine/ME DMR in 2016. Additional survey work was completed in 2017 on Jeffreys Ledge and Stellwagen Bank using optical surveys (SMAST drop camera and CFF HabCam), after the area was closed to fishing. In 2018, the SMAST drop camera survey covered Stellwagen Bank, Jeffreys Ledge, Ipswich Bay, and Platts Bank. ME DMR and UMaine conducted a dredge survey of the NGOM ranging from Machias/Seal Island to Stellwagen Bank in 2019. In 2020, SMAST conducted drop camera surveys of the NGOM on Platts Bank, Jeffreys Ledge, Ipswich Bay, and Stellwagen Bank.

SARC 65 estimates of natural mortality on Georges Bank were 0.2, and 0.25 for the Mid-Atlantic. All NGOM TAC options under consideration are either equal to or less than natural mortality estimates for other parts of the resource. The recommended fishing mortality rates areas of the NGOM would be less than half of the Fmsy value for the fishery (F=0.61) set in the 2020 management track assessment.

Harvest associated with these low fishing mortality rates could be expected to result in low positive impacts on the scallop resource in the management area.

The TAC in each option was calculated by combining the projected biomass from the four areas of the NGOM that were surveyed in either 2019 (Machias Seal Island) or 2020 (Ipswich Bay, Platts Bank, and Jeffreys Ledge). For FY2021, projections from Machias Seal Island, an area at the northern extent of the management area, account for 52% of the TAC, while Ipswich Bay contributes to 10%, Platts 8%, and Jeffreys Ledge 30%. If the full TAC is caught in the NGOM, and less than 52% of the fishing occurs in Machias Seal Island, there may be negative localized impacts on the scallop resource in the other part of the NGOM that are likely to be fished. Assuming the TAC is fully harvested, relatively higher rates of effort in Ipswich Bay, on Platts Bank, and/or on Jeffreys Ledge would be expected to result in negative impacts on the scallop resource in the NGOM. The overall and localized impacts of each measures is likely to be reduced if limited or no RSA compensation fishing occurs in the NGOM, which has occurred in recent years.

- Alternative 2, Option 1: NGOM TAC at F=0.18 in FY2021 would result in an overall TAC of 160,000 lbs (115,000 lbs LAGC)
- Alternative 2, Option 2: NGOM TAC at F=0.20 in FY2021 would result in an overall TAC of 175,000 lbs (122,500 LAGC)
- Alternative 2, Option 3: NGOM TAC at F=0.25 in FY2021 would result in an overall TAC of 210,000 lbs (140,000 lbs LAGC)

6.2.2.1 FY2021 NGOM TAC

Overall, Alternative 1 could be expected to have a low negative impact on the scallop resource since the overall TAC of 265,000 pounds would be expected to result in higher fishing mortality rates across the management unit, especially compared to the FY2021 options in Alternative 2. If RSA compensation fishing does not occur in the management unit, and only LAGC fishing occurs, removals from the area would be 167,500 pounds. This level of harvest could be expected to result in a fishing mortality rate between F=0.18 and F=0.20 if each area is fished uniformly.

The three TAC options developed in Alternative 2 would set the overall TAC at 160,000 pounds (F=0.18), 175,000 pounds (F=0.2), and 210,000 pounds (F=0.25). If only LAGC harvest occurs in the management area, removals would be lower (115,000 pounds at F=0.18). If fishing is not uniform within the NGOM, and most effort occurs in the between Platts Bank, Ipswich Bay, and Jeffreys Ledge, fishing each of these areas at an F=0.25 would result in roughly 100,000 pounds of landings (see Section 5.2.2). Impacts of the FY2021 TAC on the resource are likely to scale with the size of the TAC, with the No Action having the potential for the largest negative impact on the resource, particularly in localized areas. Options in Alternative 2 with higher TACs would also be expected to have a larger impact than lower TACs

6.2.2.2 2022 NGOM TAC (Default)

Setting the default TAC for FY2022 at zero could have positive impacts on the scallop resource by setting the F rate at 0, and closing the area until new allocations are implemented (sub-Option 2). Allowing some level of harvest (up to 70,000 pounds – 77,500 pounds) prior to the implementation of new allocations would likely have low negative impacts on the resource in the NGOM because fishing would continue in areas with low biomass and minimal recruitment (sub-Option 1). Part of Stellwagen Bank is expected to re-open to scallop fishing in FY2022. Scallops in this area will be 5 years old and are in high densities. Considering the NGOM as a set of discrete areas, Stellwagen Bank is the area that is best suited to support fishing effort in FY2022. Opening the NGOM to limited fishing on April 1, 2022 would result in

vessels fishing areas with relatively low biomass (at higher Fs) compared to awaiting the re-opening of Stellwagen Bank.

6.2.3 Summary of Relevant Biological Information

The following section describes the short-term (ST) and long-term (LT) impacts of fishery removals for each specification scenario. It should also be noted that the Council has been updating specifications on an annual basis with adjustments to the rotational management program and access areas. All estimates beyond FY 2021 are expected to be revisited again through a future action.

6.2.3.1 Overall Fishing Mortality

- All the alternatives under consideration have a total estimate of short-term fishing mortality that is considerably lower than the limit used for setting fishery allocations for the fishery overall. The ACT, or annual catch target, includes an overall fishing mortality limit of 0.39 for the total fishery. The range of total fishing mortality under consideration is between 0.054 (Alternative 1 - No Action) and a high of 0.229 for Alternative 5 that would allocate 4 total access area trips and fish open areas at F=0.33.
- The total fishing mortality is constrained by the fishing target principle that does not enable average fishing mortality to increase above F_{MSY} in open areas (0.61). For the purposes of this analysis, average total fishing mortality over the long term was simulated at F=0.48. There are no Alternatives under consideration in Framework 33 that would set open area F at the upper bound of F=0.61. Alternatives in Section 4.3 consider open area F rates under two separate open bottom configurations, and include DAS options of 24 DAS and 26 DAS. Setting open area F lower than the maximum target reduces overall fishing mortality.
- When compared to estimates of the overall F from the preferred alternatives in recent actions (FW25 – 32), the estimates of overall (total) F rates for all alternatives under consideration are slightly higher than estimated F rates in recent years (Table 37, Figure 6).

The risk of overfishing is relatively low for all of the alternatives under consideration since the projected F rates are well below 0.61. However, the projection model tends to underestimate fishing mortality. In recent years when the projected F rate compared has been compared with the actual F rate the following year, total F has been underestimated by 20-30% in some years. Even if the projected open area F of F=0.33 is underestimated by 30%, overfishing would not occur.

Table 37 - Comparison of overall F and open area F rates of preferred alternatives from recent FW actions with alternatives in FW33.

Fishing Year	FW	Run	Overall F	Open Area F
2014	**25**	Pref	0.21	0.52
2015	**26**	Pref	0.224	0.48
2016	**27**	Pref	0.1	0.48
2017	**28**	Pref	0.11	0.44
2018	**29**	Pref	0.175	0.295
2019	**30**	Pref	0.139	0.23
2020	**32**	Pref	0.182	0.33
2021	33	Alt2-24DAS	0.205	0.3
2021	33	Alt2-26DAS	0.21	0.33
2021	33	Alt3-24DAS	0.22	0.3
2021	33	Alt3-26DAS	0.222	0.33
2021	33	Alt4-24DAS	0.2	0.3
2021	33	Alt4-26DAS	0.202	0.33
2021	33	Alt5-24DAS	0.222	0.3
2021	33	Alt5-26DAS	0.229	0.33
2021	33	na	0.054	0.24

Figure 6 - Comparison of total fishing mortality (F) estimates in FW33 Alternatives with the preferred alternatives from recent Frameworks.

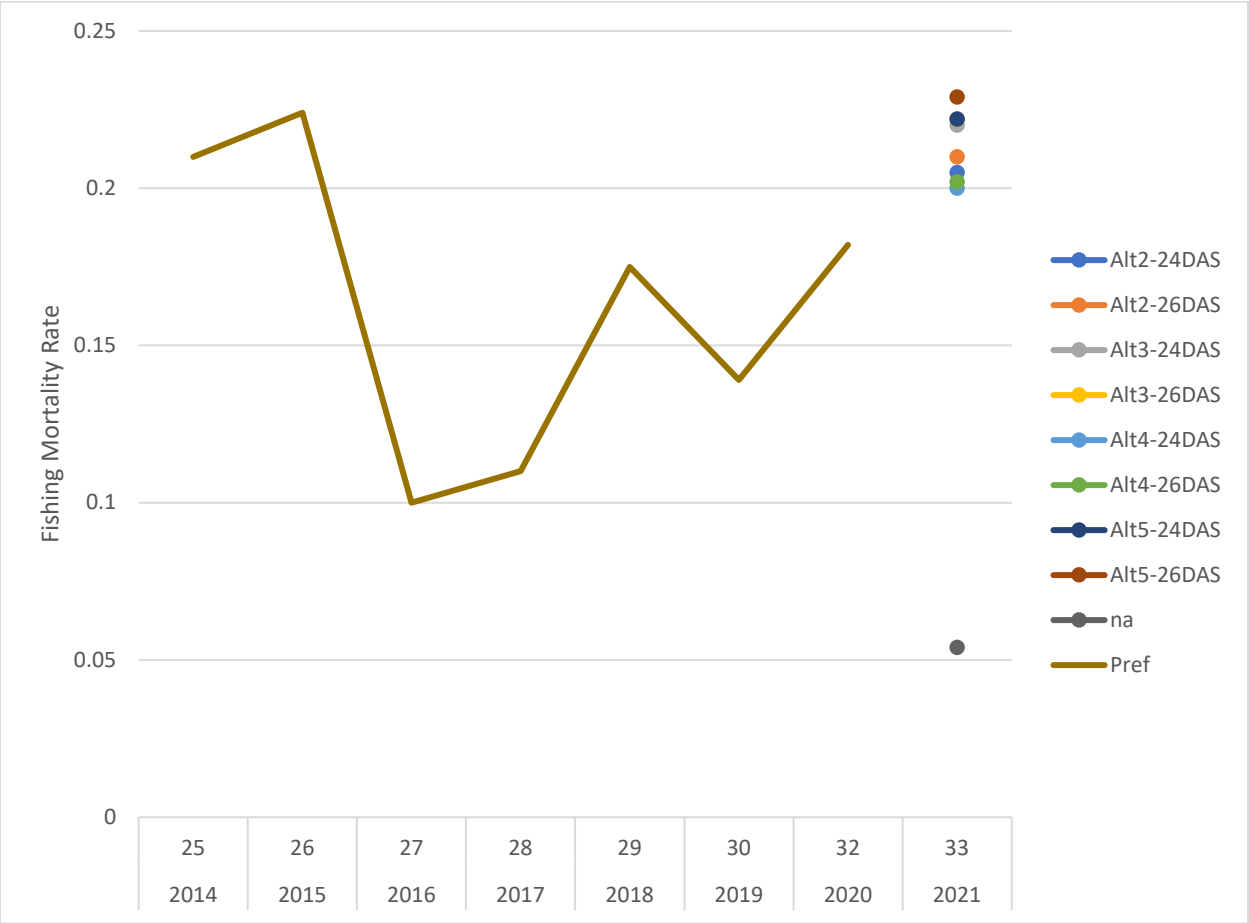
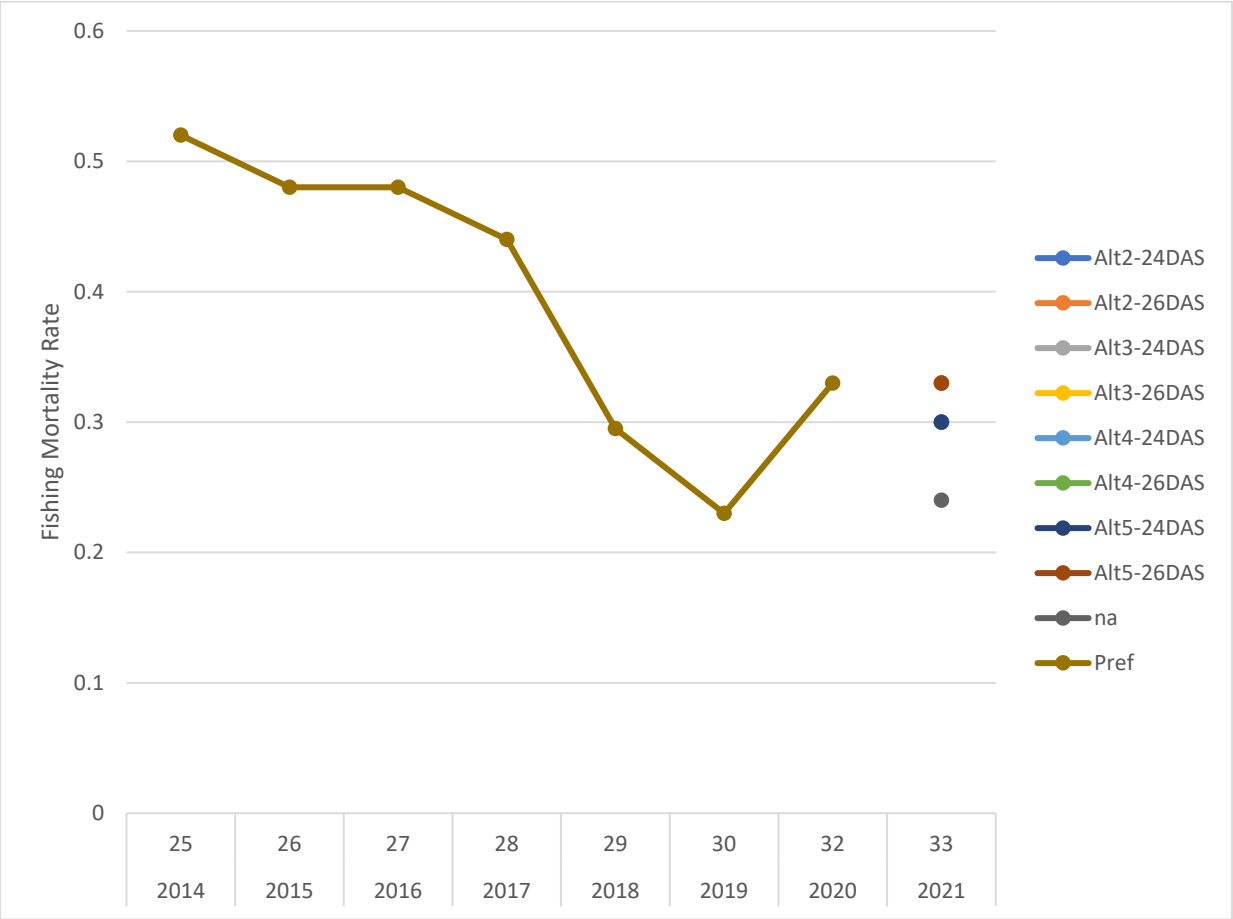


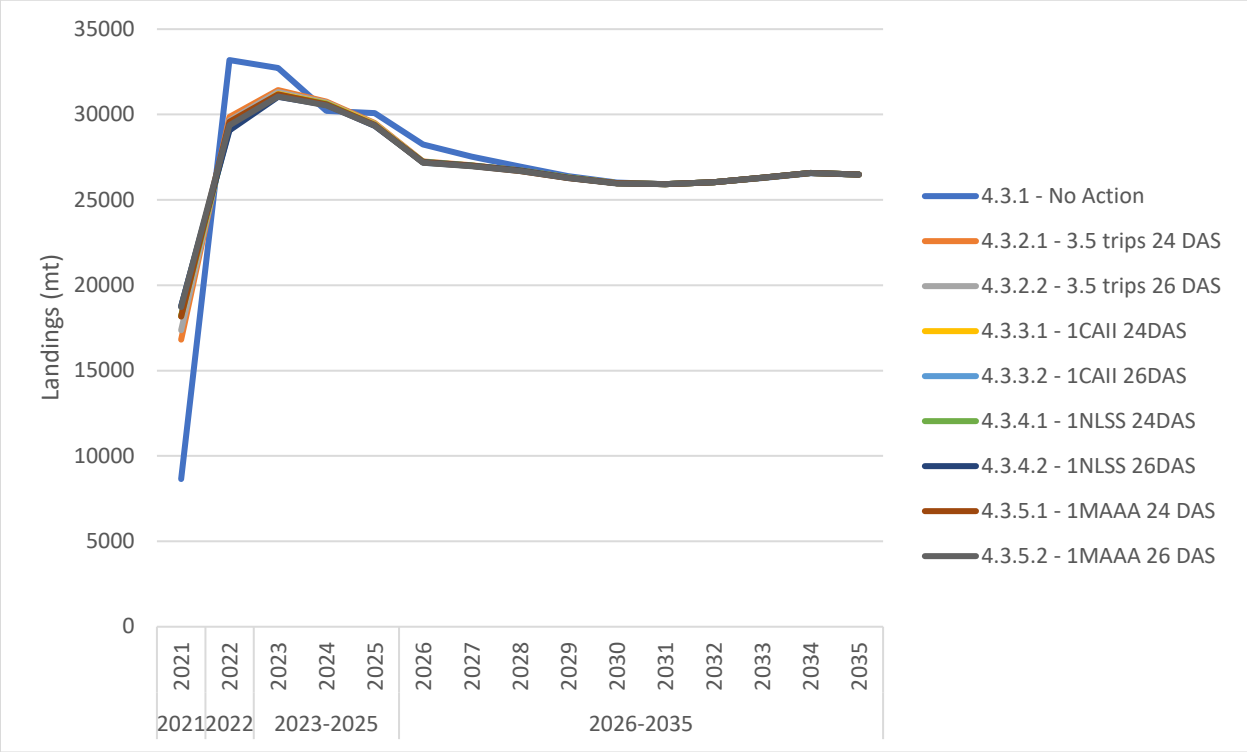
Figure 7 - Comparison of estimated open area fishing mortality estimates in FW33 with the preferred alternatives from recent Frameworks.



6.2.3.2 Projected Landings

Overall the projected landings for the alternative runs under consideration are very similar – with the exception of No Action (Figure 8). Alternative 2, which allocated 3.5 access area trips, results in lower landings in the short term, while Alternatives 3, 4, and 5 would result in higher landings in 2021 by allocating 4 access area trips. The ACL for the fishery is anticipated to be 78.5 million lbs for FY2021. Therefore, total projected landings are likely to around 50% of the ACL, and well below the OFL. It is important to keep in mind that these are mean values and based on various assumptions for natural mortality and future recruitment. These projections also generally assume higher levels of F starting in year 2 of the projection (ex: open area F=0.48). These landing estimates are useful to make comparisons across alternatives but are very likely to be higher than realized removals in 2022 and beyond. The Council plans to revisit scallop fishery specifications again in 2021 to make recommendations for 2022. The uncertainty in projected landings is lower for year 1 but increases for 2022 and beyond.

Figure 8 - Projected Landing of Framework 33 Alternatives (FY2021 – FY2035)



6.2.4 Action 3 – Fishery Specifications

The alternatives under this action set FY 2021 open area and access trip allocations for the fishery. Default specifications for FY 2022 are also established. The Council considered a total of nine allocation options. In addition to Alternative 1/No Action, four rotational management approaches (Alternatives 2-5) were developed, each with two options for open area F values. A status quo scenario, which is different from the No Action/default allocations, was evaluated for comparison to current management. The areas open under status quo differ from the action alternatives.

The majority of exploitable biomass accounted for in the current OFL and ABC estimates is located the Closed Area II and Nantucket Lightship regions, and the Mid-Atlantic Access Area. These areas encompass the rotational access options for 2021. Most of the scallops in the MAAA and NLS regions are from the 2012 (NLS) and 2013 (MAAA) year classes, now 9 and 10 years old, which were considered exceptional when they were first observed. The growth of these animals has leveled off, and these year classes have now been fished for several years. The future of the scallop fishery is likely on eastern Georges Bank following recruitment events in this region.

Given this distribution of biomass, all four alternatives close CAII-Southeast to protect small scallops and use the same access area configurations in the MAAA, NLS-South, and CAII (CAII-SW and CAII-Ext). The differences between alternatives are in the allocations to each access area, which vary between 1 trip to 1.5 trips. Each alternative has options to allocate either 24 DAS (open area F=0.30) or 26 DAS (open area F=0.33). Given the similarities between alternative, spatial patterns of effort and therefore of impacts to the scallop resource are expected to be broadly similar between the different approaches, with effects scaling according to the magnitude of effort in each area. Fishing effort and allocations this year will influence availability of scallops during fishing year 2022.

From an overall resource perspective, all five options would result in positive to low positive biological impacts relative to overall fishing mortality. Options to fish 26 DAS can be expected to result in higher fishing mortality in the open bottom at a time when there are no strong signals of incoming recruitment in these areas for FY2022. Therefore, setting open area DAS at 24 could be expected to have low-positive impacts on the scallop resource relative to 26 DAS for each FT LA vessel.

The majority of scallops in the MAAA are from the exceptional 2013 year class, which has been fished for several years. These scallops will be 9 years old in 2021 and have limited growth potential. At an average size of roughly 120mm in 2020, these scallops are likely to have larger meat yields relative to scallops in the NLS-South and CAII where the scallops were smaller in 2020. The majority of biomass in MAAA is projected to be in the Elephant Trunk Open area (17 million pounds), with roughly 9.3 million pounds estimated in the Elephant Trunk Flex, and 7.9 million pounds of exploitable biomass estimates in the Hudson Canyon for FY2021. The highest densities of biomass were found in the Elephant Trunk region (Figure 9).

Roughly 70 million pounds have been allocated to the MAAA since 2016. Over that time, the monthly landings pattern has shifted later in the year, with high landings occurring in the fall (primarily October) (See Figure 10). If scallop meats are smaller in October and November (meat weight anomaly), the realized fishing mortality in this area would be higher than projected because it would take more meats to achieve the trip limit or allocation. These changes in fishing behavior may lead to negative impacts on the scallop resource within the Mid-Atlantic Access Area if realized F is higher than projected.

Figure 11 shows the results of 1,000 simulations of fishing the MAAA at different F rates in FY2021, and what the resulting landings would be in FY2022 by fishing the MAAA at an F=0.6 in FY2022. In all scenarios but 1 trip, or 6 million pounds of harvest in FY2021, some of the simulations suggest that the harvest of a full trip in FY2022 could not be achieved fishing at F=0.6. This graphic illustrates the trade-offs associated with different levels of harvest in 2021. It should be noted that there may be additional mortality in the MAAA in FY2021 from carryover trips that were not fished in FY2020, and from RSA compensation fishing.

Scallops in the NLS-South are from the exceptional 2012 year class that settled on Georges Bank. The animals in the NLS-South will be 10 years old in FY2021, though they have not grown normally and their average size in 2020 was roughly 95mm. The shell height to meat weight ratio of these scallops is also below average, and fishing in this area typically produces smaller meats compared to the MAAA and CAII. These scallops are not expected to resume normal growth, and are likely experiencing elevated levels of natural mortality (Figure 12).

The majority of scallops in the Closed Area II region is concentrated in the CAII-SW area, where high densities of 4 year old scallops were detected in the 2020 surveys. These scallops grew faster than projected and will be recruited to the 4” ring in FY2021. The CAII-SW area was combined with the CAII-Ext as an access area in FY2021. This will afford the fleet access to 4- and 5-year-old year classes detected in these areas and will spread effort out within the larger continuous area. The four year old scallops in CAII-SW have growth potential, and harvesting before yield is optimized will sacrifice some potential landings in the future. However, biomass is expected to increase between FY2021 and FY2022, and over a billion scallops were estimated to be in the access area in FY2021.

Figure 9 - Scallop density in the Elephant Trunk region, predicted as mt per km2 (Source: NEFSC with CFF data).

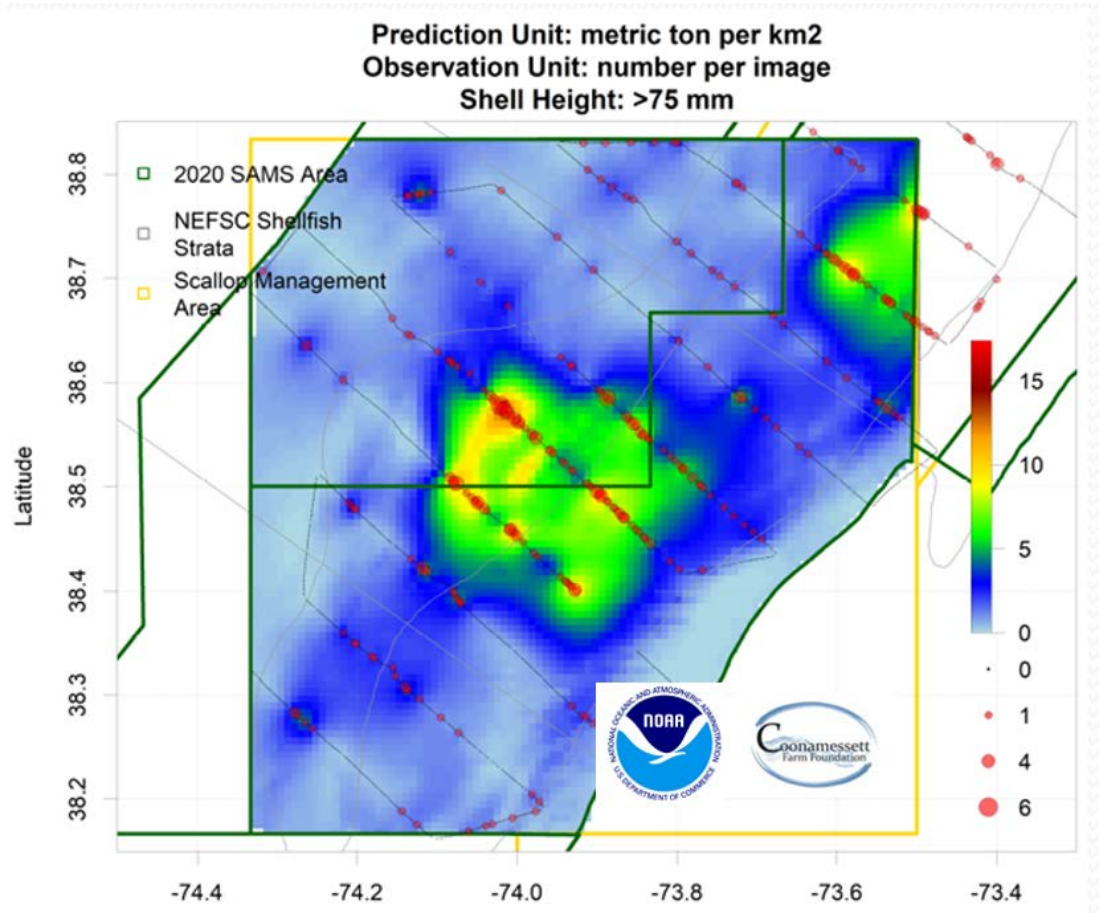


Figure 10 - Monthly landings from the Mid-Atlantic Access Area, FY2016 - FY2020 (year incomplete)

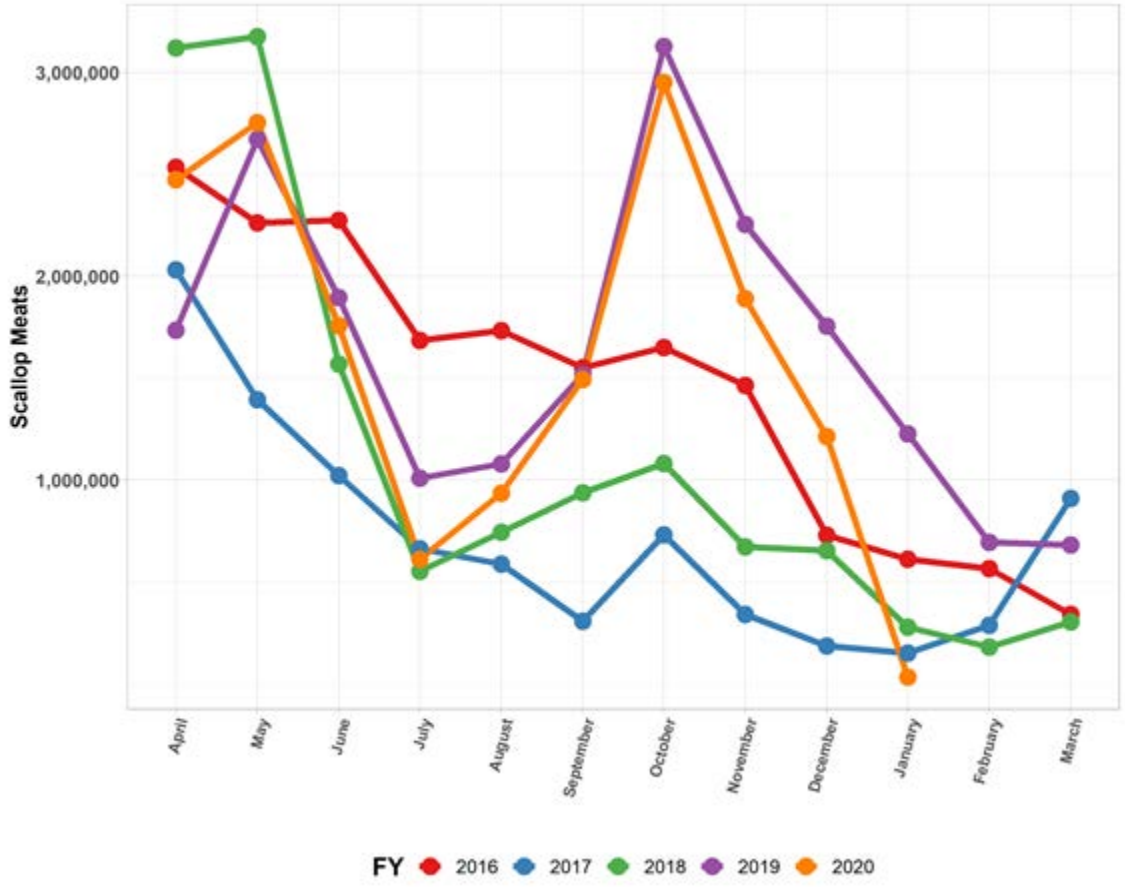


Figure 11 - Simulation of potential landings in the MAAA in FY2022 under several harvest scenarios in FY2021.

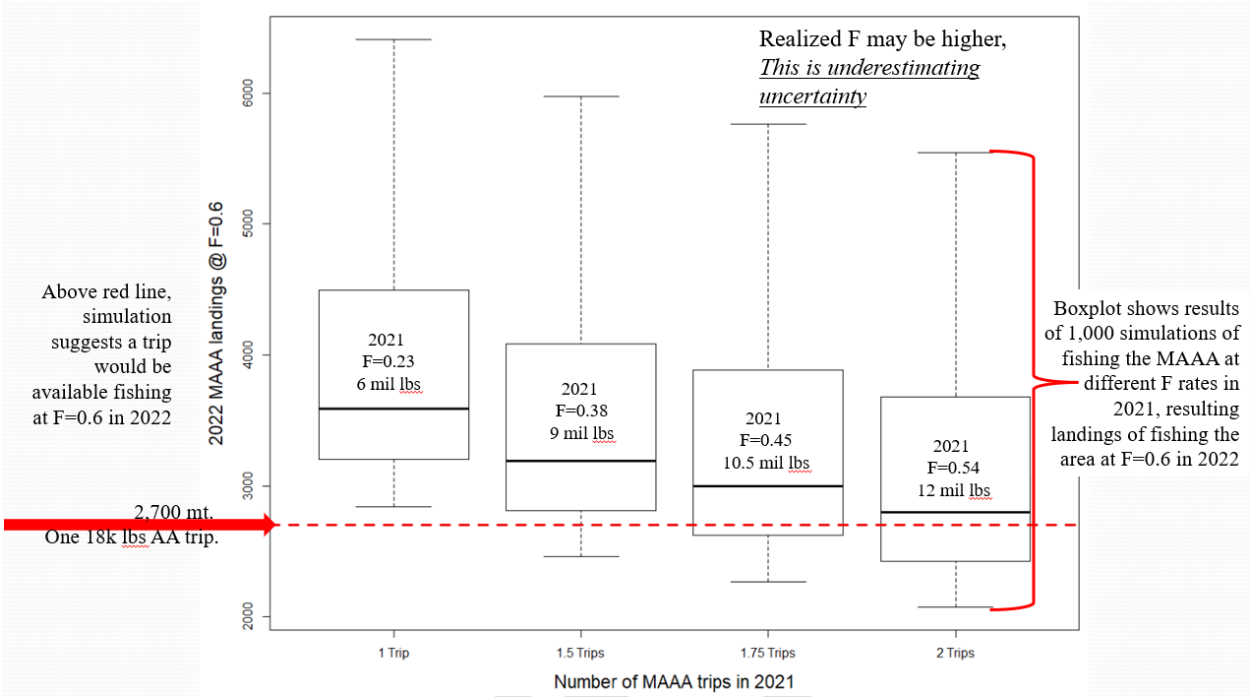
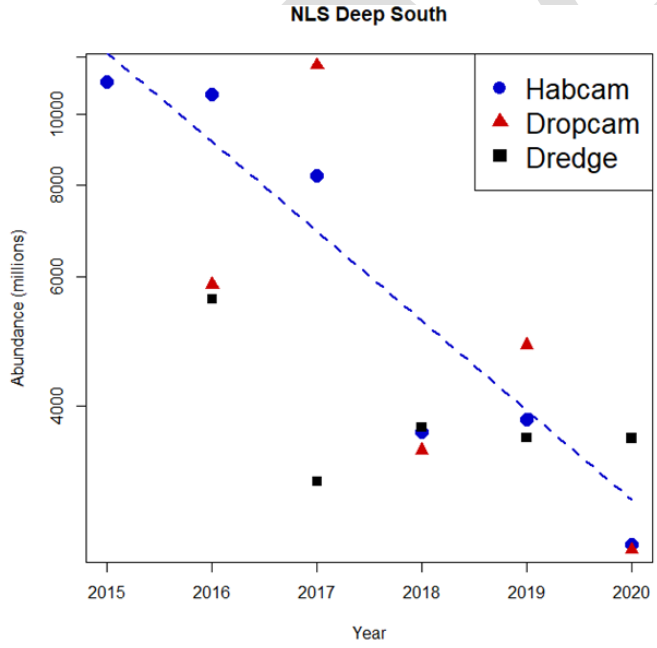


Figure 12 - Survey abundance estimates from 2015 - 2020 for dredge, HabCam, and drop camera surveys. The blue regression line is for HabCam only.



6.2.5 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

The LAGC IFQ component is allocated a fleet wide total number of access area trips. Individual vessels are not required to take trips in specific areas like access area trips allocated to the LA fishery. After the total number of access area trips are determined, a maximum number of trips are identified by access area, and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. Alternative 2 and Alternative 3 would redirect fishing effort out of Closed Area II to other parts of the scallop resource.

6.2.5.1 Alternative 1 – No Action (Default Measures from Framework 32)

Impacts of Alternative 1 are likely negligible at the stock level, but potentially low negative on the scallop resource in nearshore areas. Since the LAGC IFQ access area allocation is a proportion of the total LAGC IFQ allocation, and a much smaller proportion of total scallop catch, these removals do not have a major impact on the resource. Since the LAGC IFQ fleet would have a limited number of trips in the MAAA (571) and would not be able to fish in several access areas which hold higher densities of larger scallops under Alternative 1, this option would likely have a low negative to negligible biological impact relative to Alternative 2 and Alternative 3 because LAGC quota would primarily be harvested from open areas.

6.2.5.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation to Closed Area I only

Overall this option could have negligible to potentially low positive impacts on the resource overall by reducing fishing pressure on inshore open areas and providing more access to areas with higher biomass and catch rates. Alternative 2 would likely have a low positive to negligible biological impact on the resource relative to Alternative 1 and Alternative 3. LAGC IFQ harvest from access areas would likely reduce impacts on the resource in open areas by allowing vessels to utilize their quota within rotational management areas, and specifically shifting allocations associated with CAII to CAI for the LAGC component.

6.2.5.3 Alternative 3 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation evenly across the Mid-Atlantic Access Area, NLS-South, and Closed Area I

Overall this option could have negligible to potentially low positive impacts on the resource overall by reducing fishing pressure on inshore open areas and providing more access to areas with higher biomass and catch rates. Alternative 3 would likely have a low positive to negligible biological impact on the resource relative to Alternative 1. Relative to Alternative 2, the impacts would likely be low negative to negligible since the LAGC fleet would did not fish their trips in the NLS-S in FY 2020, which would result in more pressure on nearshore areas compared to sending all of the CAII allocation to CAI (Alternative 2), since all of the access area trips were taken in CAI in 2020. LAGC IFQ harvest from access areas would likely reduce impacts on the resource in open areas by allowing vessels to utilize their quota within rotational management areas, and specifically shifting allocations associated with CAII to the MAAA, NLS-South, and CAI for the LAGC component.

6.2.6 Action 5 – Additional Measures to Reduce Fishery Impacts

6.2.6.1 RSA Compensation Fishing

Scallop RSA compensation fishing is expected to constitute 3% of total scallop landings in FY 2021 (1.25 million pounds). Overall, removals from RSA compensation fishing represent a small proportion of fishery landings. While the Council is prescriptive about where RSA compensation can be fished, Alternative 1 and Alternative 2 are not expected to alter the status of the scallop resource.

6.2.6.1.1 Alternative 1 – No Action

Alternative 1 (No Action) would prohibit vessels from fishing RSA compensation in access areas. This option would increase effort and removals in open areas, where LPUE is projected to be much lower than in access areas. The Council has developed alternatives is to set DAS at either 24 or 26 for FT LA vessels, noting unremarkable recruitment from 2016 – 2020fg surveys. This option would be expected to slightly increase F in the open areas and have a slightly negative impact on that portion of the resource relative to Alternative 2. While No Action would have a slightly negative impact relative to Alternative 2, the overall impact on the stock would be expected to be negligible since projected landings are well below the OFL and ABC, and the RSA is very small part of the APL.

6.2.6.1.2 Alternative 2 – Allow RSA compensation fishing in the Mid-Atlantic Access Area, NLS-South, Closed Area II, and Closed Area I, with limited RSA compensation fishing in the NGOM Management Area

Alternative 2 could be expected to have negligible impacts on the scallop resource as a whole. Vessels would be allowed to fish RSA compensation pounds in all access areas open to the fishery, open bottom, and the NGOM management area (Map 10). Vessels would have a short seasonal window to fish in Closed Area II while the meat weight anomaly is high and discard to kept ratios for GB yellowtail and Northern windowpane are low. Vessels would not be able to fish RSA compensation pounds in any other access areas, and only vessels receiving allocations of NGOM RSA compensation would be able to fish their awards in the NGOM management area.

Alternative 2 would expand where RSA compensation fishing can occur which would allow vessels to fish in areas with higher LPUE. The opportunity to fish in access areas could be expected to slightly reduce F in the open areas, and therefore have a slightly positive impact on that portion of the resource relative to Alternative 1. There is some potential for negligible to low-negative biological impacts on a finer scale if catch rates or availability of preferred market grades result in higher than anticipated fishing mortality in discrete areas. The overall impact on the stock would be expected to be negligible since projected landings are well below the OFL and ABC, and the RSA is very small part of the APL.

6.2.6.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

6.2.6.2.1 Alternative 1 – No Action

Under Alternative 1, there would be no change to the existing seasonal closure to protect flatfish in Closed Area II access area, which runs from August 15th – November 15th, and includes only the portion of CAII (CAII-Southwest) that overlaps with the groundfish closure. The overall biological impacts of a two-week closure in Closed Area II in November would likely be low since landings from CAII are historically lower at this time of year compared to the summer months when meat yields are higher. The overall impact on the stock would be expected to be negligible under Alternative 1, and between the two options.

6.2.6.2.2 Alternative 2 – Extend Seasonal Closure of Closed Area II Access Area through November 30th in FY 2021

The overall impact on the stock would be expected to be negligible under Alternative 2, and between the two options. Under Alternative 2, CAII AA trips that would have been taken between November 16th and November 30th would be fished at other times of the year. If displaced fishing occurs when meat yields are better, this could have slight positive biological impacts because fewer scallops would need to be harvested to achieve the overall allocation (Figure 32). Rotational management allocates a fixed level of removals from an access area that may be fished in a given fishing year; therefore, a temporal displacement of CAII AA effort for two weeks within a year would not change the overall removals from CAII AA.

6.3 IMPACTS ON NON-TARGET SPECIES (BYCATCH)

This section primarily addresses the potential impact of scallop fishing on the four flatfish stocks that the scallop fishery has sub-ACLs for: Georges Bank (GB) yellowtail flounder, Southern New England/Mid-Atlantic yellowtail flounder, Gulf of Maine/Georges Bank (GOM/GB, "northern") windowpane flounder, and Southern New England/Mid-Atlantic (SNE/MA, "southern") windowpane flounder. Projections of catch of these four stocks are typically completed through each specification cycle. Bycatch estimates represent a reasonable approximation of catch that may occur. The projections are forecasts (with error) and should not be interpreted as precise estimates. Review of past estimates has shown that the projections have over-estimated and under-estimated catches. It is important to note that the methods and underlying assumptions used for in-season catch accounting may vary from the methods used to project catch. The FY 2021 bycatch projections associated with each specification alternative for the four stocks with a scallop sub-ACL are shown in Table 38.

Table 38 – FY2021 scallop fishery bycatch projections (mt) associated with FW33 specifications alternatives for GB yellowtail, SNE/MA yellowtail, northern windowpane, and southern windowpane, relative to the anticipated 2021 sub-ACLs for these stocks.

Alternative	Scenario	GB YT	SNE YT	NWP	SWP
Anticipated sub-ACL		*12 mt*	*2 mt*	*31 mt*	*129 mt*
4.3.1	No Action 1 MAAA 18 DAS	3.8	2.6	16.8	36.7
4.3.2.1	1.5 NLS S 1 MAAA 1 CAII 24 DAS	12.5	3.0	26.0	72.5
4.3.2.2	1.5 NLS S 1 MAAA 1 CAII 26 DAS	12.8	3.2	27.3	74.7
4.3.3.1	1.5 NLS S 1.5 MAAA 1 CAII 24 DAS	12.5	3.0	26.0	77.4
4.3.3.2	1.5 NLS S 1.5 MAAA 1 CAII 26 DAS	12.8	3.2	27.3	79.7
4.3.4.1	1 NLS S 1.5 MAAA 1.5 CAII 24 DAS	16.4	2.9	29.2	65.9
4.3.4.2	1 NLS S 1.5 MAAA 1.5 CAII 26 DAS	16.7	3.1	30.5	68.1
4.3.5.1	1.5 NLS S 1 MAAA 1.5 CAII 24 DAS	16.4	3.0	29.2	72.2
4.3.5.2	1.5 NLS S 1 MAAA 1.5 CAII 26 DAS	16.7	3.2	30.5	74.5
SQ	1 NLS S 1 CAII .5 CAI .5 NLS N 2 MAAA	151.6	3.2	143.1	86.2

6.3.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

The overfishing limit and acceptable biological catch are the absolute limits the fishery is not allowed to exceed. As has been the case recent years, fishery allocations under consideration in this action (Section 4.2.2.2) are well below the OFL and ABC values for both Alternative 1 (No Action, default OFL and ABC from FW30) and Alternative 2 (Updated OFL and ABC). Neither Alternative 1 or Alternative 2 are expected to have a direct impact on non-target species because the anticipated level of effort, spatial distribution of scallop fishing activity, and projections of non-target species bycatch in FY2020 are not based on the OFL or ABC limits. Impacts to non-target species are, however, directly related to the fishery allocations (annual projected landings or APL) being considered in this action and are assessed below in Section 6.3.3.

6.3.2 Action 2 – Northern Gulf of Maine Management Area

6.3.2.1 Northern Gulf of Maine TAC Setting

The Northern Gulf of Maine Management Area overlaps with part of the northern windowpane stock boundary. This area also overlaps with part of the Cape Cod/Gulf of Maine yellowtail stock boundary. Currently, bycatch estimates for these stocks are not stratified by the NGOM management area, and NGOM specific discard estimates are not developed for in-season catch accounting. However, to assess potential impacts, an analysis of Cape Cod/Gulf of Maine (CC/GOM) yellowtail and northern windowpane bycatch in the NGOM management area was completed in FW29 using audited data from the 18 observed LA trips in the NGOM between March 1, 2017 and March 23, 2017 (data provided by NEFOP staff). Catch data from the 443 observed hauls reported 164,039 lbs of kept scallops, along with 1,005 lbs of discarded CC/GOM yellowtail and 451 lbs of discarded northern windowpane. The d/K ratio (lbs of discarded fish/lbs of kept scallops) for CC/GOM yellowtail from these trips was 0.0061 and the d/K ratio for northern windowpane was 0.0028. Since there is no observer coverage of LAGC NGOM trips, the estimates from LA fishing in 2017 represent a reasonable approximation of what discard rates could be during the time of year that the NGOM is being fished in FY2021. The d/K ratios of CC/GOM and northern windowpane are very low, as is approximate bycatch of northern windowpane and CC/GOM yellowtail associated with the NGOM TAC options for FY2021 (Table 39).

Table 39 - Comparison of CC/GOM and northern Windowpane bycatch for the NGOM management area in FY 2020.

Section	Alt.	F rate	2020 NGOM TAC	CC/GOM YT bycatch (lbs)	Northern Windowpane Bycatch (lbs)	Bycatch Estimate (lbs) of YT and Windowpane
				(2017 d/k: 0.0061)	(2017 d/k: 0.0028)	
4.2.1	Alt. 1		265,000	1,617	742	2,359
4.2.2.1	Alt. 2 O 1	F=0.18	160,000	976	448	1,424
4.2.2.2	Alt. 2 O 2	F=0.20	175,000	1,068	490	1,558
4.2.2.3	Alt. 2 O3	F=0.25	210,000	1,281	588	1,869

6.3.2.1.1 Alternative 1 – No Action

Relative to Alternative 2 Option 1, Alternative 2 Option 2, and Alternative 2 Option 3, Alternative 1 could be expected to result in lower bycatch of CC/GOM YT flounder and Northern windowpane. Since overall bycatch is expected to be low, it is difficult to make a distinction between each option relative to bycatch of CC/GOM YT and northern windowpane; therefore, the impact of Alternative 1 on non-target species would most likely be negligible in comparison to Alternative 2. Due to the low probability that the estimates of bycatch associated with Alternative 1 would contribute to non-target stocks being overfished, the impacts of Alternative 1 on non-target species would likely be negligible overall.

6.3.2.1.2 Alternative 2 – Set 2021 and 2022 NGOM TAC, with first 70,000 pounds to LAGC, then 50/50 split between LA and LAGC

Relative to Alternative 1, the NGOM TAC options under Alternative 2 could be expected to result in slightly higher bycatch. Since overall bycatch is expected to be low under both Alternative 2 and Alternative 1, it is difficult to make a distinction between each option relative to bycatch of CC/GOM yellowtail and northern windowpane. Since the level of bycatch associated with Alternative 2 and Alternative 1 is comparable and very low overall, the impact of Alternative 2 on non-target species would most likely be negligible compared to Alternative 1. Due to the low probability that the estimated level of bycatch associated with Alternative 2 would contribute to non-target stocks being overfished, the impacts of Alternative 2 on non-target species would likely be negligible overall.

6.3.3 Action 3 – Fishery Specifications

6.3.3.1 Alternative 1 – No Action (Default Measures)

Alternative 1 would allocate one 18,000-pound FT LA trip to the MAAA and 18 DAS to FT LA vessels. The scallop fishery is not expected to exceed the limit of any flatfish stocks that it has sub-ACLs for under Alternative 1 (Table 38). Of all specifications options considered in this action, Alternative 1 could be expected to result in the lowest total bycatch of the four flatfish stocks that the scallop fishery has sub-ACLs for. Therefore, Alternative 1 could be expected to have positive impacts on non-target species relative to Alternatives 2, 3, 4, 5, and Status Quo. Because the overall level of bycatch projected for Alternative 1 is minimal relative to overall catch limits for these flatfish stocks, it is unlikely that bycatch resulting from Alternative 1 would increase the risk of stock-wide catch limits being exceeded or result in overfishing, meaning the overall impact of Alternative 1 could be considered low positive.

6.3.3.2 Alternative 2 – 3.5 Access Area Trips, with 1.5 trips to Nantucket Lightship South

Alternative 2 would set the FT LA access area trip limit to 18,000 pounds and allocate one trip to the MAAA, one trip to Closed Area II, 1.5 trips to the NLS-South, and would allocate either 24 open area DAS (Option 1) or 26 open area DAS (Option 2).

Bycatch projections associated with Alternative 2 Option 1 and Alternative 2 Option 2 are very similar for each flatfish stock and are analyzed collectively in the following text. As described in Table 38, bycatch projections for FY2021 under Alternative 2 are very close to the anticipated scallop fishery sub-ACL for SNE/MA yellowtail, less than the anticipated sub-ACL for SNE/MA windowpane, and less than the anticipated sub-ACL for northern windowpane. Therefore, the overall impact of Alternative 2 on SNE/MA yellowtail, SNE/MA windowpane, and northern windowpane would likely be negligible.

Bycatch projections associated with Alternative 2 are greater than the anticipated FY2021 sub-ACL for GB yellowtail by less than 1 mt. The projected bycatch for GB yellowtail and northern windowpane is primarily driven by spatial management under Alternative 2, which would allocate access to Closed Area II Access Area, where the scallop fishery interacts with GB yellowtail and GOM/GB windowpane at a higher rate relative to other parts of the resource. Despite this overlap, there are also several actions in FW33 that are anticipated to reduce bycatch of these flatfish stocks beyond the level projected for FY2021 (Table 38). For example, the eastern part of the traditional CAII AA overlaps with both northern windowpane and GB yellowtail stock areas; Alternative 2 would close this area to scallop fishing for the entirety of FY2021, which is expected to have positive impacts to northern windowpane and GB yellowtail by eliminating flatfish catch that could come from this area. Another spatial management measure that is anticipated to have positive impacts on non-target stocks throughout eastern Georges Bank is the Alternative 2 in Section 4.5.2, which would extend the current seasonal closure of CAII an additional two weeks and include Closed Area II Extension, making the duration of this closure from August 15 to November 30th. As noted in Figure 13, observed bycatch rates of northern windowpane and GB yellowtail are elevated during this time of year in both CAII-Southwest and CAII-Extension, meaning that incorporating both areas in the extended seasonal closure is anticipated to result in lower realized bycatch of these two stocks than what is represented in the FY2021 projections (Table 38).

There are caveats associated with the methodology used to project flatfish bycatch for the out year, and it is reasonable to expect the northern windowpane and GB yellowtail bycatch projections for FY2020 are overestimated for several reasons. The estimation methods used to calculate these projections rely on the most recent 12 months of observer data available. This means that FY2021 bycatch projections of GB yellowtail and northern windowpane in CAII AA are based on observer records from FY2017, the most recent fishing year when the scallop fishery was allocated access to CAII AA and also had observers on-board[5]. A comparison of observed discard to kept ratios for northern windowpane and GB yellowtail indicates that relative bycatch of these flatfish stocks has declined outside of CAII (i.e. in areas that have been consistently fished by the scallop fishery) since FY2017. For this reason, it is highly possible that FY2020 realized catch rates of northern windowpane and GB yellowtail in CAII will be less than what the projection for Alternative 2 suggests.

Closed Area I is bisected by the shared boundary the GB and Cape Cod/Gulf of Maine (CC/GOM) yellowtail stock areas. This is worth noting because the bycatch projections presented in Table 38 assign any yellowtail bycatch from CAI to the Georges Bank yellowtail stock; however, based on the spatial extent of scallop effort in recent fishing years (Map 15) and the spatial distribution of scallops within CAI, any fishing that occurs in CAI in FY2021 (i.e., either by LAGC vessels or LA vessels fishing RSA compensation pounds) is expected to be focused in the western extent of the area, the portion of CAI that falls within the CC/GOM yellowtail stock area. Because scallop fishing in CAI and associated yellowtail bycatch is expected to occur outside of the GB yellowtail stock area, it is anticipated that realized bycatch of GB yellowtail will be further reduced from the projections presented in Table 38.

As previously mentioned, the bycatch projections represent a reasonable approximation of catch that may occur and are highly dependent on projections of scallop biomass, assumptions of catch rates across the resource, and predictions of fishing behavior (e.g., where vessels will fish and at what time of year). As such, the projections should be used as a basis for comparing relative bycatch among the alternatives considered in this action, but should not be used to make a direct comparison to realized bycatch of past fishing years or to anticipated sub-ACLs for the flatfish stocks in the future. This point is supported by Table 29, which describes the notable divergence of realized bycatch from projections over the past several scallop fishing years for all four stocks that the scallop fishery has sub-ACLs for. Regarding

[5] Note: the scallop fishery was allocated access to Closed Area II in FY2020; however, due to the COVID-19 pandemic, observers were not deployed on scallop trips until mid-August 2020 (i.e., when the seasonal closure of CAII AA was already in place).

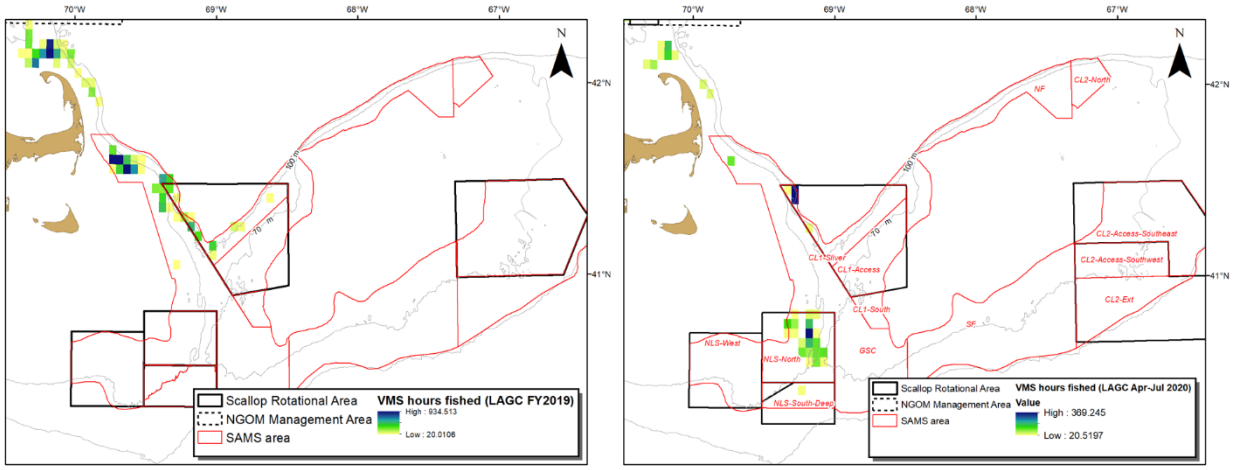
projection performance of northern windowpane, it is worth noting that the projected bycatch for this stock was 234% greater than realized bycatch the last year that the scallop fishery accessed CAII (i.e. FY 2017). In FY2018, northern windowpane projections were overestimated by 227%. Overestimation has occurred for GB yellowtail bycatch as well; for example, in FY2019, the GB yellowtail projection was 85% greater than the realized estimate of bycatch.

In addition to the comprehensive suite of proactive measures in place that are aimed at reducing bycatch of flatfish stocks, the Council, through FW29 (NEFMC 2018), developed a reactive accountability measure (AM) that could be triggered if the scallop fishery does exceed its sub-ACL. The reactive AM would require the use of a modified dredge when fishing in Closed Area II and Closed Area II extension if triggered. Should it be triggered, the reactive AM would be put into effect by NMFS in a future fishing year.

Though scallop fishery catch of GB yellowtail and northern windowpane under Alternative 2 is anticipated to be lower than the level projected for FY2021, it is still possible that the sub-ACLs could be exceeded in FY2021 which could be considered a negative impact on these non-target flatfish stocks. While it is important to acknowledge this point, it is also worth noting that total catches of GB yellowtail and northern windowpane by the groundfish, scallop, and other fisheries have been declining in recent years and are considered to be very low relative to historic levels. Considering the likelihood that this trend of low catch will continue in FY2021 for all components that interact with GB yellowtail and northern windowpane, even if the scallop fishery were to exceed its sub-ACLs for FY2021 under Alternative 2, it is unlikely that the overages would cause the overall ABC to be exceeded for these stocks. Under this scenario, the impacts of Alternative 2 on non-target species would be considered negligible because total catch by all components that interact with GB yellowtail and northern windowpane would not be exceeded. Overall impacts on non-target species are likely to be negligible to low negative.

Projected bycatch of all flatfish stocks is anticipated to be greater under Alternative 2 compared to Alternative 1, but less than Status Quo, meaning the impacts of Alternative 2 could be considered low negative relative to Alternative 1 and positive relative to Status Quo. Bycatch is expected to be slightly less for GB yellowtail and northern windowpane under Alternative 2 compared to Alternatives 3-5, meaning the impacts of Alternative 2 on these non-target flatfish stocks could be considered slightly positive; however, due to the uncertainty in projections noted above and acknowledging that none of these options are expected to result in allocated flatfish stocks exceeding their respective ABCs, it is more likely that the impacts of Alternative 2 are negligible in comparison to Alternative 3 through Alternative 5.

Map 15 – Comparison of VMS hours fished by the LAGC component on Georges Bank in FY2019 (left) and FY2020 (April through July, right).



6.3.3.3 Alternative 3 – Four Access Area Trips, with 1 trip in Closed Area II

Alternative 3 would set the FT LA access area trip limit to 18,000 pounds and allocate 1.5 trips to the MAAA, one trip to Closed Area II, 1.5 trips to the NLS-South, and would allocate either 24 open area DAS (Option 1) or 26 open area DAS (Option 2).

Bycatch projections associated with Alternative 3 Option 1 and Alternative 3 Option 2 are very similar for each flatfish stock and are analyzed collectively in the following text. As described in Table 38, bycatch projections for FY2021 under Alternative 3 are very close to the anticipated scallop fishery sub-ACL for SNE/MA yellowtail, less than the anticipated sub-ACL for SNE/MA windowpane, and less than the anticipated sub-ACL for northern windowpane. Therefore, the overall impact of Alternative 3 on SNE/MA yellowtail, SNE/MA windowpane, and northern windowpane would likely be negligible.

Bycatch projections associated with Alternative 3 are greater than the anticipated FY2021 sub-ACL for GB yellowtail by less than 1 mt. The projected bycatch for GB yellowtail and northern windowpane is primarily driven by spatial management under Alternative 3, which would allocate access to Closed Area II Access Area, where the scallop fishery interacts with GB yellowtail and GOM/GB windowpane at a higher rate relative to other parts of the resource. Despite this overlap, there are also several actions in FW33 that are anticipated to reduce bycatch of these flatfish stocks beyond the level projected for FY2021 (Table 38). For example, the eastern part of the traditional CAII AA overlaps with both northern windowpane and GB yellowtail stock areas; Alternative 3 would close this area to scallop fishing for the entirety of FY2021, which is expected to have positive impacts to northern windowpane and GB yellowtail by eliminating flatfish catch that could come from this area. Another spatial management measure that is anticipated to have positive impacts on non-target stocks throughout eastern Georges Bank is the Alternative 2 in Section 4.5.2, which would extend the current seasonal closure of CAII an additional two weeks and include Closed Area II Extension, making the duration of this closure from August 15 to November 30th. As noted in Figure 13, observed bycatch rates of northern windowpane and GB yellowtail are elevated during this time of year in both CAII-Southwest and CAII-Extension, meaning that incorporating both areas in the extended seasonal closure is anticipated to result in lower realized bycatch of these two stocks than what is represented in the FY2021 projections (Table 38).

There are caveats associated with the methodology used to project flatfish bycatch for the out year, and it is reasonable to expect the northern windowpane and GB yellowtail bycatch projections for FY2020 are overestimated for several reasons. The estimation methods used to calculate these projections rely on the

most recent 12 months of observer data available. This means that FY2021 bycatch projections of GB yellowtail and northern windowpane in CAII AA are based on observer records from FY2017, the most recent fishing year when the scallop fishery was allocated access to CAII AA and also had observers on-board[6]. A comparison of observed discard to kept ratios for northern windowpane and GB yellowtail indicates that relative bycatch of these flatfish stocks has declined outside of CAII (i.e. in areas that have been consistently fished by the scallop fishery) since FY2017. For this reason, it is highly possible that FY2020 realized catch rates of northern windowpane and GB yellowtail in CAII will be less than what the projection for Alternative 3 suggests.

Closed Area I is bisected by the shared boundary the GB and Cape Cod/Gulf of Maine (CC/GOM) yellowtail stock areas. This is worth noting because the bycatch projections presented in Table 38 assign any yellowtail bycatch from CAI to the Georges Bank yellowtail stock; however, based on the spatial extent of scallop effort in recent fishing years (Map 15) and the spatial distribution of scallops within CAI, any fishing that occurs in CAI in FY2021 (i.e., either by LAGC vessels or LA vessels fishing RSA compensation pounds) is expected to be focused in the western extent of the area, the portion of CAI that falls within the CC/GOM yellowtail stock area. Because scallop fishing in CAI and associated yellowtail bycatch is expected to occur outside of the GB yellowtail stock area, it is anticipated that realized bycatch of GB yellowtail will be further reduced from the projections presented in Table 38.

As previously mentioned, the bycatch projections represent a reasonable approximation of catch that may occur and are highly dependent on projections of scallop biomass, assumptions of catch rates across the resource, and predictions of fishing behavior (e.g., where vessels will fish and at what time of year). As such, the projections should be used as a basis for comparing relative bycatch among the alternatives considered in this action, but should not be used to make a direct comparison to realized bycatch of past fishing years or to anticipated sub-ACLs for the flatfish stocks in the future. This point is supported by Table 29, which describes the notable divergence of realized bycatch from projections over the past several scallop fishing years for all four stocks that the scallop fishery has sub-ACLs for. Regarding projection performance of northern windowpane, it is worth noting that the projected bycatch for this stock was 234% greater than realized bycatch the last year that the scallop fishery accessed CAII (i.e. FY 2017). In FY2018, northern windowpane projections were overestimated by 227%. Overestimation has occurred for GB yellowtail bycatch as well; for example, in FY2019, the GB yellowtail projection was 85% greater than the realized estimate of bycatch.

In addition to the comprehensive suite of proactive measures in place that are aimed at reducing bycatch of flatfish stocks, the Council, through FW29 (NEFMC 2018), developed a reactive accountability measure (AM) that could be triggered if the scallop fishery does exceed its sub-ACL. The reactive AM would require the use of a modified dredge when fishing in Closed Area II and Closed Area II extension if triggered. Should it be triggered, the reactive AM would be put into effect by NMFS in a future fishing year.

Though scallop fishery catch of GB yellowtail and northern windowpane under Alternative 3 is anticipated to be lower than the level projected for FY2021, it is still possible that the sub-ACLs could be exceeded in FY2021 which could be considered a negative impact on these non-target flatfish stocks. While it is important to acknowledge this point, it is also worth noting that total catches of GB yellowtail and northern windowpane by the groundfish, scallop, and other fisheries have been declining in recent years and are considered to be very low relative to historic levels. Considering the likelihood that this trend of low catch will continue in FY2021 for all components that interact with GB yellowtail and northern windowpane, even if the scallop fishery were to exceed its sub-ACLs for FY2021 under

[6] Note: the scallop fishery was allocated access to Closed Area II in FY2020; however, due to the COVID-19 pandemic, observers were not deployed on scallop trips until mid-August 2020 (i.e., when the seasonal closure of CAII AA was already in place).

Alternative 3, it is unlikely that the overages would cause the overall ABC to be exceeded for these stocks. Under this scenario, the impacts of Alternative 3 on non-target species would be considered negligible because total catch by all components that interact with GB yellowtail and northern windowpane would not be exceeded. Overall impacts on non-target species are likely to be negligible to low negative.

Projected bycatch of all flatfish stocks is anticipated to be greater under Alternative 3 compared to Alternative 1, but less than Status Quo, meaning the impacts of Alternative 3 could be considered low negative relative to Alternative 1 and positive relative to Status Quo. Bycatch is expected to be similar for GB yellowtail, SNE/MA yellowtail, and northern windowpane between Alternative 3 and Alternative 2 compared to Alternatives 4 and 5, meaning the impacts of Alternative 3 on these non-target flatfish stocks could be considered negligible to Alternative 2 and slightly positive to the other options; however, due to the uncertainty in projections noted above and acknowledging that none of these options are expected to result in allocated flatfish stocks exceeding their respective ABCs, it is more likely that the impacts of Alternative 3 are negligible in comparison to Alternative 2, Alternative 4, and Alternative 5.

6.3.3.4 Alternative 4 – Four Access Area Trips, with 1 trip in Nantucket Lightship South

Alternative 4 would set the FT LA access area trip limit to 18,000 pounds and allocate 1.5 trips to the MAAA, 1.5 trips to Closed Area II, one trip to the NLS-South, and would allocate either 24 open area DAS (Option 1) or 26 open area DAS (Option 2).

Bycatch projections associated with Alternative 4 Option 1 and Alternative 4 Option 2 are very similar for each flatfish stock and are analyzed collectively in the following text. As described in Table 38, bycatch projections for FY2021 under Alternative 4 are very close to the anticipated scallop fishery sub-ACL for SNE/MA yellowtail, less than the anticipated sub-ACL for SNE/MA windowpane, and less than the anticipated sub-ACL for northern windowpane. Therefore, the overall impact of Alternative 4 on SNE/MA yellowtail, SNE/MA windowpane, and northern windowpane would likely be negligible.

Bycatch projections associated with Alternative 4 are greater than the anticipated FY2021 sub-ACL for GB yellowtail by approximately 4 mt. The projected bycatch for GB yellowtail and northern windowpane is primarily driven by spatial management under Alternative 4, which would allocate access to Closed Area II Access Area, where the scallop fishery interacts with GB yellowtail and GOM/GB windowpane at a higher rate relative to other parts of the resource. Despite this overlap, there are also several actions in FW33 that are anticipated to reduce bycatch of these flatfish stocks beyond the level projected for FY2021 (Table 38). For example, the eastern part of the traditional CAII AA overlaps with both northern windowpane and GB yellowtail stock areas; Alternative 4 would close this area to scallop fishing for the entirety of FY2021, which is expected to have positive impacts to northern windowpane and GB yellowtail by eliminating flatfish catch that could come from this area. Another spatial management measure that is anticipated to have positive impacts on non-target stocks throughout eastern Georges Bank is the Alternative 2 in Section 4.5.2, which would extend the current seasonal closure of CAII an additional two weeks and include Closed Area II Extension, making the duration of this closure from August 15 to November 30th. As noted in Figure 13, observed bycatch rates of northern windowpane and GB yellowtail are elevated during this time of year in both CAII-Southwest and CAII-Extension, meaning that incorporating both areas in the extended seasonal closure is anticipated to result in lower realized bycatch of these two stocks than what is represented in the FY2021 projections (Table 38).

There are caveats associated with the methodology used to project flatfish bycatch for the out year, and it is reasonable to expect the northern windowpane and GB yellowtail bycatch projections for FY2020 are overestimated for several reasons. The estimation methods used to calculate these projections rely on the most recent 12 months of observer data available. This means that FY2021 bycatch projections of GB yellowtail and northern windowpane in CAII AA are based on observer records from FY2017, the most

recent fishing year when the scallop fishery was allocated access to CAII AA and also had observers on-board[7]. A comparison of observed discard to kept ratios for northern windowpane and GB yellowtail indicates that relative bycatch of these flatfish stocks has declined outside of CAII (i.e. in areas that have been consistently fished by the scallop fishery) since FY2017. For this reason, it is highly possible that FY2020 realized catch rates of northern windowpane and GB yellowtail in CAII will be less than what the projection for Alternative 4 suggests.

Closed Area I is bisected by the shared boundary the GB and Cape Cod/Gulf of Maine (CC/GOM) yellowtail stock areas. This is worth noting because the bycatch projections presented in Table 38 assign any yellowtail bycatch from CAI to the Georges Bank yellowtail stock; however, based on the spatial extent of scallop effort in recent fishing years (Map 15) and the spatial distribution of scallops within CAI, any fishing that occurs in CAI in FY2021 (i.e., either by LAGC vessels or LA vessels fishing RSA compensation pounds) is expected to be focused in the western extent of the area, the portion of CAI that falls within the CC/GOM yellowtail stock area. Because scallop fishing in CAI and associated yellowtail bycatch is expected to occur outside of the GB yellowtail stock area, it is anticipated that realized bycatch of GB yellowtail will be further reduced from the projections presented in Table 38.

As previously mentioned, the bycatch projections represent a reasonable approximation of catch that may occur and are highly dependent on projections of scallop biomass, assumptions of catch rates across the resource, and predictions of fishing behavior (e.g., where vessels will fish and at what time of year). As such, the projections should be used as a basis for comparing relative bycatch among the alternatives considered in this action, but should not be used to make a direct comparison to realized bycatch of past fishing years or to anticipated sub-ACLs for the flatfish stocks in the future. This point is supported by Table 29, which describes the notable divergence of realized bycatch from projections over the past several scallop fishing years for all four stocks that the scallop fishery has sub-ACLs for. Regarding projection performance of northern windowpane, it is worth noting that the projected bycatch for this stock was 234% greater than realized bycatch the last year that the scallop fishery accessed CAII (i.e. FY 2017). In FY2018, northern windowpane projections were overestimated by 227%. Overestimation has occurred for GB yellowtail bycatch as well; for example, in FY2019, the GB yellowtail projection was 85% greater than the realized estimate of bycatch.

In addition to the comprehensive suite of proactive measures in place that are aimed at reducing bycatch of flatfish stocks, the Council, through FW29 (NEFMC 2018), developed a reactive accountability measure (AM) that could be triggered if the scallop fishery does exceed its sub-ACL. The reactive AM would require the use of a modified dredge when fishing in Closed Area II and Closed Area II extension if triggered. Should it be triggered, the reactive AM would be put into effect by NMFS in a future fishing year.

Though scallop fishery catch of GB yellowtail and northern windowpane under Alternative 4 is anticipated to be lower than the level projected for FY2021, it is still possible that the sub-ACLs could be exceeded in FY2021 which could be considered a negative impact on these non-target flatfish stocks. While it is important to acknowledge this point, it is also worth noting that total catches of GB yellowtail and northern windowpane by the groundfish, scallop, and other fisheries have been declining in recent years and are considered to be very low relative to historic levels. Considering the likelihood that this trend of low catch will continue in FY2021 for all components that interact with GB yellowtail and northern windowpane, even if the scallop fishery were to exceed its sub-ACLs for FY2021 under Alternative 4, it is unlikely that the overages would cause the overall ABC to be exceeded for these stocks. Under this scenario, the impacts of Alternative 4 on non-target species would be considered

[7] Note: the scallop fishery was allocated access to Closed Area II in FY2020; however, due to the COVID-19 pandemic, observers were not deployed on scallop trips until mid-August 2020 (i.e., when the seasonal closure of CAII AA was already in place).

negligible because total catch by all components that interact with GB yellowtail and northern windowpane would not be exceeded. Overall impacts on non-target species are likely to be negligible to low negative.
Projected bycatch of all flatfish stocks is anticipated to be greater under Alternative 4 compared to Alternative 1, but less than Status Quo, meaning the impacts of Alternative 4 could be considered low negative relative to Alternative 1 and positive relative to Status Quo. Bycatch is expected to be similar for GB yellowtail, SNE/MA yellowtail, northern windowpane, and southern windowpane between Alternative 4 and Alternative 5 compared to Alternatives 2 and 3, meaning the impacts of Alternative 4 on these non-target flatfish stocks could be considered slightly negative to Alternative 2 and Alternative 3 and negligible to Alternative 5; however, due to the uncertainty in projections noted above and acknowledging that none of these options are expected to result in allocated flatfish stocks exceeding their respective ABCs, it is more likely that the impacts of Alternative 4 are negligible in comparison to Alternative 2, Alternative 3, and Alternative 5.

6.3.3.5 Alternative 5 – Four Access Area Trips, with 1 trip in the Mid-Atlantic Access Area

Alternative 5 would set the FT LA access area trip limit to 18,000 pounds and allocate one trip to the MAAA, 1.5 trips to Closed Area II, 1.5 trips to the NLS-South, and would allocate either 24 open area DAS (Option 1) or 26 open area DAS (Option 2).

Bycatch projections associated with Alternative 5 Option 1 and Alternative 5 Option 2 are very similar for each flatfish stock and are analyzed collectively in the following text. As described in Table 38, bycatch projections for FY2021 under Alternative 5 are very close to the anticipated scallop fishery sub-ACL for SNE/MA yellowtail, less than the anticipated sub-ACL for SNE/MA windowpane, and less than the anticipated sub-ACL for northern windowpane. Therefore, the overall impact of Alternative 5 on SNE/MA yellowtail, SNE/MA windowpane, and northern windowpane would likely be negligible.

Bycatch projections associated with Alternative 5 are greater than the anticipated FY2021 sub-ACL for GB yellowtail by approximately 4 mt. The projected bycatch for GB yellowtail and northern windowpane is primarily driven by spatial management under Alternative 5, which would allocate access to Closed Area II Access Area, where the scallop fishery interacts with GB yellowtail and GOM/GB windowpane at a higher rate relative to other parts of the resource. Despite this overlap, there are also several actions in FW33 that are anticipated to reduce bycatch of these flatfish stocks beyond the level projected for FY2021 (Table 38). For example, the eastern part of the traditional CAII AA overlaps with both northern windowpane and GB yellowtail stock areas; Alternative 5 would close this area to scallop fishing for the entirety of FY2021, which is expected to have positive impacts to northern windowpane and GB yellowtail by eliminating flatfish catch that could come from this area. Another spatial management measure that is anticipated to have positive impacts on non-target stocks throughout eastern Georges Bank is the Alternative 2 in Section 4.5.2, which would extend the current seasonal closure of CAII an additional two weeks and include Closed Area II Extension, making the duration of this closure from August 15 to November 30th. As noted in Figure 13, observed bycatch rates of northern windowpane and GB yellowtail are elevated during this time of year in both CAII-Southwest and CAII-Extension, meaning that incorporating both areas in the extended seasonal closure is anticipated to result in lower realized bycatch of these two stocks than what is represented in the FY2021 projections (Table 38).

There are caveats associated with the methodology used to project flatfish bycatch for the out year, and it is reasonable to expect the northern windowpane and GB yellowtail bycatch projections for FY2020 are overestimated for several reasons. The estimation methods used to calculate these projections rely on the most recent 12 months of observer data available. This means that FY2021 bycatch projections of GB

yellowtail and northern windowpane in CAII AA are based on observer records from FY2017, the most recent fishing year when the scallop fishery was allocated access to CAII AA and also had observers on-board[8]. A comparison of observed discard to kept ratios for northern windowpane and GB yellowtail indicates that relative bycatch of these flatfish stocks has declined outside of CAII (i.e. in areas that have been consistently fished by the scallop fishery) since FY2017. For this reason, it is highly possible that FY2020 realized catch rates of northern windowpane and GB yellowtail in CAII will be less than what the projection for Alternative 5 suggests.

Closed Area I is bisected by the shared boundary the GB and Cape Cod/Gulf of Maine (CC/GOM) yellowtail stock areas. This is worth noting because the bycatch projections presented in Table 38 assign any yellowtail bycatch from CAI to the Georges Bank yellowtail stock; however, based on the spatial extent of scallop effort in recent fishing years (Map 15) and the spatial distribution of scallops within CAI, any fishing that occurs in CAI in FY2021 (i.e., either by LAGC vessels or LA vessels fishing RSA compensation pounds) is expected to be focused in the western extent of the area, the portion of CAI that falls within the CC/GOM yellowtail stock area. Because scallop fishing in CAI and associated yellowtail bycatch is expected to occur outside of the GB yellowtail stock area, it is anticipated that realized bycatch of GB yellowtail will be further reduced from the projections presented in Table 38.

As previously mentioned, the bycatch projections represent a reasonable approximation of catch that may occur and are highly dependent on projections of scallop biomass, assumptions of catch rates across the resource, and predictions of fishing behavior (e.g., where vessels will fish and at what time of year). As such, the projections should be used as a basis for comparing relative bycatch among the alternatives considered in this action, but should not be used to make a direct comparison to realized bycatch of past fishing years or to anticipated sub-ACLs for the flatfish stocks in the future. This point is supported by Table 29, which describes the notable divergence of realized bycatch from projections over the past several scallop fishing years for all four stocks that the scallop fishery has sub-ACLs for. Regarding projection performance of northern windowpane, it is worth noting that the projected bycatch for this stock was 234% greater than realized bycatch the last year that the scallop fishery accessed CAII (i.e. FY 2017). In FY2018, northern windowpane projections were overestimated by 227%. Overestimation has occurred for GB yellowtail bycatch as well; for example, in FY2019, the GB yellowtail projection was 85% greater than the realized estimate of bycatch.

In addition to the comprehensive suite of proactive measures in place that are aimed at reducing bycatch of flatfish stocks, the Council, through FW29 (NEFMC 2018), developed a reactive accountability measure (AM) that could be triggered if the scallop fishery does exceed its sub-ACL. The reactive AM would require the use of a modified dredge when fishing in Closed Area II and Closed Area II extension if triggered. Should it be triggered, the reactive AM would be put into effect by NMFS in a future fishing year.

Though scallop fishery catch of GB yellowtail and northern windowpane under Alternative 5 is anticipated to be lower than the level projected for FY2021, it is still possible that the sub-ACLs could be exceeded in FY2021 which could be considered a negative impact on these non-target flatfish stocks. While it is important to acknowledge this point, it is also worth noting that total catches of GB yellowtail and northern windowpane by the groundfish, scallop, and other fisheries have been declining in recent years and are considered to be very low relative to historic levels. Considering the likelihood that this trend of low catch will continue in FY2021 for all components that interact with GB yellowtail and northern windowpane, even if the scallop fishery were to exceed its sub-ACLs for FY2021 under Alternative 5, it is unlikely that the overages would cause the overall ABC to be exceeded for these

[8] Note: the scallop fishery was allocated access to Closed Area II in FY2020; however, due to the COVID-19 pandemic, observers were not deployed on scallop trips until mid-August 2020 (i.e., when the seasonal closure of CAII AA was already in place).

stocks. Under this scenario, the impacts of Alternative 5 on non-target species would be considered negligible because total catch by all components that interact with GB yellowtail and northern windowpane would not be exceeded. Overall impacts on non-target species are likely to be negligible to low negative.

Projected bycatch of all flatfish stocks is anticipated to be greater under Alternative 5 compared to Alternative 1, but less than Status Quo, meaning the impacts of Alternative 5 could be considered low negative relative to Alternative 1 and positive relative to Status Quo. Bycatch is expected to be similar for GB yellowtail, SNE/MA yellowtail, northern windowpane, and southern windowpane between Alternative 5 and Alternative 4 compared to Alternatives 2 and 3, meaning the impacts of Alternative 5 on these non-target flatfish stocks could be considered slightly negative to Alternative 2 and Alternative 3 and negligible compared to Alternative 4; however, due to the uncertainty in projections noted above and acknowledging that none of these options are expected to result in allocated flatfish stocks exceeding their respective ABCs, it is more likely that the impacts of Alternative 5 are negligible in comparison to Alternative 2, Alternative 3, and Alternative 4.

6.3.4 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

The LAGC IFQ component is allocated a fleet wide total number of access area trips. Individual vessels are not required to take trips in specific areas like access area trips allocated to the LA fishery. After the total number of access area trips are determined, a maximum number of trips are identified by access area, and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year.

All options considered under Action 4 (Alternative 1, Alternative 2, and Alternative 3) would redirect fishing effort by the LAGC IFQ component out of Closed Area II to other parts of the scallop resource. While effort by the LAGC component is a relatively small portion of total effort by the scallop fishery as a whole, reducing effort in Closed Area II is expected to reduce bycatch of Georges Bank yellowtail flounder and northern windowpane flounder. This is expected to have slightly positive impacts overall for these flatfish stocks, particularly if LAGC effort redirects to parts of the scallop resource that are outside of the stock area.

6.3.4.1 Alternative 1 – No Action (Default Measures from Framework 32)

Alternative 1 would set LAGC IFQ access area trips at 571 trips to the Mid-Atlantic Access Area, which is the number of trips specified through default measures in Framework 32. The LAGC IFQ fishery represents a very small portion of overall landings and in the past has represented a very small portion of interactions with non-target species. Generally, LAGC catch in access areas is a small percentage of the overall catch and vessels tend to fish where catch rates are higher, so if they are higher in access areas, most trips that are allocated would be fished there, and if they are not, more LAGC catch would come from open areas. This means that, while the access area allocation options may increase flexibility for LAGC vessels in terms of where they can fish, impacts to non-target species are likely to be similar for all options under Action 4, including Alternative 1. With the scallop fishery's sub-ACLs for key flatfish stocks at very low levels, how access area trips are allocated is increasingly important. The impact of Alternative 1 on non-target species is likely to be negligible overall.

6.3.4.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation to Closed Area I only

Alternative 2 would allocate either 1,998 LAGC access area trips (equivalent to 3.5 FT LA access area trip option, Section 4.3.2) or 2,283 LAGC access area trips (equivalent to 4 FT LA access area trip options). LAGC access area trips would be allocated proportionally to the FT LA access area trip allocation in the Mid-Atlantic Access Area and the Nantucket Lightship South and all trips that would have been allocated to Closed Area II would be allocated to Closed Area I (Table 22).

The nature of the LAGC IFQ fishery is such that vessels are motivated to fish areas with high LPUE, thereby reducing area swept and ultimately minimizing catch of non-target species. It is also important to note that occurrences of high bycatch of non-target species in the LAGC IFQ fishery are relatively minimal when compared to the amount of bycatch by the entire fishery over the course of the year. Therefore, impacts of Alternative 2 on non-target species could be negligible to low positive relative to Alternative 1 and on non-target species overall.

6.3.4.3 Alternative 3 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation evenly across the Mid-Atlantic Access Area, NLS-South, and Closed Area I

Alternative 3 would allocate either 1,998 LAGC access area trips (equivalent to 3.5 FT LA access area trip option, Section 4.3.2) or 2,283 LAGC access area trips (equivalent to 4 FT LA access area trip options). LAGC access area trips would be allocated proportionally to the FT LA access area trip allocation in the Mid-Atlantic Access Area and the Nantucket Lightship South; all trips that would have been allocated to Closed Area II would be distributed evenly to Closed Area I, the MAAA, and the NLS-South (Table 23).

The nature of the LAGC IFQ fishery is such that vessels are motivated to fish areas with high LPUE, thereby reducing area swept and ultimately minimizing catch of non-target species. It is also important to note that occurrences of high bycatch of non-target species in the LAGC IFQ fishery are relatively minimal when compared to the amount of bycatch by the entire fishery over the course of the year. Therefore, impacts of Alternative 3 on non-target species could be negligible to low positive relative to Alternative 1 and low positive to negligible on non-target species overall.

6.3.5 Action 5 – Additional Measures to Reduce Fishery Impacts

6.3.5.1 RSA Compensation Fishing

There are two alternatives are under consideration related to RSA compensation fishing in access areas. Alternative 1 (No Action) would prohibit vessels from fishing RSA compensation in access areas (i.e., compensation fishing would be limited to the open area). Alternative 2 would allow vessels to harvest RSA compensation pounds in the open area, Mid-Atlantic Access Area, Nantucket Lightship South, Closed Area I, Closed Area II (prior to the seasonal closure) and the Northern Gulf of Maine Management Area (up to the LA share of the NGOM TAC).

Allowing RSA compensation fishing in all available access areas in addition to open area is expected to spread effort out across the resource. Vessels will likely target areas with high LPUE and higher meat yield when compensation fishing – fishing in areas with high LPUE means it will take less time for

vessels to harvest compensation pounds, which could be expected to reduce area swept and associated bycatch of non-target species overall.

GB yellowtail and northern windowpane flounder bycatch tends to be higher in Closed Area II relative to other parts of the resource within the boundaries for these respective stocks; however, bycatch of both stocks vary seasonally, and Alternative 2 limits any RSA compensation in Closed Area II to the summer months prior to the CAII seasonal closure, which corresponds with the time of year when bycatch is the lowest. Considering this and acknowledging that RSA compensation fishing represents a small portion of annual scallop effort and landings (i.e., less than 3% of the projected FY2021 APL), the impact of RSA compensation fishing on non-target species is expected to be negligible relative to impacts from the fishery as a whole.

6.3.5.1.1 Alternative 1 – No Action

Alternative 1 would prohibit RSA compensation fishing in access areas. Overall impacts of Alternative 1 on non-target species are likely to be negligible since RSA compensation fishing effort is a relatively small proportion of overall scallop fishing effort, around 3% the projected landings (1.25 million pounds). Impacts on non-target species may vary depending on where and when RSA compensation fishing occurs in the open area. LPUE is expected to be higher in access areas compared to the open area in FY2021 due to higher densities of scallops and greater meat yield being in access areas. By not allowing RSA compensation fishing in areas with higher LPUE and better meat yield, the time it takes to harvest compensation pounds will likely be elevated if vessels are only able to fish in the open bottom. More time spent fishing under Alternative 1 means that area swept will likely be greater, which in turn could lead to increases in bycatch of non-target species relative to Alternative 2, which allows RSA compensation fishing in all available access areas. Though bycatch may be somewhat elevated under Alternative 1 relative to Alternative 2, the overall impacts of either option on non-target species are expected to be negligible because RSA compensation fishing represents a small portion of annual harvest (i.e., 1.25 million pounds, less than 3% of annual projected landings).

6.3.5.1.2 Alternative 2 – Allow RSA compensation fishing in the Mid-Atlantic Access Area, NLS-South, Closed Area II, and Closed Area I, with limited RSA compensation fishing in the NGOM Management Area

Alternative 2 would allow RSA compensation fishing in all available access areas (i.e., MAAA, CAI, CAII, NLS-South), the open area, and in the NGOM Management Area up to the LA share of the NGOM TAC. RSA compensation fishing in Closed Area II would be allowed between the implementation of FY2021 specifications and the start of the Closed Area II seasonal closure on August 15th.

While bycatch of GB yellowtail and northern windowpane does tend to be higher in Closed Area II than other parts of the resource, limiting compensation fishing to the late spring and early summer months is not expected to have notable impacts to these flatfish stocks because observed bycatch rates have been the lowest during this time period (Figure 13). Meat yield on eastern Georges Bank is at its highest during this time window, meaning that vessels will be able to harvest compensation pounds with less area swept compared to other times of the year when meat yield is lower. Therefore, fishing when bycatch is the lowest and meat yield is highest could be expected to minimize any impacts to non-target stocks in Closed Area II as a result of compensation fishing.

Bycatch of non-target species is expected to be minimal in the MAAA and NLS-South, meaning additional effort from RSA compensation fishing in these areas is not expected to result in notable impacts to non-target species. Closed Area I will be accessible to the FT LA fleet when compensation fishing; considering the small amount of exploitable biomass in this area, RSA compensation fishing is expected to be minimal in CAI, as would any impacts to non-target stocks that are present in this area. As discussed in Section 6.3.2.1, the impacts of compensation fishing in the NGOM up to the LA share of the

NGOM TAC are expected to be negligible due to the minimal amount of bycatch associated with the range of NGOM TAC options.

Though bycatch may be similar or somewhat reduced under Alternative 2 relative to Alternative 1, the overall impacts of either option on non-target species are expected to be negligible because RSA compensation fishing represents a small portion of annual harvest (i.e., 1.25 million pounds, less than 3% of annual projected landings) and the direct impacts of this level of harvest are not expected to implicate the stock status of any non-target species.

6.3.5.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

6.3.5.2.1 Alternative 1 – No Action

Under Alternative 1 the existing seasonal closure of Closed Area II would be in place between August 15th and November 15th, which is the time of year that the scallop fishery and GB yellowtail flounder stock have been known to have strong overlap on eastern Georges Bank. The seasonal closure was developed with the objective of proactively reducing bycatch of GB yellowtail flounder in years that the scallop fishery has access to Closed Area II. The August 15 to November 15 seasonal closure has been in place since fishing year 2013.

Alternative 1 is expected to have positive impacts on non-target species, particularly GB yellowtail flounder, northern windowpane flounder, and other non-target stocks that persist in Closed Area II between August 15th and November 15th because scallop fishing in Closed Area II will not occur during this time. Considering that Alternative 2 would extend the timing of this closure by two weeks (i.e., encompassing late November, when GB yellowtail and northern windowpane bycatch is elevated), the impacts of Alternative 1 on these non-target stock could be negligible to low negative because bycatch savings of Alternative 1 would not be as great as Alternative 2.

6.3.5.2.2 Alternative 2 – Extend Seasonal Closure of Closed Area II Access Area through November 30th in FY 2021

Under Alternative 2, the existing seasonal closure in Closed Area II Access Area would be extended an additional two weeks, meaning the duration of the closure would be August 15th through November 30th. Alternative 2 was designed with the specific goal of reducing catch of GB yellowtail and northern windowpane by prohibiting fishing in this area when bycatch has typically been high for these stocks. Scallop fishing that would have occurred in CAII AA between November 16th and November 30th would most likely be shifted into the summer months (i.e. June and July) because this is when meat yield tends to be the highest on eastern Georges Bank; vessels will be incentivized to fish when meat yield is at its highest because they will be able to harvest allocations in less time compared to when meat yield is lower as a result of increased catch rates (i.e. LPUE), and also because larger scallops command a price premium. This is supported by Figure 14, which shows seasonal landings from Closed Area II by market grade in the 2017 fishing year (i.e., the most recent year of complete data in which the scallop fishery had access to Closed Area II). Observed discard to kept (d/K) ratios for GB yellowtail and northern windowpane suggest that bycatch rates of these stocks in June and July by the scallop fishery in Closed Area II are among the lowest across the year (Figure 13). Therefore, considering that Alternative 2 would prevent scallop fishing during the time of year when GB yellowtail and northern windowpane bycatch is elevated and that displaced effort would most likely occur in the summer months when bycatch rates of these stocks are low, the impact of Alternative 2 on non-target stocks is anticipated to be positive overall. Because bycatch savings of Alternative 2 could be expected to be greater than maintaining the existing seasonal closure under Alternative 1, the impact of Alternative 2 on non-target species could be low positive relative to Alternative 1.

Figure 13 - Comparison of observed CAII d/K ratios and observed scallop landings by month. November is shown in the red box.

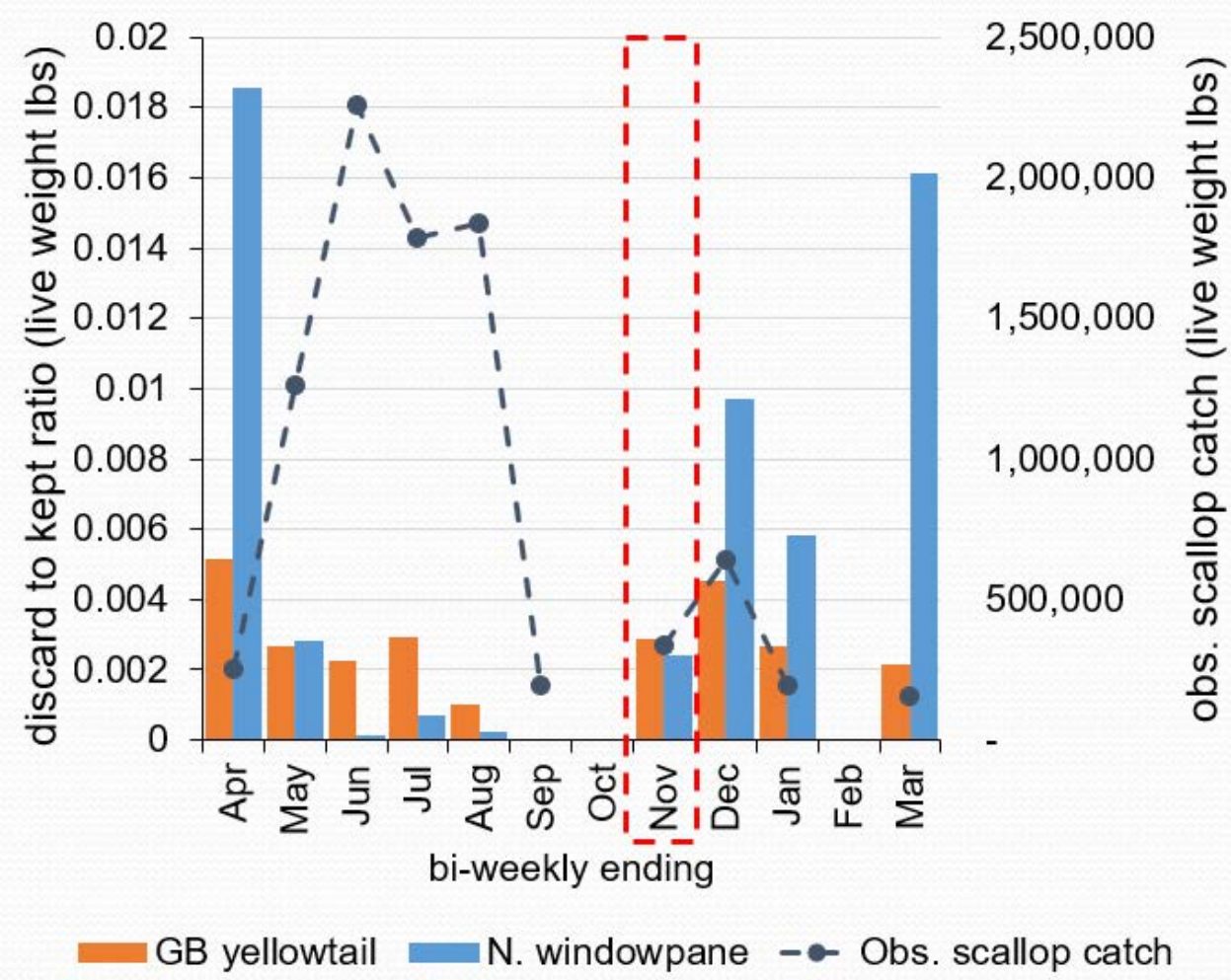
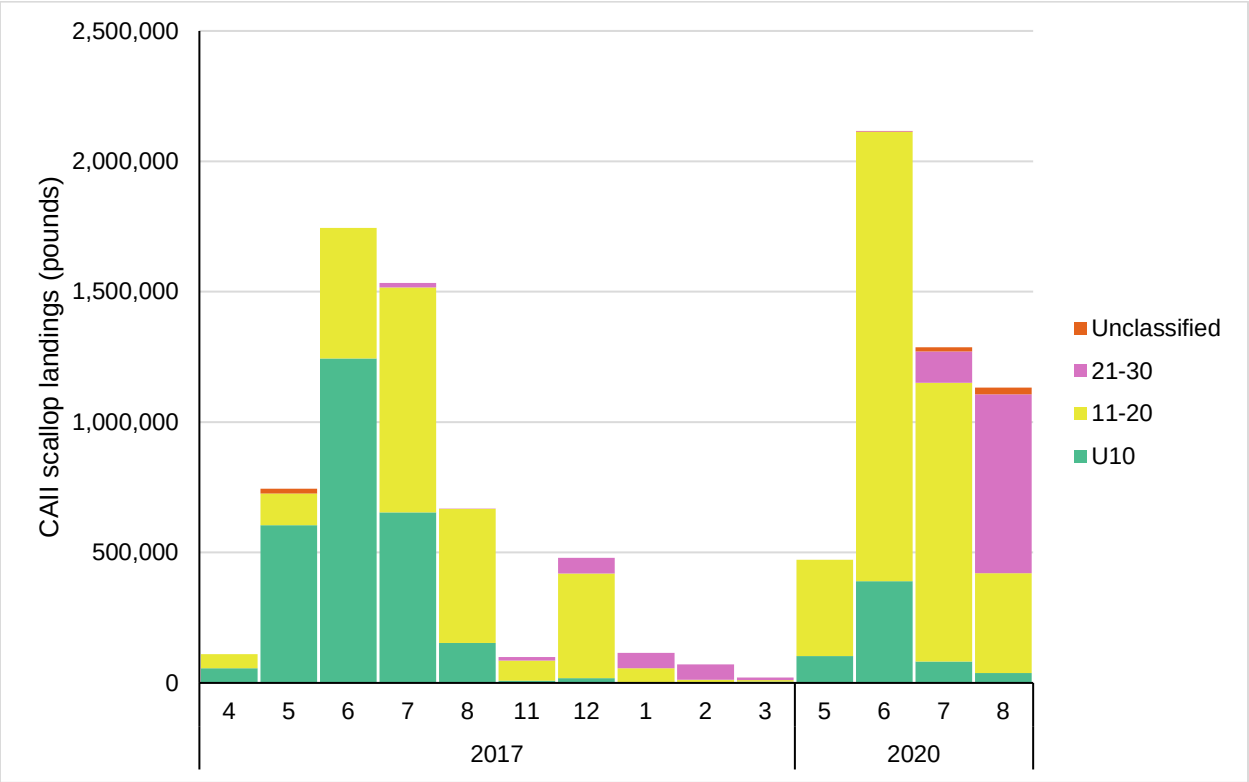


Figure 14 - Summary of monthly landings from Closed Area II Access Area in FY 2017 and FY2020 (through August 2020).



6.4 IMPACTS ON PROTECTED SPECIES

6.4.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

Annual Biological Catch (ABC) and overfishing limits (OFL) are recommended by the Council's Scientific and Statistical Committee and approved by the Council. The FY 2021 and FY 2022 OFL and ABC values that were approved by the SSC and recommended to the Council are summarized in Table 4 . The updated ABC estimate excluding discards is 30,517 mt for FY2021. This is about 5,198 mt lower than the No Action ABC (default) (Table 2). The current OFL and ABC values are driven by the large year classes in Nantucket Lightship area and the Mid-Atlantic Access Area being fished down over time with minimal recruitment expected for the 2021 fishing year. Regardless of this influx of biomass to the fishery, the OFL, ABC, and ACL values set by the Council are often much higher than the projected landings by the fishery (in this action, both alternatives are nearly double). Therefore, realized impacts on protected species for this framework will largely reflect measures discussed in Section 6.5, and are only indirectly related to the ABC and OFL values.

6.4.1.1 Alternative 1 – No Action for OFL and ABC

The scallop fishery is prosecuted with scallop dredge and bottom trawl gear. As provided in Section 5.4, ESA listed species of sea turtles and Atlantic sturgeon are at risk of interaction with these gear types, with

interactions often resulting in injury or mortality to the species. Based on this, the scallop fishery is likely to result in some level of negative impacts to ESA listed species. Taking into consideration fishing behavior/effort under this alternative, as well the fact that interaction risks with protected species are strongly associated with the amount of gear in the water, gear soak or tow duration, as well as the area of overlap, either in space or time, of the gear and a protected species (with risk of an interaction increasing with increases in of any or all of these factors), we determined the level of negative impacts to ESA listed species to be low. Below, we provide support for this determination.

Under "No Action", the overall OFL and ABC would be at the default values for FY2021, which were adopted by the Council through FW32. The No Action ABC including discards is 40,430 mt or about 89 million pounds. The No Action OFL including discards is 47,503 mt or roughly 105 million pounds. The FY2021 OFL and ABC values for No Action and Alternative 2 are similar, the updated FY2021 OFL (Alternative 2) being roughly 4% lower than No Action (Alternative 1) and the proposed FY2021 ABC (Alternative 2) being roughly 16% lower than No Action (Alternative 1) (Table 2, Table 4). The updated ABC for FY2021 including discards is 35,627 mt or approximately 79 million pounds, which is a decrease of roughly 33 million pounds compared to 2020. This decrease is primarily attributed to the large year classes on both Georges Bank and in the Mid-Atlantic being fished down with only marginal recruitment occurring in recent years, and also due to a change in the reference points used to set the ABC/OFL values through the 2020 scallop assessment update (NEFSC 2020).

Given the above, the ABC and OFL being proposed Alternative 1 (No Action) are greater than the range of ABC and OFL values that were authorized by the fishery in some years between 2012 and 2016 but are lower than the values authorized for 2017 through 2020. The OFL and ABC are not a direct measure of the Annual Projected Landings (APL) for the scallop fishery and are therefore not a direct measure of expected fishing behavior under such specifications. Furthermore, APL estimates associated with fishery allocations being considered in this action (see Section 4.1, Table 5) are consistent with the range of removals that have been authorized by the fishery since 2012 and do not exceed the ABC and OFL values specified in Alternative 1 (No Action). In addition, projected landings for FY2021 are lower compared to scallop fishery harvests in the past several years, and therefore, changes in fishing behavior and effort are not expected to differ greatly from what has been previously observed in the fishery.

As noted above, interaction risks with protected species are strongly associated with amount, time, and location of gear in the water. As fishing behavior and expected levels of effort under the No Action are not expected to change any of these operating conditions, the No Action is not expected to introduce new or elevated interaction risks to these ESA listed species. Given this, and the fact that this action would still require compliance with sea turtle chain mat and TDD regulations, Alternative 1 (No Action) would likely have low negative impacts on ESA listed species.

6.4.1.2 Alternative 2 – Updated OFL and ABC for FY2021 and FY2022 (default)

The OFL and ABC values approved by the SSC for FY2021 and FY2022 (default) are summarized in Table 4. The updated ABC including discards is 35,627 mt or approximately 79 million pounds FY2021. This is about 4,803 mt, or about 10 million pounds, lower than the No Action ABC for FY2021 (Alternative 1, default measures from FW32). Updated survey results suggest a decrease in biomass, primarily due to the large year classes on Georges Bank and the Mid-Atlantic being fished down with only marginal recruitment occurring over the past several years. Another driving factor in the reduction of the ABC and OFL is that the reference points for these values were adjusted downward through the 2020 scallop assessment update (NEFSC 2020).

The default OFL and ABC values for FY2022 under Alternative 2 represent a continued decline from the record high levels in recent years. This decline is attributed to the extraordinarily large 2012- and 2013-

year classes recruiting to the fishery and the absence of strong recruitment in subsequent years. These exceptionally strong year classes make up the majority of total biomass and, except for the slow growing deep-water scallops in the Nantucket Lightship, are responsible for the majority of the population being considered exploitable.

Under Alternative 2, the proposed OFL and ABC for FY2021 are greater than the range of ABC and OFL values that were authorized by the fishery in some years between 2012 and 2016 but are lower than the values authorized for 2017 through 2020. The increase in the ABC and OFL between FY2017 and FY2019, roughly similar values between FY2019 and FY2020, and a reduction between FY2020 and FY2021, reflects the higher estimates of scallop biomass observed in recent surveys of the scallop resource and the leveling off and steady decline of this scallop biomass as the large year classes continue to be fished with a lack of subsequent recruitment. Though similar to the historically higher values estimated for the past several years, the OFL and ABC values associated with Alternative 2 are not a direct measure of the APL allocated to the fishery, and therefore are not a direct measure of expected fishing behavior under such specifications. In fact, fishery allocations are projected to result in significantly lower landings than the OFL and ABC limits under Alternative 2 and are similar to projected landings over the past 6 years. Based on this, the OFL and ABC in and of themselves are not expected to change fishing behavior in a manner that significantly differs from Alternative 1. As a result, impacts on protected species under Alternative 2 are expected to be like those assessed for Alternative 1; therefore, relative to Alternative 1, Alternative 2 is likely to result in negligible impacts on ESA listed species.

6.4.2 Action 2 – Northern Gulf of Maine Management Area

6.4.2.1 Northern Gulf of Maine TAC Setting

6.4.2.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action) the total NGOM hard TAC would be set at 265,000 pounds, which would be split between the LA and LAGC components, with 97,500 pounds available to support RSA compensation fishing (LA share), and 167,500 pounds available for harvest by the LAGC component. The area would open on April 1, 2021 with no change to the current management program. The NGOM management area would remain open for each component until their TAC is projected to be harvested, even if the other component has reached its TAC. For example, if the LAGC component harvests its TAC before all NGOM RSA compensation pounds are harvested, the area would remain open for NGOM RSA compensation fishing.

The 167,500 pound TAC available to the LACG fishery under Alternative 1 falls within the range of updated TAC options considered in Alternative 2 and would likely result similar overall area swept on Jeffreys Ledge and in Ipswich Bay. Alternative 1 (No Action) represents a reduction in the overall NGOM TAC relative to FY2020 meaning that, while the rate of harvest from the LAGC component is expected to be similar, the overall duration of the LAGC NGOM fishery is expected to be somewhat abbreviated relative to FY2020. In other words, under Alterative 1 (No Action), the LAGC share of the NGOM TAC would likely be harvested by early May.

Since the LAGC portion of the NGOM fishery is expected to end by early May, fishing activity is not expected to have a substantial overlap with the seasonal distribution of hard-shell turtles in the Gulf of Maine (GOM). Specifically, as provided in Section 5.4.2.1, hard-shell sea turtles migrate north as water temperatures warm in the spring and may be seen on the most northern foraging grounds in the GOM beginning in June (Shoop & Kenney, 1992). Leatherback sea turtles are also likely to occur in the GOM within a similar timeframe as hard-shell sea turtles (Dodge et al., 2014; M. James et al., 2005; M. C.

James et al., 2006; NMFS & USFWS, 1992). Based on this, if the fishery closes in May, interactions with turtles are not expected.

Due to the structure of a shared overall TAC and the uncertainty associated with the timing of if, when, and(or) how much of the LA share is harvested, there is potential that fishing activity at some level could persist within the NGOM management area beyond the month of May. Under this unlikely scenario, there is the potential for sea turtles to be present in the NGOM management area and therefore, encounter scallop fishing gear (i.e. primarily dredge) known to pose an interaction risk to sea turtles, particularly hard-shelled species. However, taking into consideration expected effort, sea turtle occurrence and distribution in the GOM, as well as observed sea turtle interactions with scallop fishing gear in the GOM, the risk of an interaction is expected to be low and no greater than past years. Specifically, if the NGOM management area were open to the LAGC component for the entire year, it would indicate that fishing effort is low. Furthermore, though it is impossible to predict if eligible vessels will harvest the LA share of the TAC, the effort associated with the LA share of the TAC under Alternative 1 and the Options of Alternative 2 could be expected to be minimal, especially when considering the highest potential LA share of 70,000 pounds (i.e. under Alternative 2 Option 3) relative to what an individual full-time LA vessel is expected to harvest in FY2021 in access areas alone (i.e. approximately 63,000 to 72,000 pounds under the specifications alternatives considered in Section 4.3). Regardless, the low levels of effort, gear quantity and(or) duration of tow times under Alternative 1 and Alternative 2 are not expected to increase relative to current operating conditions. As interactions with protected species are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species (with risk of an interaction increasing with increases in of any or all of these factors), fishing behavior/effort under Alternative 1 is not expected to change any of these operating conditions and therefore is not expected to elevate interaction risks. This is further supported by the low level of co-occurrence between hard-shelled sea turtles and scallop gear in this sub-region, especially considering that hard-shelled sea turtle interactions with scallop fishing gear in the Gulf of Maine are non-existent (FSB, 2015, 2016, 2017, 2018; Murray, 2011, 2013, 2015a, 2015b; Murray & Orphanides, 2013; NMFS, 2012; Warden, 2011a, 2011b) and that hard-shelled sea turtles are generally less common in the Gulf of Maine relative to the Mid-Atlantic. Although there is the possibility for leatherback sea turtles to interact with scallop fishing gear (NMFS, 2012), based on fisheries observer data (FSB, 2019), as well as data provided by the Sea Turtle Disentanglement Network (STDN, 2016), leatherback sea turtle interactions with scallop fishing gear have never been observed, and therefore, while the risk of interaction exists, it is likely very low. Taking all these factors into consideration, should the fishery continue throughout the season, new or elevated (e.g., more gear, longer tow times) interaction risks to sea turtles are not expected under this scenario.

Atlantic sturgeon is known to occur in the Gulf of Maine year-round and are vulnerable to interactions with scallop fishing gear. Specifically, according to the NMFS Opinion on the sea scallop fishery issued on July 12, 2012, it was determined that some small level of bycatch may occur in the scallop fishery; however, the incidence rate is likely to be very low. Review of available observer data from 1989-2019 confirms this determination. No Atlantic sturgeon have been reported as caught in scallop bottom trawl gear where the haul target or trip target is scallop (FSB, 2015, 2016, 2017, 2018, 2019). However, NEFOP and ASM observer data have recorded one (1) Atlantic sturgeon interaction with scallop dredge gear targeting Atlantic sea scallops; this sturgeon was released alive (FSB, 2015, 2016, 2017, 2018, 2019). Based on this information, as well as the information provided above regarding fishing effort and interaction risks to protected species, new or elevated (e.g., more gear, longer soak or tow times) interaction risks to Atlantic sturgeon are not expected under the No Action.

Based on the above, the impacts on protected species (i.e. ESA listed species of sea turtles and Atlantic sturgeon) from Alternative 1 would likely be neutral to low negative. It should be noted that Alternative 1 represents a higher TAC than the Options of Alternative 2; however, the difference (i.e. 55,000 to 105,000 pounds) is indistinguishable when considered in terms of expected harvest from the scallop

fishery as a whole (i.e. an APL of approximately 40 million pounds in FY2021), and is not expected to result in appreciably different durations of when fishing will occur in the NGOM management area. As it is anticipated that majority of fishing in NGOM management area will conclude by the end of May under each of these alternatives, with some, albeit small, potential for activity to spread out across the entire fishing year, impacts of Alternative 1 relative to the options of Alternative 2 could be expected to be similar and both are anticipated to have a neutral to low-negative impact on protected resources. Therefore, when compared to each other, the impacts of Alternative 1, Alternative 2 Option 1, Alternative 2 Option 2, and Alternative 2 Option 3 on protected resources would be neutral.

6.4.2.1.2 Alternative 2 – Set 2021 and 2022 NGOM TAC, with first 70,000 pounds to LAGC, then 50/50 split between LA and LAGC

Alternative 2 would split the NGOM TAC between the LA and LAGC components, with the first 70,000 lbs allocated to the LAGC component, and the remainder split 50/50 between the LA and LAGC. This was the Council's preferred TAC split option in FW29.

The overall level of harvest will be predictable with this approach, since Alternative 2 would establish separate TACs and reporting requirements for both the LA and LAGC components. The magnitude of impacts to protected resources is expected to scale with the overall level of catch, regardless of which vessels harvest that catch. Therefore, the impacts of the allocation split (i.e. first 70,000 pounds to the LAGC, with the remainder split between LA and LAGC) on protected species are expected to be negligible.

6.4.2.1.2.1 Option 1 – F=0.18

Setting the NGOM TAC at F=0.18 would result in an overall TAC of 160,000 lbs for FY2021, which is likely to lead to less fishing and therefore have somewhat reduced impacts to protected species in comparison to Alternative 1 (No Action). Relative to Option 2 (F=0.20) and Option 2 (F=0.25), fishing at F=0.18 could be expected to result in less area swept and associated tow time, and fewer impacts to protected species since the overall TAC would be lower. However, as stated previously in Section 6.4.2.1.1, though Alternative 2 Option 1 represents a lower TAC than Alternative 1, the difference between these alternatives (i.e. 105,000 lbs) is indistinguishable when considered in terms of expected harvest from the scallop fishery as a whole (i.e. an APL of approximately 40 million pounds in FY2021), and is not expected to result in appreciably different durations of when fishing will occur in the NGOM management area. As it is anticipated that majority of fishing in NGOM management area will conclude by the end of May, with some, albeit small, potential for activity to spread out across the entire fishing year, impacts of Alternative 2 Option 1 relative to Alternative 1, Alternative 2 Option 2, and Alternative 2 Option 3 could be expected to be similar and all four options are anticipated to have a negligible to low-negative impact on protected resources. Therefore, when compared to each other, the impacts of Alternative 1, Alternative 2 Option 1, Alternative 2 Option 2, and Alternative 2 Option 3 on protected resources would be negligible.

6.4.2.1.2.2 Option 2 – F=0.20

Setting the NGOM TAC at F=0.20 would result in an overall TAC of 175,000 lbs for FY2021, which is likely to lead to less fishing and therefore have somewhat reduced impacts to protected species in comparison to Alternative 1 (No Action) and Option 3 (F=0.25). Relative to Option 1 (F=0.18), fishing at F=0.20 could be expected to result in slightly greater area swept and associated tow time, and meaning impacts to protected species could be slightly greater since the overall TAC would be higher. However, as stated previously in Section 6.4.2.1.1, though Alternative 2 Option 2 represents a lower TAC than Alternative 1, the difference between these alternatives (i.e. 90,000 lbs) is indistinguishable when considered in terms of expected harvest from the scallop fishery as a whole (i.e. an APL of approximately 40 million pounds in FY2021), and is not expected to result in appreciably different durations of when

fishing will occur in the NGOM management area. As it is anticipated that majority of fishing in NGOM management area will conclude by the end of May, with some, albeit small, potential for activity to spread out across the entire fishing year, impacts of Alternative 2 Option 2 relative to Alternative 1, Alternative 2 Option 1, and Alternative 2 Option 3 could be expected to be similar and all four options are anticipated to have a negligible to low-negative impact on protected resources. Therefore, when compared to each other, the impacts of Alternative 1, Alternative 2 Option 1, Alternative 2 Option 2, and Alternative 2 Option 3 on protected resources would be negligible.

6.4.2.1.2.3 Option 3 – F=0.25

Setting the NGOM TAC at F=0.25 would result in an overall TAC of 210,000 lbs for FY2021, which is likely to lead to less fishing and therefore have somewhat reduced impacts to protected species in comparison to Alternative 1 (No Action). Relative to Option 1 (F=0.18) and Option 2 (F=0.20), fishing at F=0.25 could be expected to result in slightly greater area swept and associated tow time, and meaning impacts to protected species could be slightly greater since the overall TAC would be higher. However, as stated previously in Section 6.4.2.1.1, though Alternative 2 Option 3 represents a lower TAC than Alternative 1, the difference between these alternatives (i.e. 55,000 lbs) is indistinguishable when considered in terms of expected harvest from the scallop fishery as a whole (i.e. an APL of approximately 40 million pounds in FY2021), and is not expected to result in appreciably different durations of when fishing will occur in the NGOM management area. As it is anticipated that majority of fishing in NGOM management area will conclude by the end of May, with some, albeit small, potential for activity to spread out across the entire fishing year, impacts of Alternative 2 Option 3 relative to Alternative 1, Alternative 2 Option 1, and Alternative 2 Option 2 could be expected to be similar and all four options are anticipated to have a negligible to low-negative impact on protected resources. Therefore, when compared to each other, the impacts of Alternative 1, Alternative 2 Option 1, Alternative 2 Option 2, and Alternative 2 Option 3 on protected resources would be negligible.

6.4.3 Action 3 – Fishery Specifications

The alternatives under this action set FY 2021 open area and access trip allocations for the fishery. Default specifications for FY 2022 are also established. The Council considered a total of nine allocation options. In addition to Alternative 1/No Action, four rotational management approaches (Alternatives 2-5) were developed, each with two options for open area F values (Table 40). A status quo scenario, which is different from the No Action/default allocations, was evaluated for comparison to current management. The rotational areas open under status quo differ from the action alternatives.

Table 41 shows landings, LPUE, and area swept by alternative, while Table 42 provides a matrix of comparisons for the area swept values only. Figure 15 compares the area swept values for each alternative graphically out to 2034. Figure 16 and Figure 20 show area swept and landings/area swept ratio for each FW33 alternative during the 2021 fishing year relative to values realized in the recent past.

Impacts of scallop fishing on protected resources is gauged by the level of scallop effort that overlaps with regions where protected resource species are typically observed and is measured by projected area swept (see Figure 15). Interaction risks with protected species, such as sea turtles and Atlantic sturgeon, are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species, with risk of an interaction increasing with increases of any or all of these factors. Any alternatives that will result in a low projected area swept (i.e., higher landings per unit of effort) would reduce the overall time gear is deployed in the water, thereby reducing the potential for interactions. The level of impact measured using these points of reference varies very little when comparing Alternatives except for Status Quo because all alternatives are very similar in terms of the level of expected harvest, the parts of the resource that are expected to be fished, and associated area swept by the scallop fishery as a whole.

The majority of exploitable biomass accounted for in the current OFL and ABC estimates is located the Closed Area II and Nantucket Lightship regions, and the Mid-Atlantic Access Area. These areas encompass the rotational access options for 2021. Most of the scallops in the MAAA and NLS regions are from the 2012 (NLS) and 2013 (MAAA) year classes, now 9 and 10 years old, which were considered exceptional when they were first observed. The growth of these animals has leveled off, and these year classes have now been fished for several years. The future of the scallop fishery is likely on eastern Georges Bank following recruitment events in this region.

Given this distribution of biomass, all four alternatives close CAII-East to protect small scallops and use the same access area configurations in the MAAA, NLS-South, and CAII (CAII-SW and CAII-Ext). The differences between alternatives are in the allocations to each access area, which vary between 1 trip to 1.5 trips (Table 40). Each alternative has options to allocate either 24 DAS (open area F=0.30) or 26 DAS (open area F=0.33). Given the similarities between alternative, spatial patterns of effort, area swept and therefore of impacts to protected species are expected to be broadly similar between the different approaches, with effects scaling according to the magnitude of effort in each area.

6.4.4 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

The LAGC IFQ fishery is allocated a fleet wide total number of access area trips. Individual vessels are not required to take trips in specific areas. Instead, a maximum number of trips is identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. This action is considering two options for allocating fleet wide trips to the LAGC IFQ fishery and two options related to the maximum number of trips per area.

Alternative 1 (No Action) would use the default number of trips allocated in FW32 (571 total trips in MAAA starting on April 1. Under Alternatives 2, there would be either 2,283 trips or 1,998 trips total access area trips allocated to the LAGC component depending on the preferred specifications option in Section 4.3 (i.e., either the 3.5 FT LA access area trip option of 4 FT LA access area trip options). Under Alternative 2, LAGC trips would be distributed proportionally to the FT LA access area allocation in the NLS-S and MAAA, and all trips that would have been designated for CAII would instead be directed to CAI. Alternative 3 would use the same approach, except that all LAGC trips that would be been designated for CAII would instead be evenly distributed among the NLS-S, MAAA, and CAI. Under Alternative 2 and Alternative 3, both the LA and LAGC fisheries have the same proportion of their allocations coming from open vs. access areas.

Alternative 1 would allocate fewer LAGC IFQ access area trips to the MAAA compared to recent years. This could provide some positive benefits to protected species, particularly sea turtles, by reducing effort and therefore the potential for interactions in an area where interactions are more commonly observed (i.e. Mid-Atlantic) relative to other parts of the resource (i.e. GB, GOM, and SNE). However, considering that fishing would still occur in some part of the resource at some level, the risk of an interaction with protected species would exist at some level, meaning the overall impact of Alternative 1 on protected resources is expected to be slightly negative.

Relative to Alternative 1, Alternative 2 and Alternative 3 represent an increase of LAGC trips in the Mid-Atlantic Access Area. Overall, increasing LAGC trips to the MAAA could have some negative impact on protected resource species because an increase in effort to the Mid-Atlantic would raise the risk of interacting with protected species, particularly sea turtles, which are observed more commonly there compared to other parts of the resource. However, because LAGC vessels can elect to fish quota in any available part of the resource (i.e., on either open trips or available access area trips), it is possible that LAGC vessels will concentrate effort in other parts of the resource where high densities of large scallops exists (i.e. access areas of Georges Bank), thereby reducing effort in the MAAA, where protected

resources like sea turtles are more commonly observed than in other parts of the resource. Also, because the nature of the LAGC fishery motivates vessels to fish in areas with high LPUE to reduce trip costs, if an increase in trips to the MAAA did occur, time spent fishing by LAGC vessels is expected to be low, thereby reducing the chance of interactions with protected resources like sea turtles. Also, considering how effort by the LAGC component is a small part of the overall fishery (i.e., 5.5% of the APL), impacts to protected species as a result of the time and location of LAGC effort are expected to be minimal. Overall, the impacts of Alternative 1, Alternative 2, and Alternative 3 on protected resources are expected to be slightly negative because fishing will be occurring, meaning there will be an inherent risk of interactions with protected species, even if unlikely.

6.4.5 Action 5 – Additional Measures to Reduce Fishery Impacts

6.4.5.1 RSA Compensation Fishing

There are two alternatives are under consideration related to RSA compensation fishing in access areas. Alternative 1 would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 would allow vessels to fish an RSA compensation trips in all available access areas, including the Mid-Atlantic Access Area, Closed Area II, NLS-South, Closed Area I, and the Northern Gulf of Maine management area (up to the LA TAC). Vessels would only be allowed to fish RSA compensation pounds in Closed Area II AA during time period of when FW33 is implemented up to the start of the CAII seasonal closure (i.e., August 15th). Only vessels receiving allocations of NGOM RSA compensation would be able to fish their awards in the NGOM management area.

In general, RSA compensation fishing is a small component of the overall fishery (i.e. less than 3% of the fishery-wide projected landings associated with the preferred specifications alternative) and is considered as part of the previous impact analysis. Overall impacts on protected resources are expected to be low negative from all these alternatives because the RSA compensation fishing effort is a relatively small proportion of overall scallop fishing effort. Based on this, either alternative when compared to the other is expected to result in neutral impacts to protected species.

6.4.5.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

6.4.5.2.1 Alternative 1 – No Action

Under Alternative 1, there would be no change to the existing seasonal closure to protect flatfish in Closed Area II, which currently runs from August 15th – November 15th annually. The scallop fishery accesses CAII AA periodically when the scallop resource is strong enough to support rotational harvest by the LA component. In recent history, there have been no observed interactions of scallop dredges with protected species by vessels fishing in or around CAII AA, regardless of the time of year that fishing is occurring. Considering that interactions with protected species are low on eastern Georges Bank, and that the timing of a seasonal closure in Closed Area II is not expected to increase tow times or area swept across the fishing year, the impacts of Alternative 1 on protected species are not anticipated to be any greater or less than those assessed for the underlying specifications alternatives in Section 4.3. The impacts of Alternative 1 and Alternative 2 are expected to be negligible in comparison to each other because any seasonal shift of effort in CAII under either alternative is not expected to increase the risk of dredge interactions with protected species beyond the very low or non-existent levels that have been observed in recent history.

6.4.5.2.2 Alternative 2 – Extend Seasonal Closure of Closed Area II Access Area through November 30th in FY 2021

Under Alternative 2, the existing seasonal closure in Closed Area II Access Area would be extended an additional two weeks, meaning the duration of the closure would be August 15th through November 30th. This will shift effort that would have been fished in CAII AA between November 16th and November 30th into in other times of the year when the seasonal closure is not in place; however, the shift in effort is not expected to have a substantial impact on the magnitude of impacts to protected species relative to Alternative 1 because protected species that interact with the scallop fishery do not have a strong seasonal presence in CAII and the overall level of effort, tow time, and area swept is not anticipated to change across the FY2021 fishing year. Any seasonal displacement of effort in CAII from extending the existing seasonal closure through the end of November is unlikely to translate to an increase of effort in areas with higher than average interaction risks with protected species during this time of year, meaning the impacts of Alternative 2 on protected species are not anticipated to be any greater or less than those assessed for the underlying specifications alternatives in Section 6.4.3. Furthermore, the impacts of Alternative 2 and Alternative 1 are expected to be negligible in comparison to each other because any seasonal shift of effort in CAII under either alternative is not expected to increase the risk of dredge interactions with protected species beyond the very low or non-existent levels that have been observed in recent history.

6.5 Impacts on Physical Environment and Essential Fish Habitat

6.5.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

The alternatives under this action pertain to setting the Annual Biological Catch (ABC) and overfishing limit (OFL) for fishing years 2021 and 2022 (default). These values are recommended by the Council's Scientific and Statistical Committee and approved by the Council. The FY 2021 and FY 2022 OFL and ABC values that were approved by the SSC and recommended to the Council are summarized in Table 4. The updated ABC estimate including discards is 35,627 mt for FY2021 and 32,872 mt for FY2022. The OFL values are correspondingly higher. The 2021 ABC is about 5,000 mt lower than the default/No Action 2021 ABC (40,430 mt).

The OFL and ABC values set by the Council are much higher than the projected landings by the fishery. Therefore, realized impacts on EFH for this framework will largely reflect measures discussed in Section 6.5.3, and are only indirectly related to the ABC and OFL values. Because fishery impacts to EFH are only indirectly related to the OFL and ABC, and more closely reflect the specifications alternative selected, the neither the No Action ABC (Alternative 1) nor the alternative ABC (Alternative 2) are anticipated to have direct impacts on EFH. However, because the OFL and ABC values for No Action and Alternative 2 are relatively different from one another, with lower values under Alternative 2, Alternative 2 is expected to have indirect positive effects on EFH relative to Alternative 1.

6.5.2 Action 2 – Northern Gulf of Maine TAC Setting

The alternatives in this action pertain to setting the TAC for the NGOM Management Area. Note that future changes to the NGOM specifications setting process were adopted by the Council via Amendment 21, but rulemaking for that action has not been completed yet, so these specifications continue an interim approach. Under either alternative, there will be no fishing on Stellwagen Bank in FY 2021 due to the spatial closure implemented via Framework 32.

Under Alternative 1/No Action, both LAGC fishing and LA/RSA fishing are allowed in the Northern Gulf of Maine Management Area. Of the 265,000 lb default TAC, 97,500 lb is LA/RSA, and relatively unlikely to be harvested. The 167,500 lb TAC available to the LACG fishery under Alternative 1 would be more than the TAC values in Alternative 2 and would likely result in more overall area swept on Jeffreys Ledge and Platts Bank, in Ipswich Bay, or near Machias Seal Island. Therefore, although the Alternative 1 TAC continues fishing effort and degradation of habitat leading to low negative impacts on EFH in the NGOM, it could be expected to have a low negative impact on EFH in the NGOM relative to Alternative 2, which has a lower TAC.

Alternative 2 would establish separate TACs and reporting requirements for both the LA and LAGC, with the first 70,000 lb allocated to LAGC, and the remainder split 50/50 between LAGC and LA. The magnitude of impacts to EFH is expected to scale with the overall level of catch, regardless of which vessels harvest that catch. Therefore, the impacts of the allocation split (first 70,000 lb LAGC, remainder split between LA and LAGC) are expected to be negligible. Three different F rate options would establish the total TAC for the NGOM management area for FY2021. For comparison purposes with the No Action LAGC allocation of 167,500 lb, the portion of the total Alternative 2 TAC allocated to the LAGC is listed in parentheses in the bullets below. Alternative 2 also considers, in a separate decision what the default TAC for the NGOM would be in FY2022.

- Option 1: NGOM TAC at F=0.18 in FY2021 would result in an overall TAC of 160,000 lbs (115,000 lbs LAGC)
- Option 2: NGOM TAC at F=0.20 in FY2021 would result in an overall TAC of 175,000 lbs (122,500 LAGC)
- Option 3: NGOM TAC at F=0.25 in FY2021 would result in an overall TAC of 210,000 lbs (140,000 lbs LAGC)

The TAC in each option was calculated by combining the projected biomass from the four areas of the NGOM that were surveyed in either 2019 (Machias Seal Island) or 2020 (Ipswich Bay, Platts Bank, and Jeffreys Ledge). Projections from Machias Seal Island, an area at the northern extent of the management area, account for 52% of the TAC, while Ipswich Bay contributes to 10%, Platts 8%, and Jeffreys Ledge 30%. If the full TAC is caught in the NGOM, and less than 52% of the fishing occurs in Machias Seal Island, there may be negative localized impacts on EFH in the other part of the NGOM that are likely to be fished. Assuming the TAC is fully harvested, relatively higher rates of effort in Ipswich Bay, on Platts Bank, and/or on Jeffreys Ledge would be expected to reduce LPUE in these locations, and thus increase the amount of area swept and therefore impacts to EFH.

Default measures for FY2022 would either set the NGOM TAC at zero as a way to keep the area closed until new specifications are implemented (sub-Option 2) or would set a default TAC using the F rate selected for FY2021 (sub-option 1). The default TACs for 2020 would range from 70,000 pounds (F=0.18) to 85,000 pounds (F=0.25). In both scenarios, Stellwagen Bank would be closed until it is re-opened in a future action. These defaults will have reduced impacts to EFH relative to current levels of fishing, but as is the case for FY2021, impacts will depend in part on where the TAC is harvested, and how much biomass remains in the areas and how densely aggregated the scallops are.

6.5.3 Action 3 – Fishery Specifications

The alternatives under this action set FY 2021 open area and access trip allocations for the fishery. Default specifications for FY 2022 are also established. The Council considered a total of nine allocation options. In addition to Alternative 1/No Action, four rotational management approaches (Alternatives 2-5) were developed, each with two options for open area F values (Table 40). A status quo scenario, which is different from the No Action/default allocations, was evaluated for comparison to current management. The areas open under status quo differ from the action alternatives.

The majority of exploitable biomass accounted for in the current OFL and ABC estimates is located the Closed Area II and Nantucket Lightship regions, and the Mid-Atlantic Access Area. These areas encompass the rotational access options for 2021. Most of the scallops in the MAAA and NLS regions are from the 2012 (NLS) and 2013 (MAAA) year classes, now 9 and 10 years old, which were considered exceptional when they were first observed. The growth of these animals has leveled off, and these year classes have now been fished for several years. The future of the scallop fishery is likely on eastern Georges Bank following recruitment events in this region.

Given this distribution of biomass, all four alternatives close CAII-East to protect small scallops and use the same access area configurations in the MAAA, NLS-South, and CAII (CAII-SW and CAII-Ext). The differences between alternatives are in the allocations to each access area, which vary between 1 trip to 1.5 trips (Table 40). Each alternative has options to allocate either 24 DAS (open area F=0.30) or 26 DAS (open area F=0.33). Given the similarities between alternative, spatial patterns of effort and therefore of impacts to habitat are expected to be broadly similar between the different approaches, with effects scaling according to the magnitude of effort in each area. Fishing effort and allocations this year will influence availability of scallops during fishing year 2022, so taking a multiyear view, differences in impacts to habitat between the various approaches laid out here will likely be smoothed out over time as these animals are eventually harvested.

Table 40 - Comparison of access area trip allocations between Alternatives in FW33. Alternative 2 has fewer access area trips overall. Alternatives 2-5 vary in terms of where the single trip (vs. 1.5 trips) is allocated.

	4.3.1 – Alt 1 No Action	**4.3.2 – Alt 2 3.5 Trips**	**4.3.3 – Alt 3 1 trip CAII**	**4.3.4 – Alt 4 1 trip in NLS**	**4.3.5 – Alt 5 1 trip MAAA**
Closed Area II		1 trip	1 trip	1.5 trips	1.5 trips
NLS-South		1.5 trips	1.5 trips	1 trip	1.5 trips
MAAA	1 trip	1 trip	1.5 trips	1.5 trips	1 trip
Total Trips	1 trip	3.5 trips	4 trips	4 trips	4 trips

The tables and figures in this section are intended to support the Council's evaluation of each alternative individually and compared to each of the other allocation options. Table 41 shows projections of landings, LPUE, and area swept by alternative, based on the SAMS model, while Table 42 provides a matrix of comparisons for the area swept values only. Figure 15 graphically compares the area swept values for each alternative out to 2035, and Figure 16 compares area swept for each FW33 alternative during the 2021 fishing year relative to the projections for recent preferred alternatives. Broadly speaking, lower total area swept values represent lower effects on EFH associated with a particular alternative.

However, in terms of habitat impacts, all effort in the fishery is not considered equal, and underlying differences in habitat vulnerability affect the potential magnitude of impacts. Figure 17 and Figure 19 depict estimates of intrinsic habitat vulnerability to scallop dredges from the Council's Fishing Effects Model. Both figures show estimated vulnerability based on evenly distributed fishing effort, with the magnitude of effort at a median level relative to historical activity. Figure 17 and Figure 18 present the results spatially for Georges Bank and the Mid-Atlantic Bight, and Figure 19 summarizes model estimates for the 5 km by 5 km model grids overlapping various SAMS areas. For more information on the Fishing Effects Model, see NEFMC 2020 (available at https://www.nefmc.org/library/fishing-effects-model).

Habitat impacts of the fishery are of course considered in the context of catch projections. Similar levels of catch with higher area swept values (e.g., the status quo scenario examined here) present a problematic tradeoff from a habitat standpoint, relative to the same catch with lower swept area values. The status quo

scenario is a good illustration of this. However, increases in swept area that are commensurate with increases in projected landings are generally viewed differently, because in these scenarios, fishery yield increases, with impacts to habitat as an associated cost. Indeed, efficiency of harvest (typically expressed in terms of LPUE) is an often-cited benefit of frequently revised rotational management employed in the FMP. To attempt to quantify this tradeoff between habitat impact and yield, Figure 20 show area swept and landings/area swept ratio, respectively, for each FW33 alternative during the 2021 fishing year relative to the projections from recent preferred alternatives. The landings/area swept ratio indicates the relative 'habitat efficiency' of fishing across the alternatives considered.

Because all the alternatives allow fishing in the same set of access areas (CAII-SW, CAII-Ext, NLS-South-Deep), and open area fishing is expected to occur in similar patterns regardless of how access areas are allocated, spatial variation in habitat vulnerability is not a particularly important consideration relative to this set of specifications. The substrate throughout much of southeast Georges Bank and in the Nantucket Lightship region is predominately sandy (bluer areas on Figure 17) and estimated to be less vulnerable to fishing as compared to some other locations targeted by the fishery. Areas in the Mid-Atlantic are generally lower vulnerability as well (Figure 18). Certain locations on Georges Bank are relatively more vulnerable to median levels of dredging with scallop dredges (redder areas in Figure 17). These include CAI Access, CAII Extension, Great South Channel, and Northern Flank, plus Closed Area II North, which is a long-term habitat closure that cannot be dredged.

To summarize across all alternatives including No Action and status quo, the action alternatives are similar in terms of swept area, with No Action having lower values and the status quo having much higher values (Table 41, Table 42). No Action has lower swept area estimates combined with lower projected catch (Table 41); however, No Action is very different from alternatives 2-5 as the Georges Bank access areas are not allocated under default specifications in this FMP. Status quo has landings projections within the range of the action alternatives, but much higher area swept because the projection model forces trips into areas expected to have low LPUE, i.e. CAII-SE, CAI, and NLS-N. The action alternatives keep these areas closed to fishing, which eliminates effort on these areas with lower biomass. Landings projections are substantially less under No Action (Table 41), such that habitat efficiency of No Action is much lower than the action alternatives, although higher than status quo (Figure 20).

The remainder of this section will focus on comparisons between the four action alternatives, which provide access to the same management areas, and their associated sub-options. Over the long term, all action alternatives perform very similarly in terms of projected swept area (Figure 15) and are with the range of values projected for recent specifications actions (Figure 16). For FY 2021, comparing the 24 and 26 DAS options within Alternatives 2-5, scenarios with 26 DAS project greater landings due to the larger allocations of days, and as expected have higher area swept estimates and therefore more negative effects on EFH (Table 41, Table 42). Alternative 2 with 24 DAS has the lowest area swept, which is not surprising because it has the lowest access area allocations combined with the lower DAS allowance (Table 41). This alternative also has the lowest projected landings (Table 41). Alternative 5 with 24 DAS has slightly higher area swept, with higher projected landings, and the highest habitat efficiency of any alternative (Table 41). The habitat efficiency of Alternative 5 with 26 DAS is similar, and also higher than Alternative 2 with 24 DAS (Table 41, Figure 20). Alternative 2 with 26 DAS has a projected swept area value intermediate between the two Alternative 5 options, but lower projected landings, and a lower habitat efficiency (Table 41, Figure 20). The 24 DAS and 26 DAS options for Alternatives 3 and 4 are very similar in terms of projected landings, projected area swept, and therefore habitat efficiency (Table 41, Figure 20). The 26 DAS have the highest projected landings of any alternatives considered, and the highest area swept and the lowest habitat efficiency values (Table 41, Figure 20). The 24 DAS options have lower area swept, and lower habitat efficiency, but with correspondingly lower landings (Table 41, Figure 20).

Ranked according to least to greatest estimates of swept area (least to greatest magnitude of habitat impact), the actions alternatives are 2.1, 5.1, 2.2, 5.2, 3.1, 4.1, 3.2, and 4.2 (Table 42). Overall, the swept

area estimates from the SAMS model are most favorable under alternatives where higher proportions of effort are allocated to Georges Bank, which is consistent with high biomass values in the NLS and CAII regions. Ranked according to greatest to least habitat efficiency, the action alternatives are 5.1, 5.2, 2.1, 3.1, 4.1, 2.2, 3.2, and 2.2. Considering both pieces of information together, Alternatives 5.1, 5.2, and 2.1 have lower impacts to EFH, Alternatives 2.2, 3.1, and 4.1 have intermediate impacts to EFH, and Alternatives 3.2 and 4.2 have the highest impacts to EFH. There is a 509 nm^2 difference in projected area swept between the alternatives ranked lowest (2.1) and highest (4.2), which is 18% of the lowest value. This corresponds with an 11% increase in projected landings associated with Alternative 4.2 vs. Alternative 2.1.

Table 41 - Summary of projected landings, overall LPUE, and bottom area swept for alternatives under consideration in FW33, plus a status quo scenario.

Section	Alternative	Projected Landings (lbs)	LPUE Estimate	Estimate of Area Swept ($nm^{2)}$	
4.3.1	No Action	19,069,986	2,078	2,006	4.3
4.3.2.1	3.5 trips, 24 DAS	37,068,525	1,992	2,683	6.3
4.3.2.2	3.5 trips, 26 DAS	38,281,067	1,980	2,903	6.0
4.3.3.1	1 CAII, 24 DAS	40,104,290	2,025	2,950	6.2
4.3.3.2	1 CAII, 26 DAS	41,316,833	2,014	3,170	5.9
4.3.4.1	1 NLSS, 24 DAS	40,152,792	2,114	2,971	6.1
4.3.4.2	1 NLSS, 26 DAS	41,380,767	2,098	3,192	5.9
4.3.5.1	1 MAAA, 24 DAS	40,044,765	2,037	2,723	6.7
4.3.5.2	1 MAAA, 26 DAS	41,272,740	2,026	2,944	6.4
4.3.6	Status Quo	39,129,847	2,281	5,718	3.1

Table 42 - Comparison of area swept (nm^2) between each alternative in Framework 33. Alternatives are like one another, are all higher than no action, and very distinct from status quo. Shading is used to emphasize comparisons between the action alternatives.

			1	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	SQ
Alt	Description	Area Swept	2,006	2,683	2,903	2,950	3,170	2,971	3,192	2,723	2,944	5,718
1	No Action	2,006	0	677	897	944	1,164	965	1,186	717	938	3,712
2.1	3.5 trips, 24 DAS	2,683	-677	0	220	267	487	288	509	40	261	3,035
2.2	3.5 trips, 26 DAS	2,903	-897	-220	0	47	267	68	289	-180	41	2,815
3.1	1 CAII, 24 DAS	2,950	-944	-267	-47	0	220	21	242	-227	-6	2,768
3.2	1 CAII, 26 DAS	3,170	-1,164	-487	-267	-220	0	-199	22	-447	-226	2,548
4.1	1 NLSS, 24 DAS	2,971	-965	-288	-68	-21	199	0	221	-248	-27	2,747
4.2	1 NLSS, 26 DAS	3,192	-1,186	-509	-289	-242	-22	-221	0	-469	-248	2,526
5.1	1 MAAA, 24 DAS	2,723	-717	-40	180	227	447	248	469	0	221	2,995
5.2	1 MAAA, 26 DAS	2,944	-938	-261	-41	6	226	27	248	-221	0	2,774
	Status Quo	5,718	-3,712	-3,035	-2,815	-2,768	-2,548	-2,747	-2,526	-2,995	-2,774	0

Figure 15 - Comparison of Bottom Area Swept estimates over the short and long term.

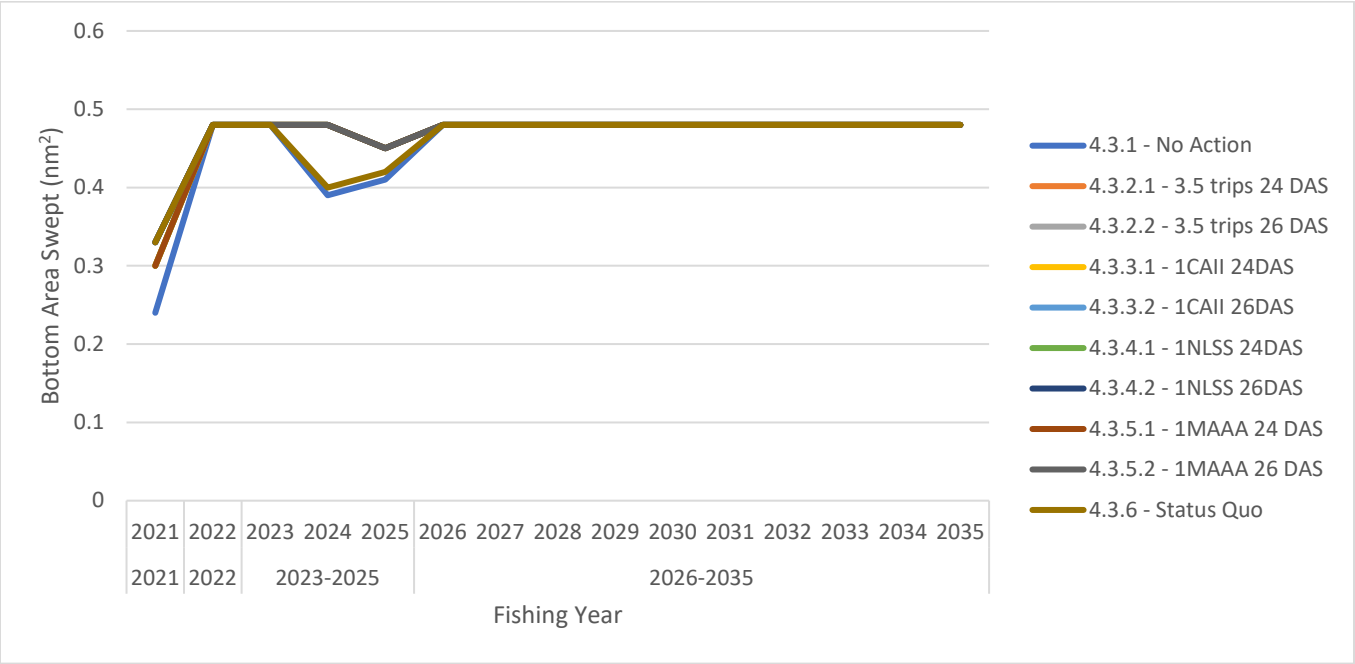


Figure 16 - Comparison of bottom area swept estimates between FW33 alternatives and recent Council actions (FW25/2014 through FW32/2020).

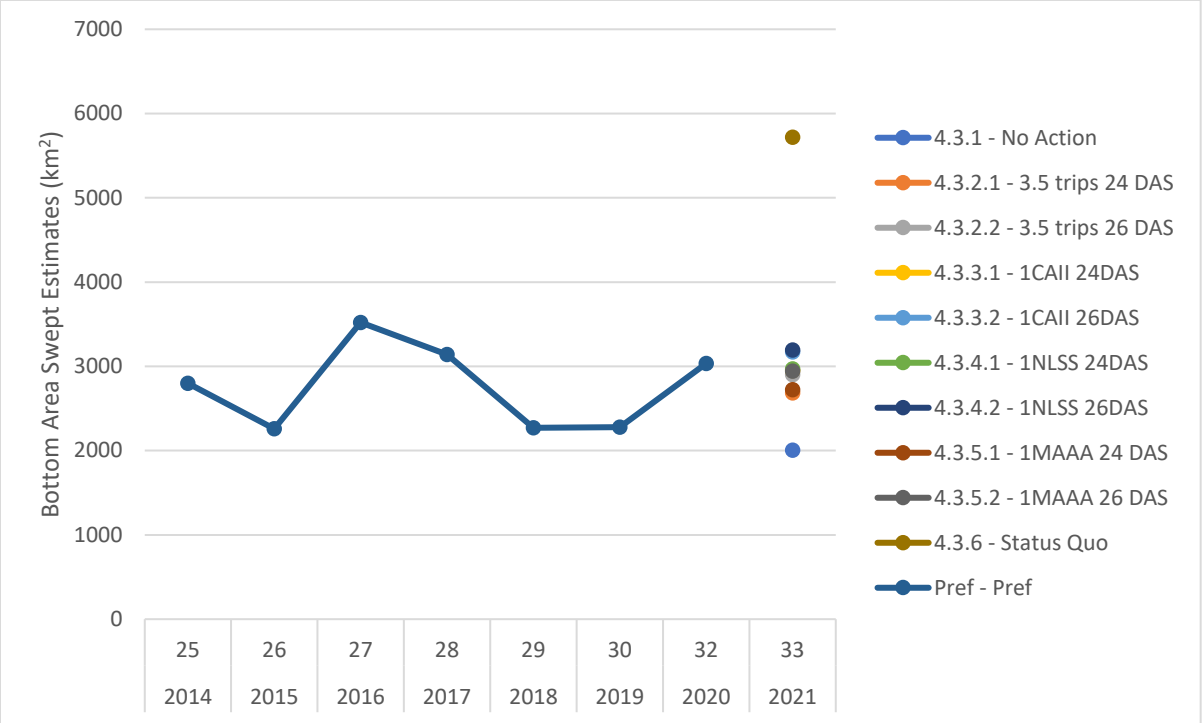


Figure 17 – Spatial distribution of intrinsic seabed habitat vulnerability on Georges Bank, based on a uniform distribution of scallop dredging at median levels. Source: Fishing Effects Model.

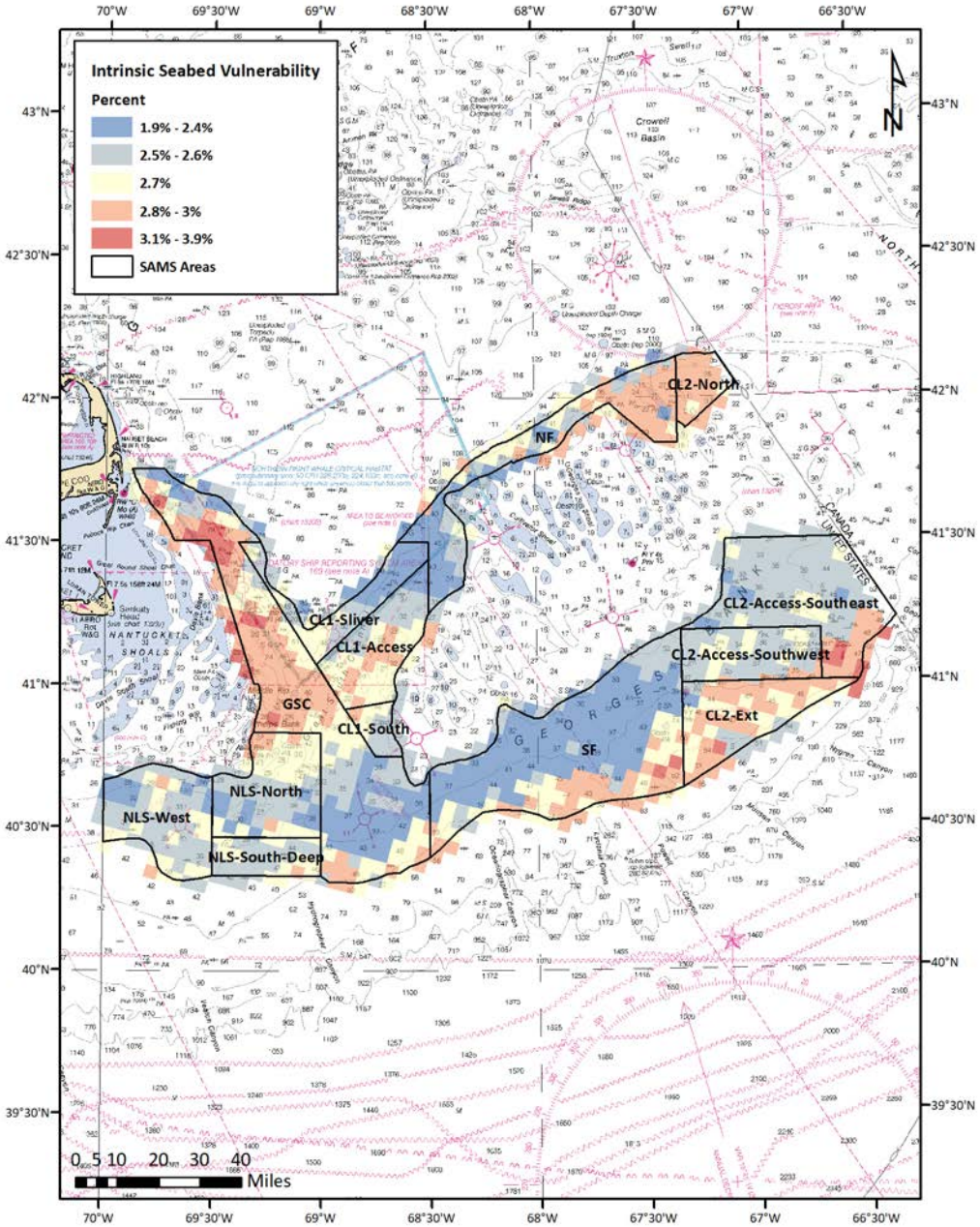


Figure 18 – Spatial distribution of intrinsic seabed habitat vulnerability in the Mid-Atlantic Bight, based on a uniform distribution of scallop dredging at median levels. Source: Fishing Effects Model.

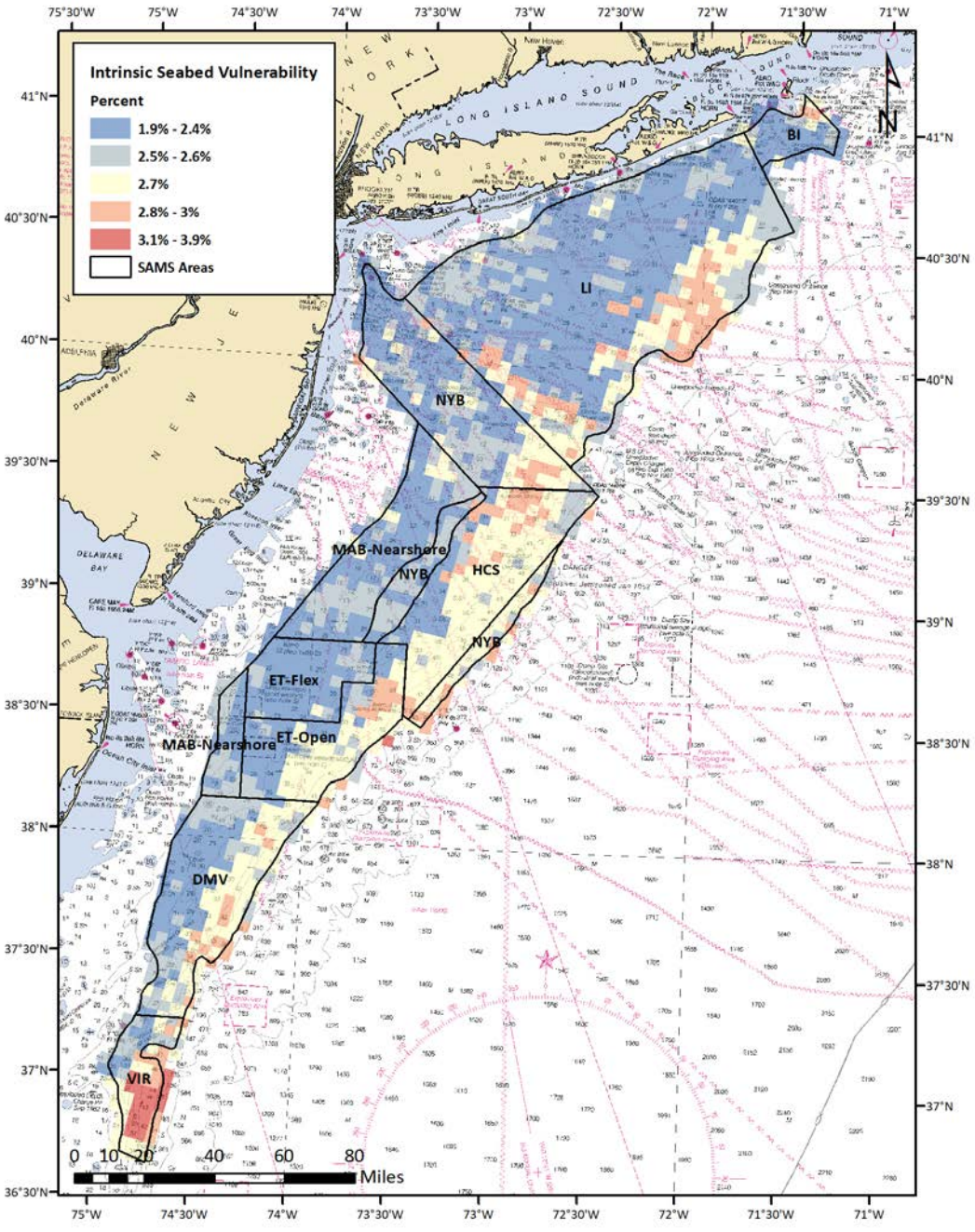

Intrinsic Seabed Vulnerability
Percent
1.9% - 2.4%
2.5% - 2.6%
2.7%
2.8% - 3%
3.1% - 3.9%
SAMS Areas
BI
LI
NYB
MAB-Nearshore
NYB
HCS
NYB
ET-Flex
ET-Open
MAB-Nearshore
DMV
VIR
0 10 20 40 60 80
Miles
75°30'W
75°W
74°30'W
74°W
73°30'W
73°W
72°30'W
72°W
71°30'W
71°W
41°N
40°30'N
40°N
39°30'N
39°N
38°30'N
38°N
37°30'N
37°N
36°30'N

Figure 19 - Comparison of Intrinsic Habitat Vulnerability among SAMS areas

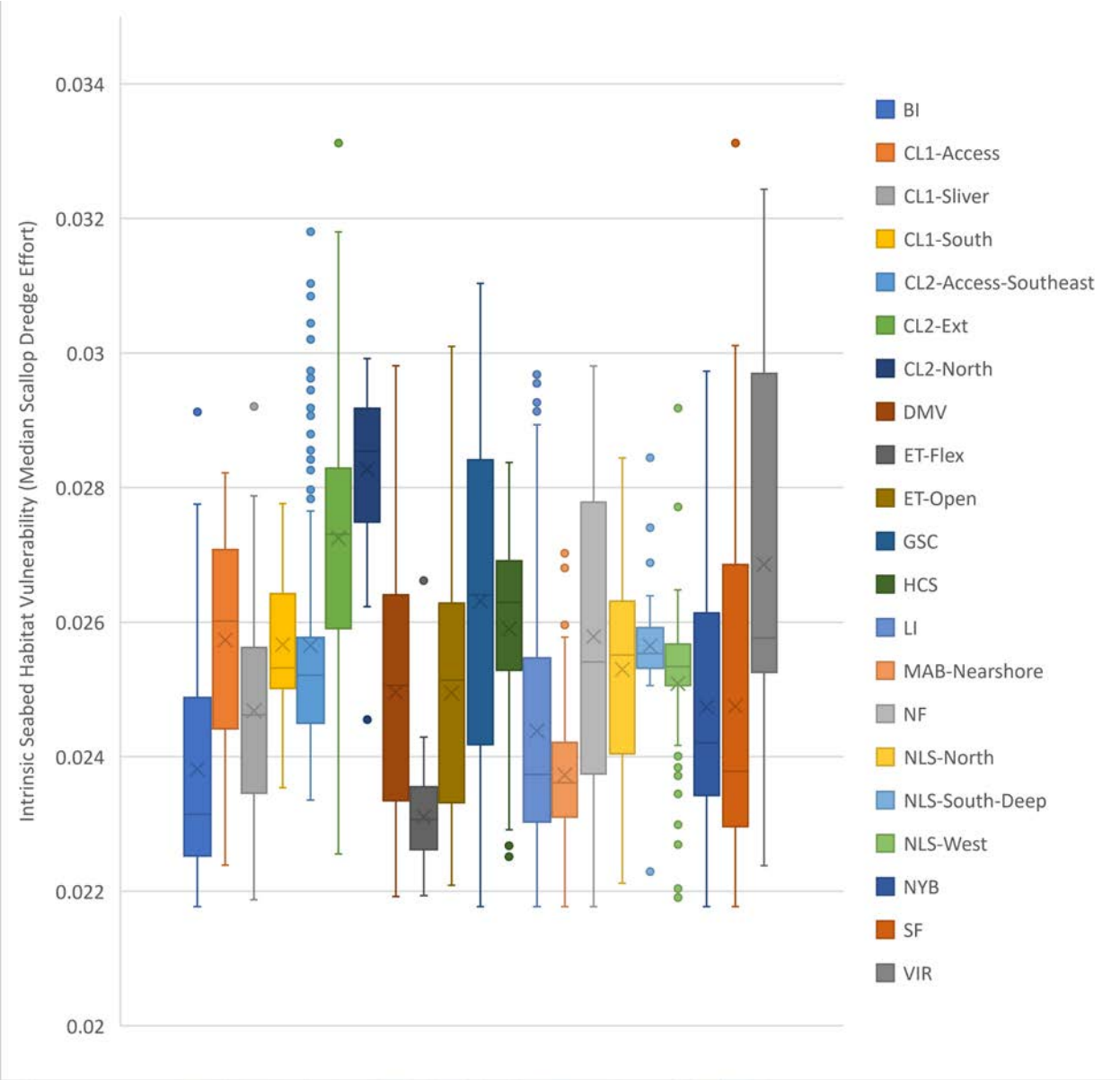
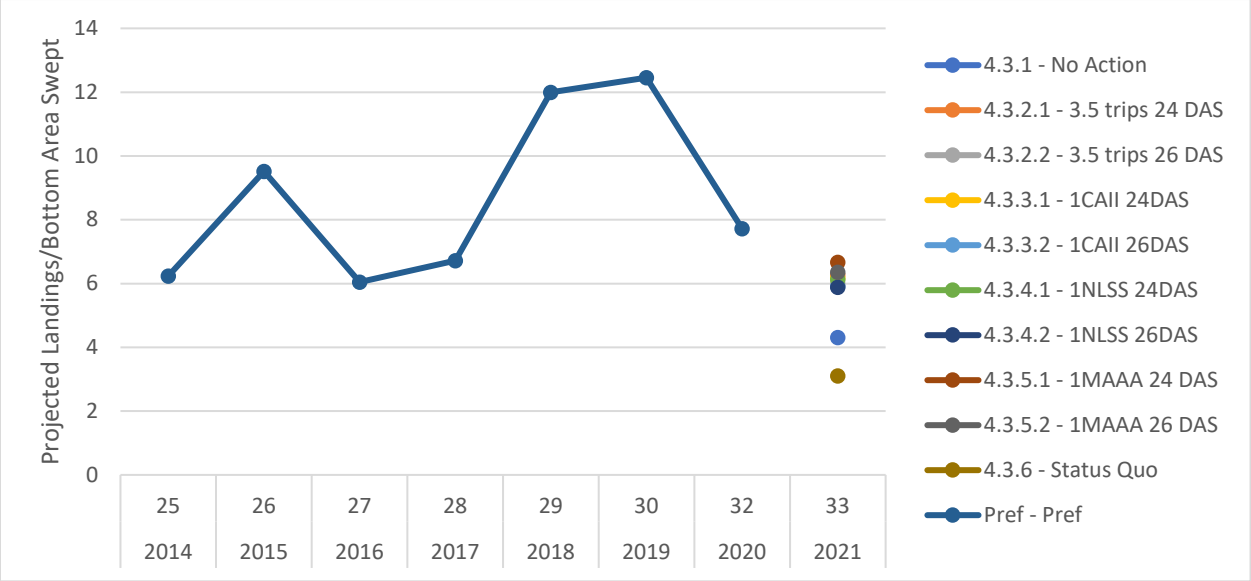


Figure 20 - Comparison of relative habitat efficiency of fishing (landings in mt divided by area swept in nm^2) for FW33 specification alternatives. The higher the ratio, the more habitat efficient an alternative is. Estimates from the alternatives selected in recent Council actions (frameworks 35-32) are shown for reference. No Action and Status Quo fall outside the cluster of values and are thus less efficient than any of the action alternatives.



6.5.4 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

The LAGC IFQ fishery is allocated a fleet wide total number of access area trips. Individual vessels are not required to take trips in specific areas. Instead, a maximum number of trips is identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. This action is considering three options for allocating fleet wide trips to the LAGC IFQ fishery and two options related to the maximum number of trips per area.

Alternative 1 (No Action) would use the default number of trips allocated in FW32 (571 total trips in MAAA starting on April 1). Under Alternative 2 and Alternative 3, there would be either 2,283 or 1,998 total access area trips allocated to the LAGC component, depending on which alternative the Council chooses in Action 3 – Fishery Specifications. These trips would be distributed across the NLS-South, CA-I, and the MAAA (Table 22). In Alternative 2, all of the LAGC share of allocation in Closed Area II would be available for harvest in Closed Area I. In Alternative 3, the LAGC share of allocation in Closed Area II would be split three ways between the MAAA, the NLS-South, and Closed Area I. Both the LA and LAGC fisheries have the same proportion of their allocations coming from open vs. access areas.

Since LAGC fishermen can choose whether to harvest their IFQ from access or open areas, options that afford greater flexibility to make this choice based on current fishery conditions are expected to have marginally lower impacts to EFH. This relies on the assumption that fishermen will opt to fish in areas that have more abundant or larger scallops whenever possible. Fishing more efficiently is expected to reduce gear/seabed contact and thus reduce impacts to EFH. Swept area estimates for access areas are generally lower than open areas, and LPUE in the open bottom is projected to be much lower than in recent fishing years. Thus, Alternatives 2 and 3 would likely have lower impacts to EFH as compared to

Alternative 1. The difference in impacts of Alternative 2 versus Alternative 3 on EFH is likely to be negligible.

6.5.5 Action 5 – Additional Measures to Reduce Fishery Impacts

This action includes two sets of measures related to RSA compensation fishing and the seasonal closure of the Closed Area II Access Area.

6.5.5.1 RSA Compensation Fishing

There are two alternatives are under consideration related to RSA compensation fishing in access areas. Alternative 1 would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 would allow vessels to fish an RSA compensation trips in all access areas open to the fishery, open bottom, and the Northern Gulf of Maine management unit (up to the LA TAC). Only vessels receiving allocations of NGOM RSA compensation would be able to fish their awards in the NGOM management area. Vessels would be able to fish in access areas (MAAA, CAII, CAI, and NLS-S) which hold the majority of exploitable biomass and have higher projected LPUE compared to the open bottom. Closed Area II would be available for RSA compensation fishing only during the time of year when meat weights are at their highest, which could limit how much effort is needed to achieve compensation trips in this area.

Overall impacts of either alternative are expected to be negligible since RSA compensation fishing is not a large contributor to overall fishing mortality (~3% of projected landings in FY2021). Adjusting the areas where RSA compensation trips can be fished is not likely to have a large influence on fishery impacts to EFH. Restrictions on RSA compensation fishing in the NGOM are to control mortality in the area and could be expected to have a slight positive impact on EFH in the NGOM.

Alternative 2 could be expected to have a low positive impact on EFH relative to Alternative 1 since it would enable vessels to direct fishing effort to areas with higher concentrations of animals, specifically in Closed Area II, Closed Area I, Nantucket Lightship South, and the Mid-Atlantic Access Areas.

6.5.5.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

The Closed Area II Access Area includes a seasonal closure to minimize bycatch of flatfish. The standing closure timeframe in the regulations extends through November 15 (this is Alternative 1, see §648.60 Sea Scallop Rotational Areas), but as occurred during FY 2020, Alternative 2 would extend the closure through November 30. The rationale is that November tends to be a higher bycatch month. This will force effort in the CAII AA into other seasons, but this is not expected to have a substantial impact on the magnitude of EFH impacts relative to Alternative 1. This is because November 16-30 is not a period of especially high meat yields such that fishing in this area would generally be avoided during this timeframe to begin with.

Overall impacts of Alternative 1 are expected to be negligible since fishing CAII over a two-week window in November is not a large contributor to overall fishing mortality. Adjusting the when the area can be fished is not likely to have a large influence on fishery impacts to EFH. Similarly, overall impacts of Alternative 2 are expected to be negligible since fishing CAII over a two-week window in November is not a large contributor to overall fishing mortality. Adjusting when the area can be fished is not likely to have a large influence on fishery impacts to EFH.

6.6 ECONOMIC AND SOCIAL IMPACTS

6.6.1 Economic Impacts

6.6.1.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

The MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis.

6.6.1.1.1 Alternative 1 – No Action

Under No Action, the ABC for FY 2021 (after discards are removed) would be the default value set through Framework 32 at 36,435 mt and be about 16% higher than the ABC under Alternative 2 (30,517 mt). There would be no ABC set for FY2022.

The economic impacts of Alternative 1 are likely negligible to low negative. The ABC is a legal limit in the scallop fishery, and is calculated using a set reference point, while the allocations for the fishery developed under rotational management are developed using a separate set of assumptions. The legal limits of the ABC for the No Action and Alternative 2 are not expected to limit what can be allocated to the fishery, the impacts of the No Action ABC on economic benefits for FY2021 is likely to be negligible compared to Alternative 2. However, since Alternative 1 would not set a default OFL or ABC for FY 2022, the start of FY 2022 could be delayed (from April 1, 2022) if there is a delay in setting specifications next year. Therefore, the overall short-term impacts of Alternative 1 are likely to be low negative, and negative compared to Alternative 2. In the long-term, Alternative 1 is likely to have low negative stock benefits (Section 6.2.1.1). If this leads to more restrictive regulations, the potential impacts of the "No Action" ABC on economic benefits are negative.

6.6.1.1.2 Alternative 2 – Update OFL and ABC for FY 2021 and FY 2022 (default)

Alternative 2 would specify OFL and ABC values for FY 2021 and FY 2022 (default) based on SSC recommendations (in November 2020). The ABC (30,517 mt after discards are removed) for FY2021 would be about 16% lower than the default ABC under No Action. The OFL and ABC values in recent years are driven by the large year classes in the Nantucket Lightship area and the Mid-Atlantic Access Area being fished down and due to a lack of incoming recruitment.

The economic impacts of Alternative 2 are likely negligible to low positive. As noted above, the ABC is a legal limit in the scallop fishery, and is calculated using a set reference point, while the allocations for the fishery developed under rotational management are developed using a separate set of assumptions. The legal limits of the ABC for the No Action and Alternative 2 are not expected to limit what can be allocated to the fishery, the impacts of the Alternative 2 on economic benefits for FY2021 is likely to be negligible compared to No Action. The overall short-term impacts of Alternative 2 are likely to be positive compared to No Action because Alternative 2 would set a default OFL or ABC for FY 2022. This means that the fishing year could start on time in FY2022 (from April 1, 2022). The fishing year could not begin on April 1, 2022 if no OFL or ABC is set and there is a delay in setting specifications next year. Overall, using these estimates to set fishery specifications should have positive economic impacts over the long-term because the ABC values were determined based on the recent surveys and best available science to prevent overfishing and optimize yield from the of the scallop resource. If this leads to less restrictive regulations, there may be positive long-term economic impacts.

6.6.1.2 Action 2 – Northern Gulf of Maine Management Area

The LAGC share is calculated by applying the first 70,000 pounds to LAGC TAC, and then splitting the remaining pounds 50/50 between the LAGC and LA component. Under both Alternative 1 and Alternative 2, the LAGC and LA (RSA) shares would operate under separate TACs.

6.6.1.2.1 Alternative 1 – No Action

Under default measures for FY2021, the total NGOM hard TAC would be set at 265,000 pounds, which is based on fishing Ipswich Bay, and Jeffreys Ledge. The overall TAC would be split between the LA and LAGC, with 97,500 pounds available to support RSA compensation fishing (LA share), and 167,500 pounds available for harvest by the LAGC component. Under these default measures, Stellwagen Bank would remain closed in FY2021. The area would open on April 1, 2021 with no change to the current management program.

Estimated scallop revenue for the LAGC NGOM fleet would be about $1.668 million under this alternative using an estimated price of $9.96 per pound and assuming landings will be equivalent to 167,000 pounds. Fishing costs are estimated to be about $0.40 million and net revenue would be about $1.263 million for the LAGC NGOM fleet[9] (Table 43).

No Action (Alternative 1) could have positive economic impacts on the NGOM portion of the fishery compared to Alternative 2. This alternative would result in higher revenues and net benefits relative to Alternative 2 (all options there in).

Table 43. NGOM TAC, Scallop revenue and costs under Alternative 1, No Action (Monetary values are in 2020 dollars)

Data and Values	**Estimated values for 2020**
Overall TAC (lbs.)	265,000
LA (RSA) TAC	97,500
LAGC (NGOM) TAC	167,500
Economic Impacts on the LAGC (NGOM) share:	
• Estimated LAGC scallop revenue	$1,668,300
• DAS	838
• Trip costs ($484/DAS)	$405,592
• **Net revenue**	**$1,262,708**

[9] Scallop revenue and cost estimates are based on the following assumptions and data. The assumed price per pound of scallops, $9.96, is roughly equivalent to the average estimated price (in 2020 dollars) for all market categories of scallops under the FW33 status quo scenario.

Trip costs estimates are based on cost function estimated using observer data for 1991-2019 and corresponds to estimated fuel, oil, water, food, ice, supply costs per trip for the NGOM fishery. Trip costs that were initially estimated in 2019 dollars were later adjusted by cost inflation to estimate costs in terms of 2020 dollars. Note that the observed trip costs in FY2018 decreased by about 5.5 percent compared to the trip cost estimates in FY2018. Hence estimated trip cost for a NGOM vessel is about $484 per DAS. This cost deflation rate was taken into consideration while estimating the trip costs (in 2020 dollars) in FR33 economic analysis. Total DAS for the NGOM fleet was estimated by dividing TAC with the 200 lb. possession limit. (def FR_s28_scenario)

6.6.1.2.2 Alternative 2 – Set 2021 and 2022 NGOM TAC, with first 70,000 pounds to LAGC, then 50/50 split between LA and LAGC

Separate caps on the LAGC and LA components are expected to reduce the negative impacts associated with derby-style fishing between LAGC and LA vessels and result in positive economic benefits of the participants of the LAGC NGOM fishery. The LA share of the NGOM TAC would be available for RSA compensation fishing only to support research projects in the NGOM, but not in addition to the 1.25 million pounds set-aside for the RSA program. When more research takes place in this area, it will help to increase understanding of removals from the NGOM management area. This, in turn, will lead better management of the NGOM resource with positive economic impacts over the long-term on both LAGC and LA vessels.

6.6.1.2.2.1 – FY2021 NGOM TAC

If the Council selects Alternative 2, it will need to select options for the FY2021 and FY2022 TACs. This section focuses on the options for FY2021 TAC, along with the LAGC and LA/RSA shares under each option (Table 44).

Table 44 – NGOM TAC options for FY 2021.

FW 33 Alternative	FW 33 Section	F	2021 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		265,000	97,500	167,500
2, Option 1	4.2.2.1.1	0.18	160,000	45,000	115,000
2, Option 2	4.2.2.1.2	0.20	175,000	52,500	122,500
2, Option 3	4.2.2.1.3	0.25	210,000	70,000	140,000

6.6.1.2.2.2 – FY2022 NGOM TAC

If the Council selects Alternative 2, it will need to select default measures for FY 2022. The possible TACs for FY 2022 under consideration are shown in Table 67.

Table 45 - NGOM TAC sub-options for FY2022 (default).

FW 33 Alternative	FW 33 Section	F	2022 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		0	0	0
2, Sub-Option 1	4.2.2.2.1	0.18	70,000	0	70,000
		0.20	74,000	2,000	72,000
		0.25	85,000	7,500	77,500
2, Sub-Option 2	4.2.2.2.2	0.0	0	0	0

Alternative 2 would allow a lower amount of scallop landings to occur in the NGOM area relative to the No Action (Alternative 1) by setting the overall 2021 TAC either at 160,000 lbs. under Sub-Option 1 (F=0.18) or 175,000 lbs. under Sub-Option 2 (F=0.20) or 210,000 lbs. under Sub-Option 3. The LAGC shares would also be lower in 2021 as well, at either 115,000 lb. under Sub-Option 1 (F=0.18) or 122500 lb. under Sub-Option 2 (F=0.20) or 140000 lb. under Sub-Option 3 (F=0.25). The default LAGC share for FY2022 are set at 70,000 lb under sub-option 1 (F=0.18), 72,000 lb. under sub-option 2 (F=0.20) and 77500 lb. under sub-option 3 (F=0.25). (See Table 46).

Table 46. Economic Impacts of Potential NGOM TAC for LA (RSA) and LAGC (monetary values are in 2019 dollars)

Data and Values	FY2021 Alternative 2			FY2022 (Default) Alternative 2			
				F rates for 2022 match F selected for FY 2021 NGOM TAC Sub-Option 1			Set F at Zero Sub-option 2
	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	
	(F=0.18)	(F=0.20)	(F=0.25)	(F=0.18)	(F=0.20)	(F=0.25)	(F=0.0)
LA/RSA share - scallop lbs.	45,000	52,500	70,000	0	2,000	7,500	0
LAGC share - scallop lbs.	115,000	122,500	140,000	70,000	72,000	77,500	0
Total Pounds	160,000	175,000	210,000	70,000	74,000	85,000	0
Estimated LA RSA value							
Impacts on the LAGC NGOM:							
• Estimated LAGC revenue	$1,145,400	$1,220,100	$1,394,400	$697,200	$717,120	$771,900	$0
• DAS	575	613	700	350	360	388	0
• Trip costs ($484 per DAS)	$278,300	$296,450	$338,800	$169,400	$174,240	$187,550	$0
• Net revenue	$867,100	$923,650	$1,055,600	$527,800	$542,880	$584,350	$0
• Net revenue net of No Action	**($395,608)**	**($339,058)**	**($207,108)**	**n/a**	**n/a**	**n/a**	**n/a**

Table 46 summarizes the economic impact of the option in Alternative 2 in FY2021 and FY2022 (default). Revenues and net revenues under all options under the Alternative 2 are lower than the Alternative 1 (No Action) for the FY2021.

- Alternative 1 – No Action (265,000 lbs. for the 2021 fishing year) is expected to have an estimated revenue of $1.145 million. Net revenue for Sub-Option 1 would be around $0.867 million, which is $0.395 million lower than No Action. Gross and net revenue estimates for the 2020 fishing year are calculated using a price estimate of $9.96 per pound (in 2020 dollar).[10]
- Alternative 2 sub-option 2 would generate$0.923 million in net revenue in FY2021. The net benefit (net of No Action) for this option is estimated to be $0.339 million lower than the Alternative 1.
- Alternative 2 option 3 yields $1.055 million in net revenue in FY2021. The net benefit (net of No Action) for this option is estimated to be $0.207 million lower than the Alternative 1.
- Comparing the three sub-options in the Alternative 2, option 3 has higher net revenues relative to options 1 and 2.

For FY2022, the sub-option 1 would establish a default TAC that would allow fishing to begin on April 1, 2022 in the event that there is a delay in the implementation on new allocations. Sub-option 1 could result in revenue generated early in the FY compared to a closure of the management unit under sub-option 2. Both scenarios are expected to be temporary, since the Council will work on an action to set allocations for this area in FY2022 and FY2023 based on 2021 survey data.

Separate caps on the LAGC and LA components are expected to reduce the negative impacts associated with derby-style fishing between LAGC and LA vessels and result in positive economic benefits of the

[10] Using the adjusted 2020 price for the Status Quo alternative.

participants of the LAGC NGOM fishery. The LA share of the NGOM TAC would be available for RSA compensation fishing only to support research projects in the NGOM, but not in addition to the 1.25 million pounds set-aside for the RSA program. When more research takes place in this area, it will help to increase understanding of removals from the NGOM management area. This, in turn, will lead better management of the NGOM resource with positive biological and economic impacts over the long-term on both LAGC and LA vessels.

6.6.1.3 Action 3 – Fishery Specifications

The LA (94.5%) and LAGC IFQ (5.5%) allocations are based on Annual Projected Landings (APL).

Table 47 - Comparison of allocations and DAS associated with each specification alternative in FW33.

Alternatives in FW33	Description	Overall F rate	Open area F	Annual Projected Landings (APL)	APL w/ set-asides removed	LA Share (94.5%)	LAGC IFQ Share (5.5%)
4.3.1	No Action	0.054	0.24	19,069,986	17,096,848	16,156,522	940,327
4.3.2.1	Alt2-24DAS	0.205	0.30	37,068,525	35,095,387	33,165,141	1,930,246
4.3.2.2	Alt2-26DAS	0.210	0.33	38,281,067	36,307,930	34,310,994	1,996,936
4.3.3.1	Alt3-24DAS	0.220	0.30	40,104,290	38,131,153	36,033,939	2,097,213
4.3.3.2	Alt3-26DAS	0.222	0.33	41,316,833	39,343,695	37,179,792	2,163,903
4.3.4.1	Alt4-24DAS	0.200	0.30	40,152,792	38,179,655	36,079,774	2,099,881
4.3.4.2	Alt4-26DAS	0.202	0.33	41,380,767	39,407,629	37,240,210	2,167,420
4.3.5.1	Alt5-24DAS	0.222	0.30	40,044,765	38,071,628	35,977,688	2,093,940
4.3.5.2	Alt5-26DAS	0.229	0.33	41,272,740	39,299,603	37,138,125	2,161,478
4.3.6*	Status Quo	0.175	0.33	39,129,847	37,156,710	35,113,091	2,043,619

* "Status Quo" refers to Framework 32 preferred measures and is provided in the alternatives section of Framework 32 to provide continuity and context for the reader, but is not an option proposed for Council decision.

6.6.1.3.1 Economic impacts of the proposed specification alternatives

Open area DAS and access area trip allocations have been developed using projections from 2020 survey data. Alternatives considered in Framework 33 are described in Section 4.3 for a full-time limited access vessel. No Action corresponds to the default measures in Framework 32 and Status Quo "Status Quo" refers to a scenario with no changes from the allocations in Framework 32 for open area DAS and access area trips.

The short-term impact in FY2021 and the long-term economic impact (FY2021-2035) for the proposed specification alternatives are summarized below. Note that Section refers to a specification alternative or run.

Summary of economic impacts

Short-term (FY2021) impacts (Table 48):

- In the short run, Alternative 4 (Section **4.3.4.2)** with 26 DAS for full-time limited access vessels in open areas is expected to result in the highest landings, revenues and total economic benefits in FY2021. This is the four access area trip option that allocates one trip to the NLS-South access area, 1.5 trips to the MAAA, and 1.5 trips to CAII. Scallops in the NLS-South are smaller than scallops found in the MAAA or CAII, and therefore the expected price of scallops coming from the NLS-S are lower than the sizes being harvested in other areas.

- Total revenues under Alternative 4 with 26 DAS (4.3.4.2)is estimated to exceed the status quo (SQ) scenario by $13.43 million in FY2021.

- Alternative 3 (24 & 26 DAS), Alternative 4 (24 & 26 DAS), and Alternative 5 with 26 DAS are estimated to have higher revenues compared to SQ. Except No Action, revenues range from around $362 million (Alternative 2 with 24 DAS, Section 4.3.2.1) to $403 million (Alternative 4 with 26 DAS, Section 4.3.4.2). Compared to SQ, revenue is lower by about $28 million in Alternative 2 (3.5 trip option) with 24 DAS, by $18.55 million in Alternative 2 with 26 DAS, and by $2.84 million in Alternative 5 with 24 DAS. However, revenue is higher by $13.43 million in Section 4.3.4.2, by $11.93 million in Section 4.3.3.2, by $6.15 million in Section 4.3.5.2, by $4.55 million in Section 4.3.4.1, and by $3.13 million in Section 4.3.3.1.
- Total economic benefits (a sum of producer and consumer surpluses) under all alternatives except No Action are estimated to be over $299 million in FY2021. It is highest for the alternative in Alternative 4 with 26 DAS at about $346 million and least for Alternative 2 with 24 DAS at $299 million. However, the total net economic benefits of SQ is higher compared to the alternatives because of lower consumer surplus due to higher scallop prices. Compared to SQ, the total economic benefits associated with Alternative 4 with 26 DAS is lower than SQ by $1.52 million. While SQ values may be slightly higher compared to Alternatives 2-5, the SQ option in FW32 allocated a total of 5 access area trips, and set FT LA DAS at F=0.33, which results in the 26 DAS in FY 2021. The fact that model simulations result in comparable allocations and economic benefits between SQ and the other alternatives for FY2021 is notable because the SQ option applied in FY2020 resulted in much higher landings. As rotational area are fished down (Closed Area I, Nantucket Lightship North, and CAII-SE), they do not produce expected landings, even when the projection model fishes the areas extremely aggressively (F=3). The
- The short-term marginal impact of an increase in open areas DAS from 24 to 26 days on fleet revenue is little over $9 million.
- It is important to note that actual prices, revenues and total economic benefits, however, may differ from these estimates depending on the actual landings, size composition of landings, and values of variables that effect prices including import prices, disposable income of consumers and imports of scallops from countries such as Canada and Japan that are a close substitute for the large domestic scallops. When estimating prices, it was assumed that the values of these variables will not change from the current levels and that actual landings will equal to the projected landings from the biological model. However, because of a large change (+8.68 %) in disposable income in FY2020 compared to FY2019, the per capita disposable personal as of October 2020 was used in the price estimation. For these reasons, the numbers provided in the Tables should be mainly used to compare one alternative with another rather than to predict future values.

Table 48 - Economic Impacts for 2021: Estimated landings (Mill.lb.), revenue and economic benefits (Mill. $, in 2020 dollars), and price (in 2020$ per lb.)

Alternatives/Runs	Alt1_NA 4.3.1	Alt2_24 das 4.3.2.1	Alt2_26 das 4.3.2.2	Alt3_24 das 4.3.3.1	Alt3_26 das 4.3.3.2	Alt4_24 das 4.3.4.1	Alt4_26 das 4.3.4.2	Alt5_24 das 4.3.5.1	Alt5_26 das 4.3.5.2	SQ 4.3.6
Landings mil lbs	19.070	37.068	38.281	40.104	41.317	40.153	41.381	40.045	41.273	39.130
Price _all	$10.86	$9.77	$9.70	$9.80	$9.73	$9.82	$9.75	$9.67	$9.60	$9.96
Revenue	$207.04	$362.25	$371.36	$393.03	$401.84	$394.45	$403.33	$387.07	$396.06	$389.90
Revenue Difference to SQ	**($182.86)**	**($27.65)**	**($18.55)**	**$3.13**	**$11.93**	**$4.55**	**$13.43**	**($2.84)**	**$6.15**	**$0.00**
Rank (Revenue)	9	8	7	5	2	4	1	6	3	
Producer Surplus (PS)	$147.41	$274.79	$281.78	$302.07	$308.76	$305.87	$312.60	$296.56	$303.40	$314.33
Consumer Surplus (CS)	$8.54	$24.87	$26.21	$31.73	$33.23	$32.32	$33.87	$28.53	$29.96	$33.66
Total Benefits (CS+PS)	$155.96	$299.66	$307.99	$333.80	$341.99	$338.19	$346.47	$325.09	$333.37	$347.99
Total Benefits Difference to SQ	**($192.03)**	**($48.33)**	**($40.00)**	**($14.19)**	**($6.00)**	**($9.80)**	**($1.52)**	**($22.90)**	**($14.62)**	**$0.00**
Rank (Total Benefits)	**9**	**8**	**7**	**4**	**2**	3	1	6	5	

Long-term impacts– 2021 to 2035

- Summary of the long-term economic impacts are provided in (Table 49 and Table 50). The results are expected to be similar over the long-term and the differences in economic benefits of various specification alternatives would be small both in the short- and long-term. The cumulative present value of the revenue is highest for the alternative Section 4.3.3.2 at about $5,177.5 million during 2021-2035. Except the No Action alternative, the cumulative present value of revenue ranged between $5,159 million (Section 4.3.2.1) to $5,177.5 million (Section 4.3.3.2).

- The long-term total economic benefits (PS + CS) for all specification alternatives are lower compared to SQ. It is slightly lower by about $1.6 million in Section 4.3.3.2, but lower by about $17 million in the Section 4.3.2.1.

- The long-term impact of an increase in open areas DAS from 24 to 26 days is marginal when future revenue stream is discounted at 7% market discount rate. The cumulative impact on the present value of revenue increases by about $3 million, and total economic benefit increases by about $2 million.

- Similarly, the long-term impact of an increase in open areas DAS from 24 to 26 days is also marginal when future revenue stream is discounted at 3% market discount rate. The cumulative impact on the present value of revenue increases by about $2.5 million, and total economic benefit increases by about $1 million.

- The ranking of alternatives changes between short- and long-term impacts for the first top four ranked specification alternatives. In terms of the revenue ranking, the alternative Section 4.3.4.2 ranks 1st in the short-term, but 3rd in the long-term. Similarly, the alternative Section 4.3.3.2 ranks 2nd in the short-term, but 1st in the long-term.

- At 3% discount rate, the present value of the cumulative total economic benefits net of SQ would be higher only in the specification alternatives Section 4.3.3.2 (Rank 2) and Section 4.3.3.1 (Rank 1). However, they are all lower compared to SQ at higher discount rate of 7%.

- At 3% discount rate, the present value of the estimated total revenues net of SQ values would range from $0.98 million for the alternative Section 4.3.2.1 to $19.19 million for the alternative Section 4.3.3.2.

- At 3% discount rate, the present value of the cumulative total economic benefits net of SQ would range from range from -$9.5 million (Section 4.3.2.1) to $3.73 million (Section 4.3.3.2).

- A higher discount rate at 7%, do not alter the rank of alternatives in general although the cumulative present value of revenues and total economic benefits would be lower due to the discounting the long-term benefits at a higher rate. However, revenue rankings switched for the specification alternatives Section 4.3.4.1 and Section 4.3.5.2 when discount rate is lowered to 3%.

- Higher revenues and economic benefits expected from specifications alternatives with the higher open area DAS for the FT LA vessels. The increase is revenues and economic benefits can be attributed to higher DAS from 24 to 26 DAS in open areas.

Table 49 - Long-term Economic Impacts (2021-2035): Cumulative present value of revenues, producer surplus and total economic benefits net of Status quo values (million $ in 2020 dollars, 7% Discount rate)

Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
Landings million lbs.	884.626	888.405	888.568	889.273	889.434	888.980	889.147	889.165	889.333	886.149
Price (all categories)	$8.99	$8.94	$8.94	$8.95	$8.94	$8.95	$8.94	$8.94	$8.94	$8.96
Revenue	$5,086.17	$5,158.64	$5,161.77	$5,174.70	$5,177.49	$5,171.41	$5,174.31	$5,168.85	$5,171.88	$5,162.48
Revenue Difference to SQ	**($76.31)**	**($3.84)**	**($0.71)**	**$12.22**	**$15.01**	**$8.94**	**$11.84**	**$6.37**	**$9.40**	**$0.00**
Rank (Revenue)	9	8	7	2	1	5	3	6	4	
Producer Surplus	$4,141.98	$4,197.81	$4,199.82	$4,211.79	$4,213.48	$4,210.13	$4,211.91	$4,206.21	$4,208.12	$4,216.69
Consumer Surplus	$591.08	$578.78	$578.45	$578.56	$578.41	$574.39	$574.30	$575.18	$574.95	$576.80
Total Benefits	$4,733.06	$4,776.58	$4,778.27	$4,790.35	$4,791.90	$4,784.52	$4,786.22	$4,781.39	$4,783.07	$4,793.49
Total Benefits Difference to SQ	**($60.43)**	**($16.91)**	**($15.23)**	**($3.14)**	**($1.59)**	**($8.97)**	**($7.28)**	**($12.10)**	**($10.42)**	**$0.00**
Rank (Total Benefits)	**9**	**8**	**7**	**2**	**1**	4	3	6	5	

Table 50 – Long-term Economic Impacts (2021-2035): Cumulative present value of revenues, producer surplus and total economic benefits net of Status quo values (million $ in 2020 dollars, 3% Discount rate).

Alternatives/ Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
Landings million lbs.	884.626	888.405	888.568	889.273	889.434	888.980	889.147	889.165	889.333	886.149
Price (all categories)	$8.99	$8.94	$8.94	$8.95	$8.94	$8.95	$8.94	$8.94	$8.94	$8.96
Revenue	$6,438.84	$6,504.03	$6,506.63	$6,518.94	$6,521.23	$6,515.17	$6,517.58	$6,512.43	$6,514.95	$6,502.33
Revenue Difference to SQ	**($63.48)**	**$1.70**	**$4.31**	**$16.61**	**$18.90**	**$12.84**	**$15.25**	**$10.10**	**$12.62**	**$0.00**
Rank (Revenue)	9	8	7	2	1	4	3	6	5	
Producer Surplus	$5,247.08	$5,296.56	$5,298.15	$5,309.53	$5,310.81	$5,307.28	$5,308.65	$5,303.30	$5,304.79	$5,310.56
Consumer Surplus	$732.43	$718.21	$717.73	$717.47	$717.18	$712.67	$712.45	$713.66	$713.30	$713.70
Total Benefits	$5,979.51	$6,014.77	$6,015.88	$6,027.00	$6,027.99	$6,019.95	$6,021.09	$6,016.96	$6,018.09	$6,024.26
Total Benefits Difference to SQ	**($44.74)**	**($9.49)**	**($8.38)**	**$2.74**	**$3.73**	**($4.31)**	**($3.16)**	**($7.30)**	**($6.17)**	**$0.00**
Rank (Total Benefits)	**9**	**8**	**7**	**2**	**1**	4	3	6	5	

- The results of these analyses should be interpreted with caution and should be used solely to compare one alternative with another rather than to predict future values. The costs and the benefits of the alternatives were analyzed based on the biological projections of landings, DAS and LPUE and the available information about the vessel costs and characteristics and price model. Actual value of landings, size composition and other biological variables are likely to be different, at least to some extent, than the projected values due to scientific and management uncertainties. Price projections are derived from the price model that estimated the impact of landings and size composition on prices after taking into account the impact of exogenous variables including the import prices, per capita disposable income and scallop imports from Japan and Canada as a proxy of changes in international markets for large scallops. Future price projections hold all the exogenous explanatory variables constant in order to estimate the economic impacts of alternative management measures on landings, scallop size composition, LPUE and effort. Actual prices will be different than estimated depending on the differences in actual landings and in size composition from projected values as well as due to changes inflation, consumer demand, price, composition of imports, disposable personal income, etc.

6.6.1.3.2 LAGC IFQ allocations

LAGC IFQ fishery is allocated 5.5% of the annual projected landings (APL), those with IFQ permits receiving 5% and those with both IFQ and LA permits receiving 0.5% of the total APL.

Table 51. Economic Impacts of the LAGC IFQ TAC for 2021 fishing year

Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
LAGC IFQ Share (lbs.)	940,327	1,930,246	1,996,936	2,097,213	2,163,903	2,099,881	2,167,420	2,093,940	2,161,478	2,043,619
LAGC IFQ Share (mt)	427	876	906	952	982	953	983	950	981	927
Price per lbs. (in 2020$)	$10.83	$9.75	$9.68	$9.782	$9.71	$9.81	$9.73	$9.65	$9.58	$9.94
Revenue (2020 million $)	$10.19	$18.83	$19.34	$20.51	$21.01	$20.59	$21.08	$20.20	$20.70	$20.32
Revenue Difference from SQ (million $)	-$10.14	-$1.49	-$0.99	$0.19	$0.68	$0.27	$0.76	-$0.12	$0.38	$0.00
Percent Change in Revenue from SQ	-49.87%	-7.36%	-4.86%	0.94%	3.36%	1.31%	3.75%	-0.59%	1.87%	0.00%

Table 51 presents the LAGC IFQ share (5.5% of APL) and estimated revenues for all specification alternatives including SQ and NA options. LAGC IFQ share for the SQ alternative is 2,043,619 pounds. The share for the specification alternatives ranges from 1,930,246 pounds (Section 4.3.2.1) to a high of 2,167,420 pounds (Section 4.3.4.2). Alternative 4.3.6 is the Status Quo scenario for comparison purposes of the relative economic benefits. Under this scenario, allocations for the LAGC IFQ fishery would be set at the same level as in FW32, at 2,043,619 pounds. Section 4.3.4.2 has the highest LAGC IFQ allocation, at 2,167,420 pounds with an expected revenue of $21.08 million (in 2020 dollars). The differences in revenue with SQ across alternatives range from about -$1.5 to $0.76 million. The highest-ranking option in terms of revenue is Section 4.3.4.2 with 3.75% more revenue than what is expected for the LAGC IFQ allocation under Status Quo.

6.6.1.3.3 Landings and size composition

- Projected landings under all specification alternatives (except for No Action) range from roughly 37.06 million to 41.38 million pounds in FY 2021. While projections suggest that landings could reach close to 66 million pounds in FY 2022 to FY2025 (Table 52), the Council plans to revisit its rotational management strategy again next year using different assumptions. However, over the long-term (FY2026 to FY2035), the projected landings for each specification alternative (including No Action) are expected to stabilize around 58 million pounds.
- The short- and long-term projected landings of U10s are shown in
- Table 53 and the proportion of projected landings that are U10s are shown in Table 55. Under the specification alternatives being considered in this action (except for No Action), the proportion of overall landings that are U10s is estimated to vary from 6.4% to 8.4% in FY2021 and is expected to stabilize around 6% in the long-term (FY 2025 to FY 2034). The share of U10 landing is expected to fall significantly compared to around 17% in Framework 32 APL projection on this category.

Table 52. Estimated landings (Million lbs., Average per fishing year)

Average of Total landings										
Alternatives/ Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	19.070	37.068	38.281	40.104	41.317	40.153	41.381	40.045	41.273	39.130
2022	73.167	65.832	65.367	64.717	64.256	64.538	64.068	65.208	64.739	67.479
2023-25	68.362	67.375	67.217	67.092	66.929	66.985	66.822	66.981	66.818	65.370
2026-35	58.730	58.338	58.327	58.318	58.308	58.333	58.323	58.297	58.287	58.343

Table 53. Projected landings of U10 scallops per year (Mill.lb.)

Average of U10 landings										
Alternatives/ Runs	Alt1_ NA	Alt2_24 das	Alt2_26 das	Alt3_24d as	Alt3_26d as	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	2.039	2.418	2.449	3.250	3.280	3.375	3.406	2.544	2.575	4.017
2022	4.852	4.522	4.508	4.169	4.156	4.090	4.076	4.442	4.429	3.990
2023-25	6.770	6.002	5.998	5.888	5.883	5.693	5.689	5.808	5.803	6.366
2026-35	2.490	2.590	2.590	2.587	2.586	2.566	2.566	2.568	2.568	2.426

Table 54. Historical landings of scallops by size category (in pounds)

Fishyear	'U10'_landing	'U1120'_landing	'U2130'_landing	U31+ landing	'UNK'_landing	Grand Total
2009	8,426,450	35,799,075	12,193,737	172,283	1,327,049	57,918,594
2010	8,770,955	36,052,201	10,831,759	63,244	939,048	56,657,207
2011	8,543,436	45,260,311	3,256,836	306,256	1,339,491	58,706,330
2012	10,485,521	41,587,639	3,486,843	63,484	1,234,715	56,858,202
2013	8,666,779	24,780,078	5,564,030	125,631	1,076,312	40,212,830
2014	8,046,766	19,084,369	4,079,070	286,378	873,788	32,370,371
2015	6,115,533	21,138,141	7,719,681	170,252	772,211	35,915,818
2016	4,720,193	18,774,077	14,691,792	2,202,112	1,141,890	41,530,064
2017	10,186,798	29,399,041	12,655,069	388,708	979,780	53,609,396
2018	10,857,391	41,363,933	6,929,958	65,768	875,675	60,092,725
2019	11,956,901	38,151,255	8,156,095	993,189	967,217	60,224,657

Table 55. Biological projections - Percentage share of U10 scallops in total landings

% Share of U10 landings Average of L-U10										
Alternatives /Runs	**Alt1_NA**	**Alt2_24das**	**Alt2_26das**	**Alt3_24das**	**Alt3_26das**	**Alt4_24das**	**Alt4_26das**	**Alt5_24das**	**Alt5_26das**	**SQ**
Fishing year	**4.3.1**	**4.3.2.1**	**4.3.2.2**	**4.3.3.1**	**4.3.3.2**	**4.3.4.1**	**4.3.4.2**	**4.3.5.1**	**4.3.5.2**	**4.3.6**
2021	10.69%	6.52%	6.40%	8.10%	7.94%	8.41%	8.23%	6.35%	6.24%	10.27%
2022	6.63%	6.87%	6.90%	6.44%	6.47%	6.34%	6.36%	6.81%	6.84%	5.91%
2023-25	9.90%	8.91%	8.92%	8.78%	8.79%	8.50%	8.51%	8.67%	8.69%	9.74%
2026-35	4.24%	4.44%	4.44%	4.44%	4.44%	4.40%	4.40%	4.40%	4.40%	4.16%

Table 56. Historical data: Percentage composition of scallop landings by size categories

Fishyear	'U10'_landing	'U1120'_landing	'U2130'_landing	U31+ landing	'UNK'_landing
2009	14.55%	61.81%	21.05%	0.30%	2.29%
2010	15.48%	63.63%	19.12%	0.11%	1.66%
2011	14.55%	77.10%	5.55%	0.52%	2.28%
2012	18.44%	73.14%	6.13%	0.11%	2.17%
2013	21.55%	61.62%	13.84%	0.31%	2.68%
2014	24.86%	58.96%	12.60%	0.88%	2.70%
2015	17.03%	58.85%	21.49%	0.47%	2.15%
2016	11.37%	45.21%	35.38%	5.30%	2.75%
2017	19.00%	54.84%	23.61%	0.73%	1.83%
2018	18.07%	68.83%	11.53%	0.11%	1.46%
2019	19.85%	63.34%	13.54%	1.64%	1.60%

Table 57. Scallop landings pounds per DAS (LPUE)

Average of LPUE-all										
Alternatives/Runs	**Alt1_NA**	**Alt2_24das**	**Alt2_26das**	**Alt3_24das**	**Alt3_26das**	**Alt4_24das**	**Alt4_26das**	**Alt5_24das**	**Alt5_26das**	**SQ**
Fishing year	**4.3.1**	**4.3.2.1**	**4.3.2.2**	**4.3.3.1**	**4.3.3.2**	**4.3.4.1**	**4.3.4.2**	**4.3.5.1**	**4.3.5.2**	**4.3.6**
2021	2,078	1,992	1,980	2,025	2,014	2,114	2,098	2,037	2,026	2,281
2022	2,545	2,552	2,551	2,536	2,535	2,524	2,523	2,543	2,543	2,514
2023-25	2,769	2,725	2,725	2,721	2,722	2,711	2,711	2,718	2,719	2,753
2026-35	2,730	2,731	2,731	2,731	2,731	2,730	2,730	2,730	2,730	2,727

6.6.1.3.4 Prices and Revenue

- Prices are estimated (Table 58) using the ex-vessel price model that takes into account the impacts of changes in domestic landings, exports, import prices, income of consumers, composition of landings by market category (i.e., size of scallops), and changes in international markets for large scallops using imports of Japanese and Canadian scallops as proxy variables (Economic Appendix I. Price Model).

- The price estimates in Framework 33 correspond to the price model outputs assuming that the import prices will be constant at their recent two year average value (i.e., import price for FY2018 and FY2019 averaged to about $5.6 per pound); scallop exports will constitute about 20% of the domestic landings; disposable income in FY2020 (Apr-Oct) increased to about 8.68% and is adjusted for in price estimation, and the ratio of Japanese and Canadian imports to total scallops imported will be constant at their current levels in 2020; and only the effects of the reduction in and changes in the size composition of landings could be identified. In addition, price estimates reflect real (as opposed to nominal) prices since they are expressed in 2019 constant prices assuming inflation will be zero in future years. Therefore, actual real or nominal prices could be higher (lower) than the estimated prices depending on the import prices, exports,

and(or) disposable income increased (decreased) in future years. Nominal prices will probably be higher in the future as well since it is unusual for the inflation to remain at zero. In addition, ex-vessel prices could be underestimates of true values because the biological model underestimates the proportion of U10s in landings and it does not have a separate category for U12 scallops.

- Although the absolute values for revenues, producer and consumer surpluses, and total economic benefits would change with the value of estimated prices, the differences of these values for all the alternatives to the No Action or Status Quo scenarios would not change in any substantial way. Higher realized prices than estimated prices would increase the short-term positive impact of all alternatives on revenues compared to No Action and SQ, while lower realized prices would reduce this impact. Increase in import prices leads to higher ex-vessel prices and revenues.

- In short, absolute values of short- and long-term revenues (Table 59) and economic will be greater with higher prices and smaller with lower prices, but the ranking of alternatives are not expected to change.

Table 58. Estimated ex-vessel prices (in 2020 dollars)

Average of P-Adj.2020$										
Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$10.86	$9.77	$9.70	$9.80	$9.73	$9.82	$9.75	$9.67	$9.60	$9.96
2022	$8.63	$8.86	$8.88	$8.88	$8.89	$8.88	$8.89	$8.88	$8.89	$8.78
2023-25	$8.88	$8.87	$8.87	$8.87	$8.88	$8.87	$8.88	$8.87	$8.88	$8.97
2026-35	$8.87	$8.89	$8.89	$8.89	$8.89	$8.89	$8.89	$8.89	$8.89	$8.87

Average of PU10 (in 2019$)

Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$23.40	$19.96	$19.70	$18.69	$18.45	$18.58	$18.35	$19.28	$19.01	$18.24
2022	$12.56	$13.74	$13.81	$14.04	$14.11	$14.09	$14.17	$13.86	$13.94	$13.67
2023-25	$12.63	$13.01	$13.04	$13.09	$13.11	$13.17	$13.19	$13.13	$13.16	$13.15
2026-35	$15.74	$15.76	$15.77	$15.77	$15.77	$15.78	$15.78	$15.78	$15.78	$15.84

Average of P11+ (in 2019$)										
Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$9.55	$9.11	$9.08	$9.04	$9.02	$9.04	$9.01	$9.04	$9.01	$9.07
2022	$8.30	$8.46	$8.47	$8.48	$8.49	$8.49	$8.50	$8.47	$8.48	$8.42
2023-25	$8.41	$8.43	$8.43	$8.44	$8.44	$8.44	$8.44	$8.44	$8.44	$8.48
2026-35	$8.61	$8.62	$8.62	$8.62	$8.62	$8.62	$8.62	$8.62	$8.62	$8.62

Table 59. Scallop revenue per fishing year (undiscounted, Million $, in 2020 dollars)

Average of REV-20										
Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$207.039	$362.251	$371.357	$393.034	$401.836	$394.451	$403.332	$387.066	$396.055	$389.902
2022	$631.707	$583.387	$580.264	$574.550	$571.418	$572.978	$569.818	$578.893	$575.783	$592.129
2023-25	$606.539	$597.470	$596.451	$595.320	$594.275	$594.060	$593.020	$594.360	$593.313	$586.380
2026-35	$520.724	$518.649	$518.571	$518.492	$518.424	$518.465	$518.402	$518.224	$518.159	$517.615

6.6.1.3.5 Estimated impacts on DAS, fishing costs and open area days and employment

- Total effort in terms of DAS (Table 60, Table 61) used as a sum total of all areas will be higher in the short-term in FY 2020 for all the alternatives compared to the SQ scenario. Changes in the employment level in the scallop fishery as measured by CREW*DAS will be proportional to total effort under all alternatives compared to No Action and SQ. Because overall annual DAS per FT vessel will increase under all alternatives compared to the levels under SQ conditions in 2021, employment is also expected to increase by about 28% to 40% depending on the specification alternatives except No Action. Under No Action (Section 4.3.1) DAS and employment levels would be anticipated to decrease by about 37% compared to Status Quo conditions in FY 2021. However, over the long-term, total effort and employment is expected to slightly increase close to 2% compared to SQ under all alternatives.

- Fleet-wide trip costs (Table 62) for all the alternatives are expected to be higher than SQ levels in 2021 by roughly $8 to $10 million dollars as a result of higher Total DAS, but there are small differences in the magnitude of trip costs across specification alternatives. However, trip costs are expected to increase slightly over the long-term. Trip cost per DAS in FY2021 is expected to decrease by about 5.5% primarily attributed to a declining trend in fuel costs recently.

Table 60. Projected DAS per FT vessel per year (including open and access areas)

Average of DAS/LAvessel										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	25.72	52.18	54.20	55.51	57.53	53.26	55.29	55.09	57.12	40.88
2022	80.58	72.32	71.82	71.53	71.04	71.69	71.19	71.87	71.37	75.24
2023-25	69.30	69.33	69.17	69.13	68.96	69.28	69.11	69.10	68.92	66.65
2026-35	60.30	59.89	59.87	59.87	59.86	59.90	59.89	59.86	59.85	59.98
Long-term avg.	61.15	62.09	62.15	62.21	62.27	62.12	62.18	62.19	62.25	61.06

Table 61. Percentage change in total DAS from SQ levels (open and access areas)

% Change from SQ on Avg of DAS/LA vessel in t^{th} year or period										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	-37.09%	27.65%	32.58%	35.79%	40.72%	30.27%	35.25%	34.74%	39.73%	0.00%
2022	7.10%	-3.88%	-4.54%	-4.93%	-5.58%	-4.72%	-5.38%	-4.48%	-5.15%	0.00%
2023-25	3.98%	4.03%	3.78%	3.73%	3.47%	3.95%	3.69%	3.67%	3.41%	0.00%
2026-35	0.54%	-0.16%	-0.18%	-0.19%	-0.21%	-0.14%	-0.16%	-0.21%	-0.22%	0.00%
Long-term 2021-2035	0.15%	1.69%	1.79%	1.88%	1.98%	1.73%	1.83%	1.85%	1.95%	0.00%

Table 62. Trip costs per year for the scallop fleet (Undiscounted, in million 2020 dollars)

Average of Trip Cost										
Alternatives/Runs	Alt1_NA	Alt2_24das	Alt2_26das	Alt3_24das	Alt3_26das	Alt4_24das	Alt4_26das	Alt5_24das	Alt5_26das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$15.372	$31.189	$32.394	$33.180	$34.382	$31.829	$33.047	$32.923	$34.141	$24.434
2022	$48.161	$43.222	$42.927	$42.753	$42.460	$42.847	$42.550	$42.952	$42.654	$44.968
2023-25	$41.419	$41.438	$41.338	$41.320	$41.216	$41.407	$41.304	$41.296	$41.192	$39.834
2026-35	$36.042	$35.792	$35.785	$35.780	$35.774	$35.799	$35.792	$35.776	$35.769	$35.849
Long-term avg. 2021-35	$36.547	$37.110	$37.145	$37.179	$37.215	$37.126	$37.162	$37.168	$37.204	$36.493

6.6.1.3.6 Present Value of Producer Surplus, Consumer Surplus and Total Economic Benefits

- Producer surplus (benefits) for a fishery shows the net benefits to harvesters, including vessel owners and crew, and is measured by the difference between total revenue and costs including operating costs and opportunity costs of labor and capital. In technical terms, the producer surplus (PS) is defined as the area above the supply curve and the below the price line of the corresponding firm and industry (Just, Hueth & Schmitz (JHS)-1982). The supply curve in the short-run coincides with the short-run marginal cost above the minimum average variable cost. This area between price and the supply curve can then be approximated by various methods depending on the shapes of the marginal and average variable cost curves. All alternatives have lower producer surplus relative to the SQ alternative both in the short- and long run. The decrease in producer surplus is largely attributed to decline in scallop landings together with the decline in share of U10 scallops. An increase in scallop prices and decrease in trip costs, however, partially offset any decline in revenues due to reduced landing expectations.

- In FY2021, producer surplus (Table 63) range between $275 million (Section 4.3.2.1) to $313 million (Section 4.3.4.2).

- The economic analysis presented in this section used the most straightforward approximation of producer surplus, which was defined as the excess of total revenue (TR) over the total variable costs (TVC) minus the opportunity costs of labor and capital. The fixed costs were not deducted from the producer surplus since the producer surplus is equal to profits plus the rent to the fixed inputs. More information about the producer surplus estimates and opportunity costs are provided in the Appendix for the Economic Model.

- It must also be emphasized that the empirical results of the economic analyses should be used to compare alternatives with each other and with No Action or Status Quo rather than to estimate the absolute values since the later will be change according to the several external variables that affect prices, revenues and costs including changes in import prices, exports of scallops, disposable income of consumers, size composition of scallop landings, oil prices and inflation.

- Consumer surplus for a fishery is the net benefit that consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline, and/or when the volume of fish harvested goes up. Present value of the consumer surplus (using a 7% discount rate), and the cumulative present values net of Status Quo levels are summarized in Table 64.
- The alternative in Section 4.3.4.2 has higher consumer surplus relative to the SQ in FY2021. However, consumer surplus for rest other alternatives is lower relative to SQ. In FY2021, consumer surplus range between $25 million (Section 4.3.2.1) to $34 million (Section 4.3.4.2). Only the highest revenue ranked alternative (Section 4.3.4.2) yielded a slight positive consumer surplus relative to SQ.

- Economic benefits include the benefits both to the consumers and to the fishing industry and are equal the sum of benefits to the consumers and producers. The cumulative present value of the

total benefits and economic benefits net of Status Quo (SQ) levels are shown in Table 65. The cumulative present value of economic benefits is also estimated at a 7% discount rate. Total economic benefits for all specification alternatives are lower relative to the SQ. Discounting future benefits at a lower level resulted in higher benefits for all options without changing the ranking of the alternatives in terms of magnitude of benefits.

- Total economic benefits would be largest under the specification alternative in Section 4.3.4.2 and lowest under the specifications alternative in Section 4.3.2.1, but all alternatives have lower total economic benefits compared to SQ in FY 2021 as well as in the long-term (Table 65). Total economic benefits range between $300 million (Section 4.3.2.1) to $346 million (Section 4.3.4.2).

- The short-term impact on total economic benefit for increasing open areas DAS from 24 to 26 DAS is estimated to be about $8 million.

Table 63. Present value of producer surplus (using 7% discount rate, Million $, in 2020 dollars)

Sum of PSPV										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$147	$275	$282	$302	$309	$306	$313	$297	$303	$314
2022	$481	$444	$441	$436	$434	$435	$432	$440	$438	$449
2023-25	$1,231	$1,208	$1,206	$1,203	$1,201	$1,200	$1,198	$1,201	$1,199	$1,187
2026-35	$2,283	$2,271	$2,271	$2,270	$2,270	$2,270	$2,270	$2,269	$2,268	$2,266
Grand Total	**$4,142**	**$4,198**	**$4,200**	**$4,212**	**$4,213**	**$4,210**	**$4,212**	**$4,206**	**$4,208**	**$4,217**

% Change from SQ on Sum of PSPV in t^{th} year or period										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	-53.10%	-12.58%	-10.36%	-3.90%	-1.77%	-2.69%	-0.55%	-5.65%	-3.48%	0.00%
2022	7.07%	-1.18%	-1.72%	-2.85%	-3.39%	-3.21%	-3.76%	-2.02%	-2.55%	0.00%
2023-25	3.63%	1.74%	1.56%	1.32%	1.14%	1.03%	0.85%	1.14%	0.96%	0.00%
2026-35	0.76%	0.23%	0.22%	0.19%	0.18%	0.18%	0.16%	0.12%	0.11%	0.00%
Grand Total	**-1.77%**	**-0.45%**	**-0.40%**	**-0.12%**	**-0.08%**	**-0.16%**	**-0.11%**	**-0.25%**	**-0.20%**	**0.00%**

Table 64. Present value of consumer surplus (CS) using 7% discount rate (in 2019 dollars, Million $)

Sum of CSPV										
Alternatives / Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$8.54	$24.87	$26.21	$31.73	$33.23	$32.32	$33.87	$28.53	$29.96	$33.66
2022	$83.01	$69.48	$68.70	$65.73	$64.97	$64.99	$64.23	$68.07	$67.29	$68.74
2023-25	$227.00	$211.70	$210.94	$208.71	$207.92	$205.42	$204.65	$207.13	$206.34	$207.70
2026-35	$272.54	$272.73	$272.60	$272.40	$272.29	$271.66	$271.56	$271.45	$271.35	$266.71
Grand Total	**$591.08**	**$578.78**	**$578.45**	**$578.56**	**$578.41**	**$574.39**	**$574.30**	**$575.18**	**$574.95**	**$576.80**

% Change from SQ on Sum of CSPV in tth year or period										
Alternatives / Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	-74.62%	-26.12%	-22.14%	-5.74%	-1.26%	-3.97%	0.61%	-15.24%	-10.98%	0.00%
2022	20.76%	1.08%	-0.06%	-4.38%	-5.48%	-5.46%	-6.57%	-0.98%	-2.11%	0.00%
2023-25	9.29%	1.93%	1.56%	0.49%	0.11%	-1.10%	-1.47%	-0.27%	-0.65%	0.00%
2026-35	2.19%	2.26%	2.21%	2.13%	2.09%	1.86%	1.82%	1.78%	1.74%	0.00%
Grand Total	**2.48%**	**0.34%**	**0.29%**	**0.30%**	**0.28%**	**-0.42%**	**-0.43%**	**-0.28%**	**-0.32%**	**0.00%**

Table 65. Present value of total economic benefits (TB) using 7% discount rate (in 2020 dollars, Mill. $)

Sum of TOTBENPV										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	$156	$300	$308	$334	$342	$338	$346	$325	$333	$348
2022	$564	$513	$510	$502	$499	$500	$496	$508	$505	$518
2023-25	$1,458	$1,420	$1,417	$1,412	$1,409	$1,405	$1,402	$1,408	$1,405	$1,395
2026-35	$2,556	$2,544	$2,543	$2,543	$2,542	$2,542	$2,541	$2,540	$2,540	$2,533
Grand Total	**$4,733**	**$4,777**	**$4,778**	**$4,790**	**$4,792**	**$4,785**	**$4,786**	**$4,781**	**$4,783**	**$4,793**

% Change from SQ on Sum of TOTBENPV in tth year or period										
Alternatives/ Runs	Alt1_NA	Alt2_24 das	Alt2_26 das	Alt3_24 das	Alt3_26 das	Alt4_24 das	Alt4_26 das	Alt5_24 das	Alt5_26 das	SQ
Fishing year	4.3.1	4.3.2.1	4.3.2.2	4.3.3.1	4.3.3.2	4.3.4.1	4.3.4.2	4.3.5.1	4.3.5.2	4.3.6
2021	-55.18%	-13.89%	-11.50%	-4.08%	-1.72%	-2.82%	-0.44%	-6.58%	-4.20%	0.00%
2022	8.89%	-0.88%	-1.50%	-3.05%	-3.67%	-3.51%	-4.13%	-1.88%	-2.50%	0.00%
2023-25	4.48%	1.77%	1.56%	1.20%	0.99%	0.72%	0.51%	0.93%	0.72%	0.00%
2026-35	0.91%	0.45%	0.43%	0.40%	0.38%	0.36%	0.34%	0.30%	0.28%	0.00%
Grand Total	**-1.26%**	**-0.35%**	**-0.32%**	**-0.07%**	**-0.03%**	**-0.19%**	**-0.15%**	**-0.25%**	**-0.22%**	**0.00%**

6.6.1.4 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

6.6.1.4.1 Alternative 1 – No Action (Default Measures from Framework 32)

Alternative 1 could have negative economic impacts on the LAGC IFQ vessels overall compared to Alternative 2 and Alternative 3. Alternative 1 would set LAGC IFQ access area trips at 571 trips to the Mid-Atlantic Access Area, which is the number of trips specified through default measures in Framework 32. Under No Action only a small percentage of the LAGC IFQ catch could come from access areas, with the rest coming from open areas. The cost of fishing could be higher in the open areas compared to fishing in access areas which are expected to have a higher abundance of exploitable scallops and higher LPUE. Usually, larger scallops have a price premium compared to smaller ones and if larger scallops are more abundant in access areas, not being able to fish in those areas could affect the revenues negatively as well.

6.6.1.4.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation to Closed Area I only

Alternative 2 could have positive economic impacts on LAGC IFQ vessels overall, and compared to Alternative 1. Alternative 2 could be expected to have low positive impacts relative to Alternative 3. Under Alternative 2, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2), and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e., either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips or 1,998 trips with a 600-pound trip limit. The proportion of LAGC IFQ trips that would have been allocated to Closed Area II Access Area would instead be allocated to Closed Area I. Alternative 2 would provide more opportunities to fish in access areas compared to Alternative 1 over a larger geographic area. Having access area opportunities on Georges Bank (CAI) and in the Mid-Atlantic where scallop market grades could be expected to be larger than in the Nantucket Lightship-South area could lead to increased revenues for the LAGC IFQ component (Alternative 2 vs. Alternative 3).

6.6.1.4.3 Alternative 3 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation evenly across the Mid-Atlantic Access Area, NLS-South, and Closed Area I

Alternative 3 could have positive economic impacts on LAGC IFQ vessels overall. Alternative 3 could be expected to have low negative impacts relative to Alternative 2. Alternative 3 would provide more opportunities to fish in access areas compared to Alternative 1 over a larger geographic area. Under Alternative 3, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2), and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e., either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips or 1,998 trips with a 600-pound trip limit. The proportion of LAGC IFQ trips that would have been allocated to Closed Area II

Access Area would instead be distributed evenly between the Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area I. This would increase the number of LAGC IFQ trips available in the MAAA and NLS-S, but decrease the number of trips available in CAI compared to Alternative 2. Since market grades from the NLS-S are projected to be small (30+ counts), and LPUE in the open bottom is projected to decline in FY 2021, LAGC IFQ vessels may have fewer opportunities to target larger scallops in areas of high abundance under Alternative 3.

6.6.1.5 Action 5 – Additional Measures to Reduce Fishery Impacts

6.6.1.5.1 RSA Compensation Fishing

6.6.1.5.1.1 Alternative 1 – No Action

This alternative is expected to have negligible economic impacts on the scallop fishery as a whole compare to Alternative 2. Under No Action, Research Set-Aside (RSA) compensation fishing would be restricted to areas open to LA DAS fishing only. Vessels with RSA poundage would not be allowed to harvest RSA compensation from access areas. The cost of fishing could be higher in the open areas compared to fishing in access areas which are expected to have a higher abundance of exploitable scallops and higher LPUE.

6.6.1.5.1.2 Alternative 2 – Allow RSA compensation fishing in the Mid-Atlantic Access Area, NLS-South, Closed Area II, and Closed Area I, with limited RSA compensation fishing in the NGOM Management Area

Alternative 2 could have low positive impacts on the scallop yield and negligible to low positive economic benefits over the long-term for the scallop fishery. Alternative 2 could be expected to have low positive economic impacts relative to Alternative 1. Under Alternative 2, RSA compensation fishing would be permitted in the following areas in FY2021 (Map 10):

- Areas open to Limited Access DAS fishing (i.e., open bottom)
- Mid-Atlantic Access Area
- Closed Area II, as defined in Section 4.2.2.2, from June 1, 2021 – August 15, 2021
- Closed Area I
- Nantucket Lightship-South
- NGOM Management area (up to the LA TAC in this area)

RSA compensation fishing would be permitted in the NGOM management area, per NGOM alternatives as specified in Section 4.2. RSA compensation fishing would be permitted in the NGOM management area up to the poundage specified in the Council's preferred alternative for the Limited Access share of the NGOM TAC, and only by vessels that are awarded NGOM RSA compensation pounds.

Since this option would allow directed scallop fishing on larger animals in high densities scallops in access areas, it could result in lower trip costs compared to open area fishing. Access to larger scallops in access areas could have positive effect on revenues, which is an important part of the RSA program.

This provision will help accurately account for scallop removals in the NGOM by restricting RSA compensation fishing to vessels that receive a portion of the LA TAC, will facilitate access to high

densities of scallops in available access areas, and reduce impacts on small scallops and overall mortality in Closed Area II.

6.6.1.5.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder

6.6.1.5.2.1 Alternative 1 – No Action

This alternative is expected to have negligible economic impacts on the scallop fishery as a whole compare, and compared to Alternative 2. There would be no change to when scallop vessels could access the Closed Area II Access Area. The existing seasonal closure to protect flatfish would remain in place from August 15 – November 15 of each year. The scallop fishery accesses CAII AA periodically when the scallop resource is strong enough to support rotational harvest by the LA component. Landings during this two-week window were low last time the area was open in 2017 (Figure 32).

6.6.1.5.3 Alternative 2 – Extend Seasonal Closure of Closed Area II Access Area through November 30th in FY 2021

This alternative is expected to have negligible economic impacts on the scallop fishery as a whole compare, and compared to Alternative 1. Alternative 2 would extend the Closed Area II Access Area (as defined in Section 4.2.2.2) seasonal closure by two weeks in November, making the newly configured area closed from August 15 until November 30 (Map 12). Closed Area II Access Area would re-open to access area fishing on December 1, 2021. This measure would be in place for one year and would expire after the 2021 fishing year. This will shift effort that would have been fished in Closed Area II Access Area between November 16th and November 30th into in other times of the year when the seasonal closure is not in place; however, the shift in effort is not expected to have a substantial impact on the magnitude of economic impacts overall since there will be no change to the overall harvest from Closed Area II Access Area.

6.6.1.6 Uncertainties and risks

- The economic impacts presented for the Action 3 specification alternatives in the above sections are analyzed using the price model, costs, revenues and total net benefits as described in the economic model provided in Economic Appendix I. The estimated fishing costs are used in calculating producer surplus for the proposed alternatives, which shows total revenue net of variable costs minus the opportunity costs of labor and capital. The costs and the benefits of the proposed alternatives in the proposed specification alternatives were analyzed based on the biological projections of landings, DAS and LPUE and the available information about the vessel costs and characteristics, crew shares and prices. The numerical results of these analyses should be interpreted with caution due to uncertainties about the likely changes in:
    - factors affecting scallop resource abundance
    - fishing behavior
    - variable and fixed costs
    - import prices and imports from Canada and Japan that are close substitutes for large domestic scallops.
    - demand for scallop exports
    - bycatch and revenues from other fisheries
    - the crew share system

  - change in the number of active vessels
  - structural changes in ownership
  - changes in the composition of fleet in terms of tonnage, HP and crew size of the active vessels
  - disposable income and preferences of consumers for scallops, etc.
- The estimated values of the economic cost/benefit analysis should be used solely in comparing preferred action with the other alternatives since the uncertainties related to landings and prices are expected to affect all alternatives in the same direction.
- The landings projections and estimates of DAS and LPUE were obtained from the biological model, which is based on fishing mortality by area and the inputs are not fishery-based in terms of DAS, etc. The biological simulations do not model individual vessels or trips; it models the fleet as a whole. The output of the biological model and the landings streams were used to estimate the costs and benefits of the preferred action and alternatives. The results for economic impacts would change if the actual landings, size composition of landings and LPUE are different than the forecasted values from the biological model.
- The prices are estimated using the ex-vessel price model described in Appendix I. This model takes into account the impacts of changes in meat count, domestic landings, exports, price of imports, income of consumers, and composition of landings by market category (i.e., size of scallops) including a price premium on U10 scallops.
- The important changes in external factors, such as exports, imports, the value of the dollar, and export and import prices had some unpredictable impacts on scallop prices in the past, first resulting an increase to over $9.70 per pound (in terms of 2017 dollars) in 2005, then a consequent decline to about $7.86 per pound (in terms of 2017 dollars) in 2006 as import prices declined but without a significant increase in scallop landings in 2006 (about 56 million lb.) compared to 2005 (about 54 million lb.). During the fishing years from 2010 to 2016, however, the decline in the value of the dollar, a strong demand for scallops, especially from European countries, and a diminished supply from Japan and other competing, scallop-producing nations, resulted in much higher prices than anticipated in the previous frameworks. However, in 2017 as scallop landings reached nearly 50 million lb. and proportion of U10 and 11-to-20 count scallops increased, the average annual ex-vessel price declined to $9.70 from over $12 in 2016. The decrease in import prices and an increase in imports from Japan and Canada relative to total imports played a role in this decline as well (See Price Model section in the Economic Model provided in the Appendix I.). Recent scallop trade information is described in the affected economic environment. Thus, any change in the external factors that affect price, such as in import prices or the differences between the actual and projected landings will result in differences in the actual and estimated prices.
- In addition, the prices were estimated by holding the values of the all the variables that impact prices, such as import prices and disposable income, at the recent levels. For example, disposable income per capita and import prices are assumed to stay constant at the 2019 levels for the economic analyses of this framework action. This is because it is not possible to accurately predict the changes in the future values of the explanatory variables and also because the goal of the analyses is to determine the response in scallop prices to the change in landings and the composition in terms of market category given other variables are held constant. However, due to a large change in per capita personal disposable income, a recent value was used in the price estimation. Therefore, future prices could be higher (or lower) than what is predicted depending on the values of the explanatory variables.

- For these reasons, the empirical results of the economic analyses should be used to compare alternatives with each other and with No Action or Status Quo, rather than to estimate the absolute values, since a change in the variables listed above will change the numerical results in the same direction. For example, an increase in import prices would lead to a rise in ex-vessel prices and revenues for all alternatives above the levels estimated in the sections above. An increase in the price of oil, on the other hand, would increase the variable costs and reduce the cost savings under all options. While these changes would affect the absolute values of net economic benefits, the ranking of alternatives in terms of their impacts on revenues, costs, and net benefits are not expected to change.

6.6.2 Social Impacts

The social impact factors outlined below help describe the scallop fishery, its sociocultural and community context and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS, 2007) and other texts (e.g., Burdge, 1998). Longitudinal data describing these social factors region-wide and in comparable terms are limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts. The factors fit into five categories:

1. *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.

2. The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.

3. The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities.

4. The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.

5. The *Historical Dependence on and Participation* in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS, 2007).

General impacts of scallop fishery specifications on human communities

Reauthorization of the MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis. Increasing the scallop ABC (and associated catch limits, as contemplated in this action) would likely have positive short-term impacts on fishing communities. Likewise, lowering

allowable harvests could result in short-term revenue reductions, which may, in turn, have negative impacts on employment and the size of the scallop fishery within fishing communities. Additionally, declines in fishing earnings may decrease job satisfaction among fishermen (e.g., Pollnac & Poggie, 2008; Pollnac, Seara, & Colburn, 2015), which may reduce the well-being of fishermen, their families, and their communities (e.g., Pollnac et al., 2015; Smith & Clay, 2010). In the long term, ensuring continued, sustainable harvest of the resource benefits all fisheries.

The specific communities that may be impacted by this action are identified in Section 5.6.2. This includes 11 primary ports (e.g., New Bedford, Cape May, Hampton/Seaford) and 12 secondary ports for the scallop fishery (Table 34). The communities more involved in the scallop fishery are likely to experience more direct impacts of this action, though indirect impacts may be experienced across all the key communities. As these specifications largely affect stock-wide harvest levels, impacts would likely occur across the communities that participate in the scallop fishery, proportional to their degree of participation.

6.6.2.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

6.6.2.1.1 Alternative 1 – No Action

Under No Action, the ABC for FY 2021 (after discards are removed) would be the default value set through Framework 32 at 36,435 mt and be about 16% higher than the ABC under Alternative 2 (30,517 mt). There would be no ABC set for FY 2022.

The social impacts of No Action are likely negative. With no change in the FY 2021 ABC from the default, there would be a degree of constancy and predictability for fishing industry operations. However, this ABC is 20% lower than that of FY 2020 (45,414 mt). The employment levels of the fishery-related workforce could be lowered, and the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) could be altered. The SSC determined (in November 2020) that the ABC should be lower to sustain the resource, so selecting No Action might cause distrust in management among the industry, and a feeling that managers are not making use of the best available science in a timely manner. This may lead to negative impacts on the attitudes of stakeholders towards management. Because the default ABC for FY 2022 would be 0 mt (i.e., there would be no fishery), unless the Council takes a future action that sets ABC, and it is implemented on-time, stakeholders could perceive the use of default specifications for sea scallops as a fishery management failure.

6.6.2.1.2 Alternative 2 – Update OFL and ABC for FY 2021 and FY 2022 (default)

Alternative 2 would specify OFL and ABC values for FY 2021 and FY 2022 (default) based on SSC recommendations (in November 2020). The ABC (30,517 mt after discards are removed) for FY 2021 would be about 16% lower than the default ABC under No Action.

The social impacts of Alternative 2 are likely negative. An ABC in FY 2021 that is 33% lower than in FY 2020 and 16% lower than the default that was set for FY 2021. While fishery allocations are not linked to ABC (set in Action 3), the decline in the ABC is a bellwether for scallop resource as a whole, and may

lead to reduced levels of harvest in the fishery. Employment levels of the fishery-related workforce could be lowered, and the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) could be altered. Although the ABC would be lower, the social impacts of Alternative 2 would be more positive than Alternative 1. Using the SSC recommendation would likely cause more trust in management among the industry relative to No Action, and a feeling that managers are making use of the best available science in a timely manner. This may lead to positive impacts on the attitudes of stakeholders towards management. In the long term, the industry could realize the benefits of yield that is supported by the best available science. With a default ABC for 2022, there is more assurance under Alternative 2 that the fishery will continue, providing a degree of predictability for fishing industry operations into the future, leading to long-term positive social impacts.

6.6.2.2 Action 2 – Northern Gulf of Maine Management Area

6.6.2.2.1 Northern Gulf of Maine TAC Setting

The LAGC share is calculated by applying the first 70,000 pounds to LAGC TAC, and then splitting the remaining pounds 50/50 between the LAGC and LA component (Table 44). Under both Alternative 1 and Alternative 2, the LAGC and LA (RSA) shares would operate under separate TACs.

6.6.2.2.1.1 Alternative 1 – No Action

Under Alternative 1, the default measures set for FY2021 would be in place: the total NGOM hard TAC would be set at 265,000 pounds, which is based on fishing Ipswich Bay, Jeffreys Ledge, and Platts Bank portions of the management area at a F=0.20. This overall TAC would be split between the LA and LAGC, with 97,500 pounds available to support RSA compensation fishing (LA share), and 167,500 pounds available for harvest by the LAGC component. Under these default measures, the NGOM would open on April 1, 2021 with no change from the current management program (e.g., Stellwagen Bank would remain closed in FY2021).

The social impacts of No Action are likely positive. With no change in the TAC from the FY 2020 level and the FY 2020 default (265,000 lb), the fishery would continue to benefit from fishing in the NGOM, and there would be a degree of constancy and predictability for fishing industry operations and a steady supply to the market. The size of the fishery-related workforce would likely be unchanged, as would the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights). Separate caps on the LAGC and LA components are expected to reduce the negative impacts associated with derby-style fishing between LAGC and LA vessels and result in positive economic benefits of the participants of the LAGC NGOM fishery. In terms of resource surveys, the NGOM area is data-poor relative to the rest of the scallop resource, but survey data and projections indicate that fishing under a lower TAC than allowed under No Action is likely sustainable. Selecting No Action might cause distrust in management among the industry, and a feeling that managers are not making use of the best available science in a timely manner. This may lead to negative impacts on the attitudes of stakeholders towards management. Because the default NGOM TAC for FY 2022 would be 0 mt (i.e., there would be no fishery), unless the Council takes a future action that sets the TAC, and it is implemented on-time, stakeholders could perceive the use of default specifications for this area as a fishery management failure.

6.6.2.2.1.2 Alternative 2 – Set 2021 and 2022 NGOM TAC, with first 70,000 pounds to LAGC, then 50/50 split between LA and LAGC

Alternative 2 would set an updated NGOM TAC for FY 2021 and set default measures for FY 2022. Like No Action, Alternative 2 would set separate caps on the LAGC and LA components, the LA share would be available for RSA compensation fishing only to support research projects in the NGOM, and is included within the 1.25 million pounds set-aside for the RSA program.

6.6.2.2.1.3 FY2021 NGOM TAC Options

Under Alternative 2, there are three options for the FY2021 TACs, set a F = 0.18, 0.20, and 0.25 (Table 44).

Table 66 NGOM TAC options for FY 2021.

FW 33 Alternative	FW 33 Section	F	2021 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		265,000	97,500	167,500
2, Option 1	4.2.2.1.1	0.18	160,000	45,000	115,000
2, Option 2	4.2.2.1.2	0.20	175,000	52,500	122,500
2, Option 3	4.2.2.1.3	0.25	210,000	70,000	140,000

The social impacts of the Alternative 2 options for FY 2021 are likely positive as the fishery would continue to benefit from fishing in the NGOM. Social impacts would be slight negative relative to No Action as they would provide less fishing opportunities in this area. Employment opportunities and the size of the fishery-related workforce could decrease. Within the Alternative 2 options for FY 2021, Option 3 would be the most positive and Option 1 would be the least positive.

The long-term historical dependence on and participation in the fishery (structure of fishing practices, income distribution and access privileges) may be sustained, as they would not necessarily change just from decreasing the FY 2021 TAC. Any long-term change would be minor and difficult to predict. With no change in the TAC setting method, benefits would continue to accrue to both fishery components (LA and LAGC).

In terms of resource surveys, the NGOM area is data-poor relative to the rest of the scallop resource, but the survey data and projections indicate that fishing under a lower TAC than allowed under No Action is more sustainable. Selecting Alternative 2 would likely cause more trust in management among the industry relative to No Action, and a feeling that managers are making use of the best available science in a timely manner. This may lead to positive impacts on the attitudes of stakeholders towards management, although the industry could realize fewer short-term benefits of additional yield relative to No Action.

Given the likely implementation delay of Framework 33 by a few months, it is highly likely that even if one of the Alternative 2 options for FY 2021 were selected, the fishery would start on April 1, 2021 under the default NGOM TAC (265,000). It is quite possible that at least the NGOM LAGC fishery landings could exceed any level set by the Alternative 2 options prior to the implementation of Framework 33. If so, there could be future negative impacts on the fishery, should a reduction in

TAC be necessary in a future year (likely FY 2023) to account for any overage. Risk of overage would be highest under Option 1 and lowest under Option 3.

6.6.2.2.1.4 – FY2022 NGOM TAC Options

Under Alternative 2, there are two options for default measures for FY 2022 (Table 67). Option 1 would use the same F selected for FY 2021. Option 2 would set the default to 0 lb for FY 2022.

Table 67 - NGOM TAC options for FY2022 (default).

FW 33 Alternative	FW 33 Section	F	2022 TAC (lbs)	LA/RSA Share (lbs)	LAGC Share (lbs)
1	4.2.1		0	0	0
2, Sub-Option 1	4.2.2.2.1	0.18	70,000	0	70,000
		0.20	74,000	2,000	72,000
		0.25	85,000	7,500	77,500
2, Sub-Option 2	4.2.2.2.2	0.0	0	0	0

The social impacts of the Alternative 2 options for FY 2022 are likely mixed. The social impacts of sub-Option 1 would be positive as the fishery would continue to benefit from fishing in the NGOM, though at a much lower level than FY 2021. Option 1 would be more positive and Option 2 as it would provide more fishing opportunities in this area. Employment opportunities and the size of the fishery-related workforce could be sustained. With a default TAC for 2022 set at a value above zero, there is more assurance under Option 1 that the fishery will continue and lead to greater predictability and business planning in the event of delayed implementation on new allocations, which have positive social outcomes. Option 2 would have slight negative impacts and be more negative than Option 1, as there would be no NGOM fishery in FY 2022 unless the Council takes a future action to set specifications.

6.6.2.3 Action 3 – Fishery Specifications

This section sets specifications for open area DAS and access area trip allocations. The alternatives here are based on Alternative 2 for OFL and ABC (Section 4.1). No Action is the default measures for FY 2021 (set through Framework 32). Status Quo is a state with no changes from the FY 2020 specifications for open area F and access area trips. The LA (94.5%) and LAGC IFQ (5.5%) allocations are based on Annual Projected Landings (APL).

6.6.2.3.1 Alternative 1 – No Action (Default Measures)

Under Alternative 1 – No Action, the default specifications approved for FY 2021 (through Framework 32) would remain in place, and there would be none specified for FY 2022. Default measures include full-time Limited Access DAS set at 18 (75% of the DAS allocated for FY2020). Part-time Limited Access vessels would receive 7.2 DAS, and Occasional Limited Access vessels would be allocated 1.5 DAS. The LA component would be allocated one 18,000-pound trip for FT vessels in the Mid-Atlantic Access Area (Map 2). Under the FW32 default measures for FY 2021, the total LAGC IFQ allocation would be 923 mt

(2,034,867 lb) for LAGC IFQ and LA with LAGC IFQ quota, which is equivalent to 75% of the LAGC IFQ allocation for FY2020. LAGC IFQ vessels would also have access in the Mid-Atlantic Access Area on April 1, 2021 under default measures, with a fleet wide maximum of 571 trips to each area.

The social impacts of No Action are likely negative. Fishing would be allowed for all vessels in the open areas, but at a substantially reduced level relative to FY 2020, and fishing in the rotational access areas would be limited to just one area. Revenue is expected to be about 47% lower than Status Quo (Table 48). No Action would likely provide substantially fewer fishing opportunities. Employment (i.e., crew limit * DAS) is modeled to be lower (37%) under No Action relative to Status Quo (Table 61). Thus, the size of the fishery-related workforce would likely decrease. Given these specifications are only for the next two years, any change to the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) would be minor and difficult to predict. Fishermen could perceive the selection of No Action as a fishery management failure (e.g., no default for FY 2022) and it might cause distrust in management among the industry, and a feeling that managers are not making use of the best available science which indicates that scallop fishing would be sustainable in additional areas and using more DAS. This may lead to negative impacts on the attitudes of stakeholders towards management. The industry could not realize the benefits of yield that is supported by the best available science. The social impacts could be negative in the long term because no access would be specified for FY 2021, unless the Council takes a future action to set specifications.

6.6.2.3.2 Alternative 2 – 3.5 Access Area Trips, with 1.5 trips to Nantucket Lightship South

Under Alternative 2, specifications for access to the open areas and rotational access areas would be set for FY 2020 and default measures for FY 2021. Alternative 2 would set the FT LA trip limit at 18,000 pounds and each full time Limited Access vessel would be allocated a total of 63,000 pounds to the following access areas: Mid-Atlantic Access Area (18,000 pounds), Closed Area II (18,000 pounds), and the Nantucket Lightship South (27,000 pounds). Options 1 and 2 would set open area fishing at F=0.3 (24 DAS) and F=0.33 (26 DAS), respectively. The APL (after set-asides removed) would be 35.1M lb and 36.3M lb, respectively.

The social impacts of both Alternative 2 options are likely positive. Impacts would be more positive than No Action. Revenue would be 75-79% higher than under No Action, likely leading to greater fishery employment and participation. Social impacts of the Alternative 2 options are likely negligible relative to each other, the Status Quo and the Alternative 3-5 options. Revenue under Alternative 2 Option 1 is estimated to be just 2% lower than Option 2 ($262M vs. $371M), and both are slightly lower than the Status Quo ($389M) and the Alternatives 3-5 options ($386-403M) (Table 48). While this range is narrow enough that the benefits to the fishery-related workforce may be similar across Alternatives 2-5 and relative to Status Quo, employment (i.e., crew limit * DAS) is modeled to be higher (28-33%) under Alternative 2 relative to Status Quo, yet slightly lower (3-9%) than Alternatives 3-5 (Table 61). Thus, the size of the fishery-related workforce would likely increase relative to Status Quo but not as much as under Alternatives 3-5. Given these specifications are only for the next two years, any change to the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) would be minor and difficult to predict. Alternative 2 would allow for trip exchanges in 9,000 lb increments, which allows more flexibility of fishing operations relative to No Action. Alternative 2 would also increase the crew limit by two for

fishing in NLS-S-deep, which would allow for more efficiency and a small increase in employment opportunities. Scallops in NLS-S-deep are generally small, so without this allowance, trips to this area would likely be longer to harvest the trip limit. Setting default measures for FY 2021 leads to greater predictability and business planning, which have positive social outcomes.

6.6.2.3.3 Alternative 3 – Four Access Area Trips, with 1 trip in Closed Area II

Alternative 3 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 6) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (27,000 pounds), Closed Area II (18,000 pounds), and the Nantucket Lightship South (27,000 pounds). Options 1 and 2 would set open area fishing at F=0.3 (24 DAS) and F=0.33 (26 DAS), respectively. The APL (after set-asides removed) would be 38.1M lb and 37.2M lb, respectively.

The social impacts of both Alternative 3 options are likely positive. Impacts would be more positive than No Action. Revenue would be 90-94% higher than under No Action, likely leading to greater fishery employment and participation. Social impacts of the Alternative 3 options are likely negligible relative to each other, the Status Quo and the Alternative 2, 4 and 5 options. Revenue under Alternative 3 Option 1 ($392M) is estimated to be just 2% lower than Option 2 ($392M vs. $401M) (Table 48), and both are slightly higher than the Alternative 2 options ($362-371M) and more like Status Quo ($389M) and the Alternatives 4-5 options ($386-403M). While this range is narrow enough that the benefits to the fishery-related workforce may be similar across Alternatives 2-5 and relative to Status Quo, employment (i.e., crew limit * DAS) is modeled to be higher (36-41%) under Alternative 3 relative to Status Quo, slightly higher than Alternative 2 (8%) and like Alternatives 4 and 5. Thus, the size of the fishery-related workforce would likely increase relative to Status Quo and more so than under Alternative 2. Given these specifications are only for the next two years, any change to the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) would be minor and difficult to predict. Alternative 3 would allow for trip exchanges in 9,000 lb increments, which allows more flexibility of fishing operations relative to No Action. Alternative 4 would also increase the crew limit by two for fishing in NLS-S-deep, which would allow for more efficiency and a small increase in employment opportunities. Scallops in NLS-S-deep are generally small, so without this allowance, trips to this area would likely be longer to harvest the trip limit. Setting default measures for FY 2021 leads to greater predictability and business planning, which have positive social outcomes.

6.6.2.3.4 Alternative 4 – Four Access Area Trips, with 1 trip in Nantucket Lightship South

Alternative 4 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 7) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (27,000 pounds), Closed Area II (27,000 pounds), and the Nantucket Lightship South (18,000 pounds). Options 1 and 2 would set open area fishing at F=0.3 (24 DAS) and F=0.33

(26 DAS), respectively. The APL (after set-asides removed) would be 38.2M lb and 39.4M lb, respectively.

The social impacts of both Alternative 4 options are likely positive. Impacts would be more positive than No Action. Revenue would be 91-95% higher than under No Action, likely leading to greater fishery employment and participation. Social impacts of the Alternative 4 options are likely negligible relative to each other, the Status Quo and the Alternative 2, 3 and 5 options. Revenue under Alternative 4 Option 1 is estimated to be just 2% lower than Option 2 ($394M vs. $403M), and both are slightly higher than the Alternative 2 options ($362-371M) and even more like Status Quo ($389M) and the Alternatives 3 and 5 options ($386-401M) (Table 48). While this range is narrow enough that the benefits to the fishery-related workforce may be similar across Alternatives 2-5 and relative to Status Quo, employment (i.e., crew limit * DAS) is modeled to be higher (30-35%) under Alternative 4 relative to Status Quo, slightly higher than Alternative 2 (2%) and like Alternatives 3 and 5 (). Given these specifications are only for the next two years, any change to the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) would be minor and difficult to predict. Alternative 4 would allow for trip exchanges in 9,000 lb increments, which allows more flexibility of fishing operations relative to No Action. Alternative 4 would also increase the crew limit by two for fishing in NLS-S-deep, which would allow for more efficiency and a small increase in employment opportunities. Scallops in NLS-S-deep are generally small, so without this allowance, trips to this area would likely be longer to harvest the trip limit. Setting default measures for FY 2021 leads to greater predictability and business planning, which have positive social outcomes.

6.6.2.3.5 Alternative 5 – Four Access Area Trips, with 1 trip in the Mid-Atlantic Access Area

Alternative 5 would allocate full-time limited access access area trips to Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area II (Map 8) with a possession limit of 18,000 pounds. Each full time Limited Access vessel would be allocated a total of 72,000 pounds to the following access areas: Mid-Atlantic Access Area (18,000 pounds), Closed Area II (27,000 pounds), and the Nantucket Lightship South (27,000 pounds). Options 1 and 2 would set open area fishing at F=0.3 (24 DAS) and F=0.33 (26 DAS), respectively. The APL (after set-asides removed) would be 38.1 lb and 39.3M lb, respectively.

The social impacts of both Alternative 5 options are likely positive. Impacts would be more positive than No Action. Revenue would be 87-92% higher than under No Action, likely leading to greater fishery employment and participation. Social impacts of the Alternative 5 options are likely negligible relative to each other, the Status Quo and the Alternative 2-4 options. Revenue under Alternative 5 Option 1 is just 2% lower than Option 2 ($386M vs. $395M), and both are slightly higher than the Alternative 2 options ($362-371M) and even more like Status Quo ($389M) and the Alternatives 3-4 options ($392-403M). While this range is narrow enough that the benefits to the fishery-related workforce may be similar across Alternatives 2-5 relative to Status Quo, employment (i.e., crew limit * DAS) is modeled to be higher (35-40%) under Alternative 5 relative to Status Quo, slightly higher than Alternative 2 (7%) and like Alternatives 3 and 5 (). Given these specifications are only for the next two years, any change to the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and privileges) would be minor and difficult to predict. Alternative 5 would allow for trip exchanges in 9,000 lb increments, which

allows more flexibility of fishing operations relative to No Action. Alternative 5 would also increase the crew limit by two for fishing in NLS-S-deep, which would allow for more efficiency and a small increase in employment opportunities. Scallops in NLS-S-deep are generally small, so without this allowance, trips to this area would likely be longer to harvest the trip limit. Setting default measures for FY 2021 leads to greater predictability and business planning, which have positive social outcomes.

6.6.2.4 Action 4 – Access Area Trip Allocations to the LAGC IFQ Component

6.6.2.4.1 Alternative 1 – No Action (Default Measures from Framework 32)

Alternative 1 would set LAGC IFQ access area trips at 571 trips to the Mid-Atlantic Access Area, which is the number of trips specified through default measures in Framework 32.

The social impacts of No Action are likely negative. For FY 2020, there were 2,855 access area trips for this fishery component, so No Action would result in a substantial reduction from present conditions. Fishing in the rotational access areas would be limited to just one area. LAGC IFQ vessels would still be allowed to fish in open areas, but the scallop resource is generally less dense in open areas, so fishing operations tend to be less efficient. No Action would provide less fishing opportunities. Employment and the size of the fishery-related workforce would likely decrease. The historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) would likely change, though it is difficult to predict specifically how. Fishermen could perceive the selection of No Action as a fishery management failure and it might cause distrust in management among the industry, and a feeling that managers are not making use of the best available science which indicates that scallop fishing would be sustainable in additional areas and using more DAS. This may lead to negative impacts on the attitudes of stakeholders towards management. No Action may lead to a perception among LAGC IFQ fishermen of management unfairness if their effort in the access areas is substantially constrained while the LA effort continues. The social impacts could be negative in the long term because no access would be specified for FY 2022, unless the Council takes a future action to set the ABC.

6.6.2.4.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation to Closed Area I only

Under Alternative 2, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2) and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e. either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips (Alternatives 4 & 5) or 1,998 trips (Alternatives (2 & 3) with a 600-pound trip limit. The proportion of LAGC IFQ trips that would have been allocated to Closed Area II Access Area would instead be allocated to Closed Area I.

The social impacts of Alternative 2 are likely slight positive. For FY 2020, there were 2,855 access area trips for this fishery component, so Alternative 2 would result in a reduction from present conditions. Relative to No Action, the social impacts would be positive, leading to more opportunity for the LAGC IFQ to harvest scallops from access areas. Employment opportunities, the size of the fishery-related workforce and the historical dependence on and participation in the fishery (structure

of fishing practices, income distribution and rights) could be sustained, but would not necessarily change relative to current conditions. Alternative 2 would likely lead to a perception among LAGC IFQ fishermen of management fairness, relative to No Action, as their effort in the access areas could continue along with that of the LA effort. This may lead to more positive impacts on the attitudes of stakeholders towards management. Access would be allowed in multiple access areas, so vessels based in a wider geographic range of ports could benefit from fishing in the access areas relative to No Action. Shifting effort from CAII to CAI could improve the safety of vessel operations as CAI is more assessable to the vessels in the LAGC IFQ fleet (generally smaller than LA vessels) than CAII which is further offshore. The social impacts of Alternative 2 may be mixed relative to Alternative 3. While Alternative 2 distributes what would be CAII access to one other area, rather than to three, leading to less flexibility for vessels to choose fishing locations, scallops in CAI are likely to be of higher market grade than in NLS-S, so of greater value to the fishery.

6.6.2.4.3 Alternative 3 – Update LAGC IFQ Access Area Trip Allocations, Distribute Closed Area II Access Area Trip Allocation evenly across the Mid-Atlantic Access Area, NLS-South, and Closed Area I

Under Alternative 3, the number of total access area trips allocated to the LAGC IFQ component under this option would be dependent upon the APL value in each specification run (Section 4.2.2.2) and is driven by the number of access area trips that are allocated to the FT LA component. When 5.5% is applied to the FT LA access area allocations for FY2021 (i.e. either four 18,000-pound allocations or 3.5 18,000-pound allocations), the LAGC IFQ component would receive either 2,283 trips or 1,998 trips with a 600-pound trip limit. The proportion of LAGC IFQ trips that would have been allocated to Closed Area II Access Area would instead be distributed evenly between the Mid-Atlantic Access Area, Nantucket Lightship South, and Closed Area I.

The social impacts of Alternative 3 are likely slight positive. For FY 2020, there were 2,855 access area trips for this fishery component, so Alternative 3 would result in a reduction from present conditions. Relative to No Action, the social impacts would be positive, leading to more opportunity for the LAGC IFQ to harvest scallops from access areas. Employment opportunities, the size of the fishery-related workforce and the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights) could be sustained, but would not necessarily change relative to current conditions. Alternative 3 would likely lead to a perception among LAGC IFQ fishermen of management fairness, relative to No Action, as their effort in the access areas could continue along with that of the LA effort. This may lead to more positive impacts on the attitudes of stakeholders towards management. Access would be allowed in multiple access areas, so vessels based in a wider geographic range of ports could benefit from fishing in the access areas relative to No Action. Shifting effort from CAII to the MAAA, NLS-S, and CAI could improve the safety of vessel operations as these areas are more assessable to the vessels in the LAGC IFQ fleet (generally smaller than LA vessels) than CAII which is further offshore. The social impacts of Alternative 3 may be mixed relative to Alternative 2. While Alternative 3 distributes what would be CAII access to three other areas, rather than to one, leading to greater flexibility for vessels to choose fishing locations, scallops in NLS-S are likely to be of lower market grade than in CAI, so of lesser value to the fishery.

6.6.2.5 Action 5 – Additional Measures to Reduce Fishery Impacts

6.6.2.5.1 RSA Compensation Fishing

6.6.2.5.1.1 Alternative 1 – No Action

Under No Action, the default set for FY 2021 in Framework 33 would continue. Research Set-Aside (RSA) compensation fishing would be restricted to areas open to LA DAS fishing only. Vessels with RSA poundage would not be allowed to harvest RSA compensation from access areas.

The social impacts of No Action are likely slight positive, as RSA compensation fishing could continue, but slight negative relative to Alternative 2, because the fishery would not have the opportunity harvest compensation pounds from access areas, which generally have higher densities of exploitable scallops. Fishing operations could be less efficient relative to Alternative 2. As RSA compensation fishing represents a small portion to total fishing effort, No Action would likely have negligible impacts on employment, the size of the fishery-related workforce, or the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights).

6.6.2.5.1.2 Alternative 2 – Allow RSA compensation fishing in the Mid-Atlantic Access Area, NLS-South, Closed Area II, and Closed Area I, with limited RSA compensation fishing in the NGOM Management Area

Under Alternative 2, RSA compensation fishing would be permitted in the following areas in FY2021 (Map 10):

- Areas open to Limited Access DAS fishing (i.e., open bottom)
- Mid-Atlantic Access Area
- Closed Area II, as defined in Section 4.2.2.2, from June 1, 2021 – August 15, 2021
- Closed Area I
- Nantucket Lightship-South
- NGOM Management area (up to the LA TAC in this area)

RSA compensation fishing would be permitted in the NGOM management area, per NGOM alternatives as specified in Section 4.2. RSA compensation fishing would be permitted in the NGOM management area up to the poundage specified in the Council's preferred alternative for the Limited Access share of the NGOM TAC, and only by vessels that are awarded NGOM RSA compensation pounds.

The social impacts of Alternative 2 are likely positive and slight positive relative to No Action, because the fishery would have the opportunity harvest compensation pounds from certain access areas, which generally have higher densities of exploitable scallops than open areas. Fishing operations could be more efficient relative to No Action. As RSA compensation fishing represents a small portion to total fishing effort, Alternative 2 would likely have negligible impacts on employment, the size of the fishery-related workforce, or the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights). Alternative 2 may incentivize additional vessels to participate in compensation fishing.

6.6.2.5.2 Seasonal Closure of Closed Area II to Reduce Impacts on Georges Bank Yellowtail Flounder and Northern Windowpane Flounder, including CAII-Extension

6.6.2.5.2.1 Alternative 1 – No Action

. There would be no change from the default to when scallop vessels could access the Closed Area II Access Area. The existing seasonal closure to protect flatfish would remain in place from August 15 – November 15 of each year (the extension to November 30 in FY 2020 was only in place for that year).

The social impacts of No Action are likely slight positive. The existing seasonal closure of Closed Area II Access Area is targeted around a time of year when GB yellowtail bycatch rates are known to be relatively high. Continuing this closure would help the fishery remain within its bycatch limits, sustaining the season of the scallop fishery with positive effects on fishermen and communities.

6.6.2.5.2.2 Alternative 2 – Extend Seasonal Closure of Closed Area II Access Area through November 30th in FY 2021

Alternative 2 would extend the Closed Area II Access Area (as defined in Section 4.2.2.2) seasonal closure by two weeks in November, making the newly configured area closed from August 15 until November 30 (Map 12). Closed Area II Access Area would re-open to access area fishing on December 1, 2021.

The social impacts of Alternative 2 are likely positive and more positive than No Action. Shifting effort towards summer months when bycatch is typically lower would help the fishery remain within its bycatch limits and more so relative to No Action. As there could be positive impacts on the groundfish and skate stocks caught as bycatch, there could be positive long-term outcomes for their directed fisheries.

6.7 CUMULATIVE IMPACTS

7.0 APPLICABLE LAWS/EXECUTIVE ORDERS

8.0 GLOSSARY

Annual projected landings – The annual projected landings are the model-based estimate of scallop fishery landings for a given fishing year, accounting for the spatial management of the fishery (*see also* area based management *and* area rotation). The APL is equal to the combined projected landings by the limited access and LAGC IFQ fleets in both the open area and access areas, after set-asides (RSA and observer) and incidental landings are accounted for, for a given fishing year. Projected scallop landings are calculated by estimating the landings that will come from open and access area effort combined for both limited access and LAGC IFQ fleets.

Area based management – in contrast to resource wide allocations of TAC or days, vessels would receive authorization to fish in specific areas, consistent with that area's status, productivity, and environmental characteristics. Area based management does not have to rotate closures to be effective.

Area rotation – a management system that selectively closes areas to fishing for short to medium durations to protect small scallops from capture by commercial fishing until the scallops reach a more optimum size. Closed areas would later re-open under special management rules until the resource in that area is similar to other open fishing areas. Area rotation is a special subset of area based management that relies on an area closure strategy to achieve the desired results when there are sufficient differences in the status of the management areas.

Biological Opinion – an ESA document prepared by either the NMFS or USFWS describing the impacts of a specific Federal action, including an FMP, on endangered or threatened species. The Biological Opinion concludes whether or not the NMFS/USFWS believe that the actions are likely to jeopardize the continued existence of any of the protected species, and provides recommendations for avoiding those adverse impacts.

Consumer surplus - The net benefit consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or landings go up.

Critical habitat – an area that has been specifically designated under the ESA as an area within the overall geographical region occupied by an endangered or threatened species on which are found the physical or biological features essential to conservation of the species.

Day-at-sea (DAS) – is each 24-hour period that a vessel is on a scallop trip (i.e. not declared out of the day-at-sea program) while seaward of the Colregs line.

Endangered species – a species that is in danger of extinction throughout all or a significant portion of its range.

Exploitable biomass - the total meat weight of scallops that are selected by fishing, accounting for gear and cull size, at the beginning of the fishing year[11].

[11] The **average exploitable biomass** is different and is defined as the total meat weight of scallops that are selected by fishing averaged over the fishing year, accounting growth, natural mortality, fishing mortality, and gear and cull size.

Fixed costs - These costs include expenses that are generally independent of the level of fishing activity, i.e., DAS-used, such as insurance, license, half of repairs, office expenses, professional fees, dues, utility, interest, dock expenses, bank, rent, store, auto, travel, and employee benefits.

Incidental Take Statement – a section of a Biological Opinion that allows the take of a specific number of endangered species without threat of prosecution under the ESA. For the Scallop FMP, an incidental take statement has been issued for a limited number of sea turtles to be taken by permitted scallop vessels.

LPUE – Similar to catch per unit effort (CPUE), commonly used terminology in fisheries, LPUE in the Scallop FMP refers to the amount of landings per DAS a vessel achieves. This value is dependent on the scallop abundance and catch rate, but also depends on the shucking capacity of the crew and vessel, since most of the scallop catch must be shucked at sea. Since discard mortality for sea scallops is low, discards are not included as a measure of catch in the calculation of LPUE.

Meat yield – the weight of a scallop meat in proportion to the total weight or size of a scallop. Scallops of similar size often have different meat yields due to energy going into spawning activity or due to the availability of food.

Net economic benefits - Total economic benefits measure the benefits both to the consumers and producers and are estimated by summing consumer and producer surpluses. Net economic benefits show, however, the change in total economic benefits net of no action.

Nominal versus real economic values - The nominal value of fishing revenues, prices, costs and economic benefits are simply their current monetary values unadjusted for inflation. Real values are obtained, however, by correcting the current values for the inflation.

Open area – a scallop fishing area that is open to regular scallop fishing rules. The target fishing mortality rate is the resource-wide target.

Operating expenses or variable costs - The operating costs measures the expenses that vary with the level of the fishing activity including food, ice, water, fuel, gear, supplies and half of the annual repairs.

Opportunity cost - The cost of forgoing the next best opportunity. For example, if a fisher's next best income alternative is to work in construction, the wage he would receive from construction work is his opportunity cost.

PDT – Scallop plan Development Team; a committee of experts that contributed to and developed the technical analysis and evaluation of alternatives.

Producer surplus -Producer surplus for a particular fishery shows the net benefits to harvesters, including vessel owners and the crew, and is measured by the difference between total revenue and operating costs.

Recruitment – a new year class of scallops measured by the resource survey. Scallop larvae are pelagic and settle to the bottom after 30-45 days after spawning. The resource survey, using a lined dredge, is able to capture scallops between 20 – 40 mm, but more reliably at between 40 and 60 mm. Recruitment in this document refers to a new year class that is observable in the survey, at around two years after the eggs had been fertilized and spawned.

SAFE Report – A Stock Assessment and Fishery Evaluation Report, required by the Sustainable Fisheries Act. This report describes the present condition of the resource and managed fisheries, and in New England it is prepared by the Council through its Plan Development Teams (PDT) or Monitoring

Committees (MC). The Scallop PDT is the MC for the Atlantic Sea Scallop FMP and prepares this report.

Shucking – a manual process of cutting scallop meats from the shell and viscera.

TAC – Total allowable catch is an estimate of the weight of scallops that may be captured by fishing at a target fishing mortality rate. The TAC could apply to specific areas under area based management rules.

Take – a term under the MMPA and ESA that means to harass, harm , pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct with respect to either a marine mammal or endangered species.

Ten-minute square – an approximate rectangle with the dimensions of 10-minutes of longitude and 10-minutes of latitude.

Threatened species – any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

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10.0 INDEX