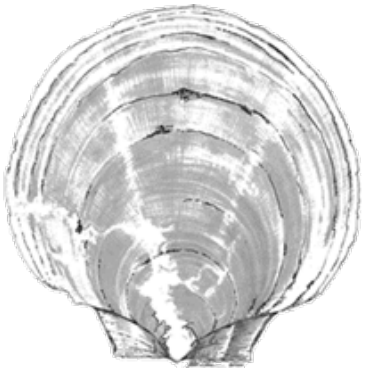
Scallop Fishery Management Plan

Framework Adjustment 36

Including an Environmental Assessment and

Regulatory Flexibility Analysis



DRAFT

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Prepared by the

New England Fishery Management Council

In consultation with the

National Marine Fisheries Service

New England
Fishery Management Council

NOAA
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FRAMEWORK ADJUSTMENT 34 TO THE ATLANTIC SEA SCALLOP FISHERY MANAGEMENT PLAN

Proposed Action: Propose updated fishery specifications for FY 2023 and FY 2024 (default) with corresponding management measures and manage removals from the NGOM management area.

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Abstract:

1.0 EXECUTIVE SUMMARY

Framework 36 (FW36) will set specifications and adjust management measures for the Atlantic Sea Scallop fishery for fishing years 2023 and 2024 (default) to achieve the objectives of the fishery management plan (FMP).

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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
INCI	Incidental permit
ITQ	Individual transferable quota
IVR	Interactive voice response reporting system
IWC	International Whaling Commission
LA	Limited access
LAGC	Limited access general category
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
NGOM	Northern Gulf of Maine
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

This EA is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 Fed. Reg. at 43372-73 (§§ 1506.13, 1507.3(a)). This EA began on June 30, 2022 and accordingly proceeds under the 2020 regulations.

3.1 BACKGROUND

This framework adjustment to the Scallop Fishery Management Plan (FMP) sets fishery specifications for fishing year (FY) 2023 and default measures for FY 2024.

3.2 PURPOSE AND NEED

The purpose and need for Framework 36 are described in Table 1.

Table 1 – Purpose and need for Framework 36.

Purpose	Need

3.3 SUMMARY OF ANNUAL CATCH LIMITS

These specifications include 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 assessments 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).

Overfishing Limit. 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 stock assessment (NEFSC 2020) set the OFL where F = 0.61. To account for scientific uncertainty, ABC is set at the 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).

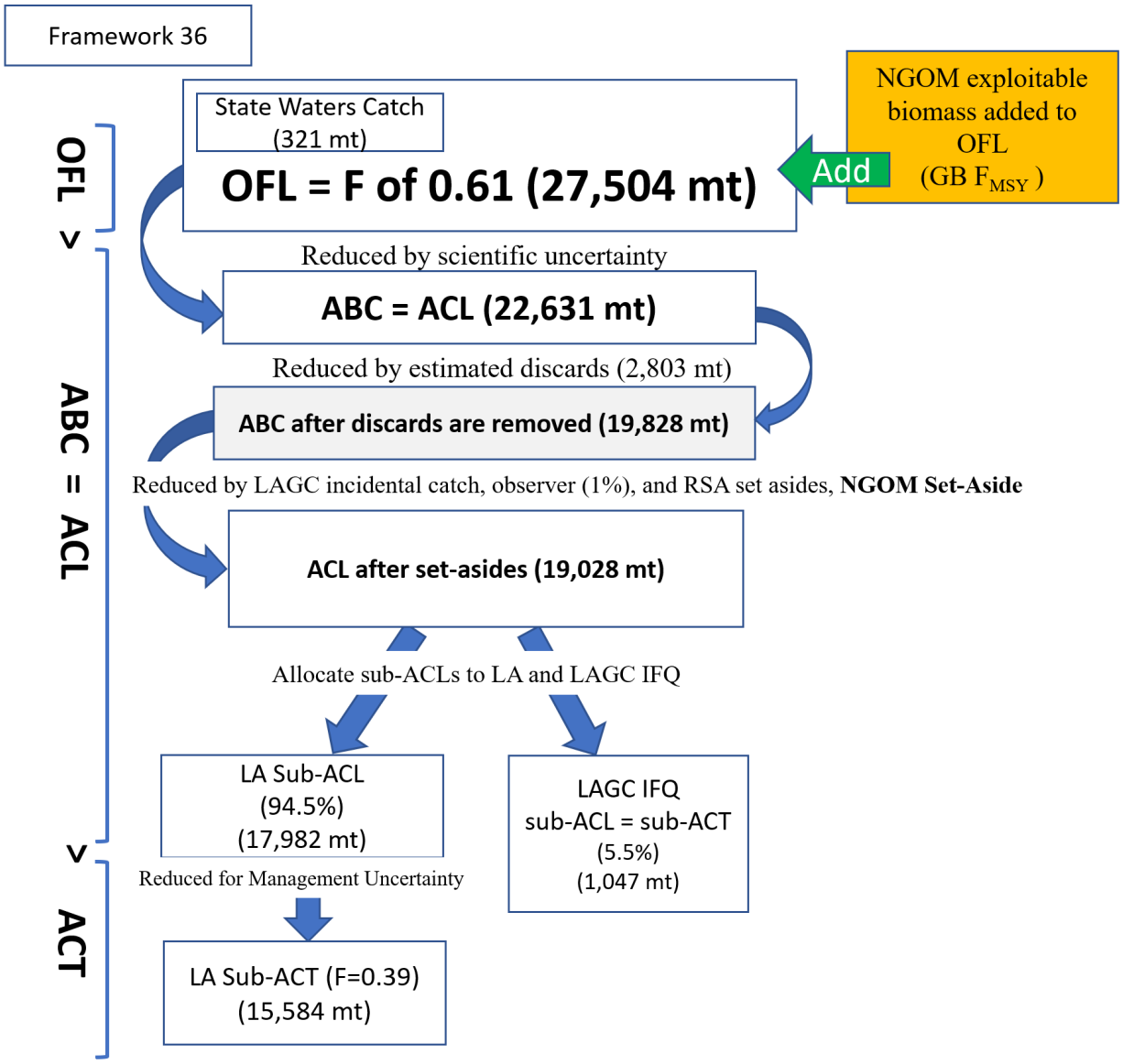
Annual Catch Limit. The ACL is equal to the ABC in the Scallop FMP. The 2020 management track assessment determined that the F associated with the ABC/ACL is F=0.45. As specified in Amendment 21, exploitable biomass from the Northern Gulf of Maine contributes to the overall OFL and ABC. Observer and research set-asides are removed from the ABC (1 percent of the ABC/ACL and 1.275 mil lb. (578 mt), respectively). The NGOM Set-Aside, which is available for directed LAGC fishing, is also removed before calculating the legal limits for LA and LAGC IFQ. 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.

Annual Catch Targets. For each sub-ACL there is an ACT to account for management uncertainty. For the LA fleet, the ACT has an associated 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 from the previous fishing year within the first 60 days of the year. For the

LAGC fleet, the ACT is equal to the LAGC fleet's sub-ACL, since this component is managed entirely by quotas 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.

Annual Projected Landings. The annual projected landings (APL) were developed using a forecasting model (SAMS) of the scallop resource. The APL combines 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 - Framework 36 ACL flowchart for fishing year 2023.



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 FY2023 OFL and ABC would be the default values adopted in Framework 34 (Table 2) that were calculated using fishery data through 2021. These default values would remain in place until a subsequent action replaced them. The OFL and ABC values were selected based on the following scallop control rule: 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 subtracted first and allocations are based on the remaining ABC available (Table 2, column to the far right). There would be no OFL or ABC set for FY 2024.

Table 2 – No Action OFL and ABC for FY 2023 (default) approved through Framework 34 (values in mt).

Fishing Year	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards subtracted)
2023	34,941	27,606	4,406	23,200

Table 3 – No Action (default) ACL related values for the scallop fishery based on 2023 OFL and ABC approved through Framework 34.

Catch limits	FY2023 (mt)
Overfishing Limit	34,941
Acceptable Biological Catch/ACL (discards removed)	23,200
Incidental Catch (Estimated catch by LAGC Cat. C permits)	23
Research Set-Aside (RSA)	578
Observer Set-Aside	232
ACL for fishery	22,367
Limited Access ACL (94.5% of ACL)	21,137
LAGC Total ACL	18,318
LAGC IFQ ACL (5% of ACL)	1,230
Limited Access with LAGC IFQ ACL (0.5% of ACL)	1,118
Limited Access ACT (F=0.46)	112
Annual Projected Landings (APL)***	(*)
Limited Access Projected Landings (94.5% of APL)	(*)
Total IFQ Annual Allocation (5.5% of APL)	
LAGC IFQ Annual Allocation (5% of APL)	
Limited Access with LAGC IFQ Annual Allocation (0.5% of APL)	

*The catch limits for the 2023 fishing year are subject to change through a future specifications action or framework adjustment. This includes the setting of an APL for 2023 that will be based on the 2022 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 FW34.

4.1.2 Alternative 2 - Updated OFL and ABC for FY 2023 and FY 2024 (default)

Alternative 2 would specify OFLs and ABCs for FY 2023 and set default values for FY 2024 (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. 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 uses 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

Table 4 - OFL and ABC values for FY 2023 and FY 2024 (default).

Fishing Year	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards removed)
2023	27,504	22,631	2,803	19,828
2024	29,151	23,289	3,083	20,206

Table 5 - Alternative 2 ACL related values for the scallop fishery based on 2023 and 2024 OFL and ABC

	FY2023	FY2024
	mt	mt
OFL	27,504	29,151
ABC/ACL (discards removed)	19,828	20,206
Incidental Catch	23	23
RSA	578	578
Observer set-aside	198	202
ACL for fishery	18,853	19,403
Limited Access ACL	17,816	18,335
Limited Access ACT	15,441	15,891
LAGC Total ACL	1,037	1,067
LAGC IFQ ACL	943	970
LA w/ LAGC IFQ ACL (0.5% of ACL)	94	97
APL (after set-asides are removed)***		(*)
Limited Access Projected Landings (94.5% of APL)		(*)
Total IFQ Annual Allocation (5.5% of APL)		
LAGC IFQ Annual Allocation (5% of APL)		
Limited Access with LAGC IFQ Annual Allocation (0.5% of APL)		

*The catch limits for the 2024 fishing year are subject to change through a future specifications action or framework adjustment. This includes the setting of an APL for 2024 that will be based on the 2023 scallop surveys.

**As a precautionary measure, the 2024 IFQ annual allocations are set at 75% of the 2023 IFQ Annual Allocations.

***The APL value reflects the Council's preferred alternatives for specifications from FW36.

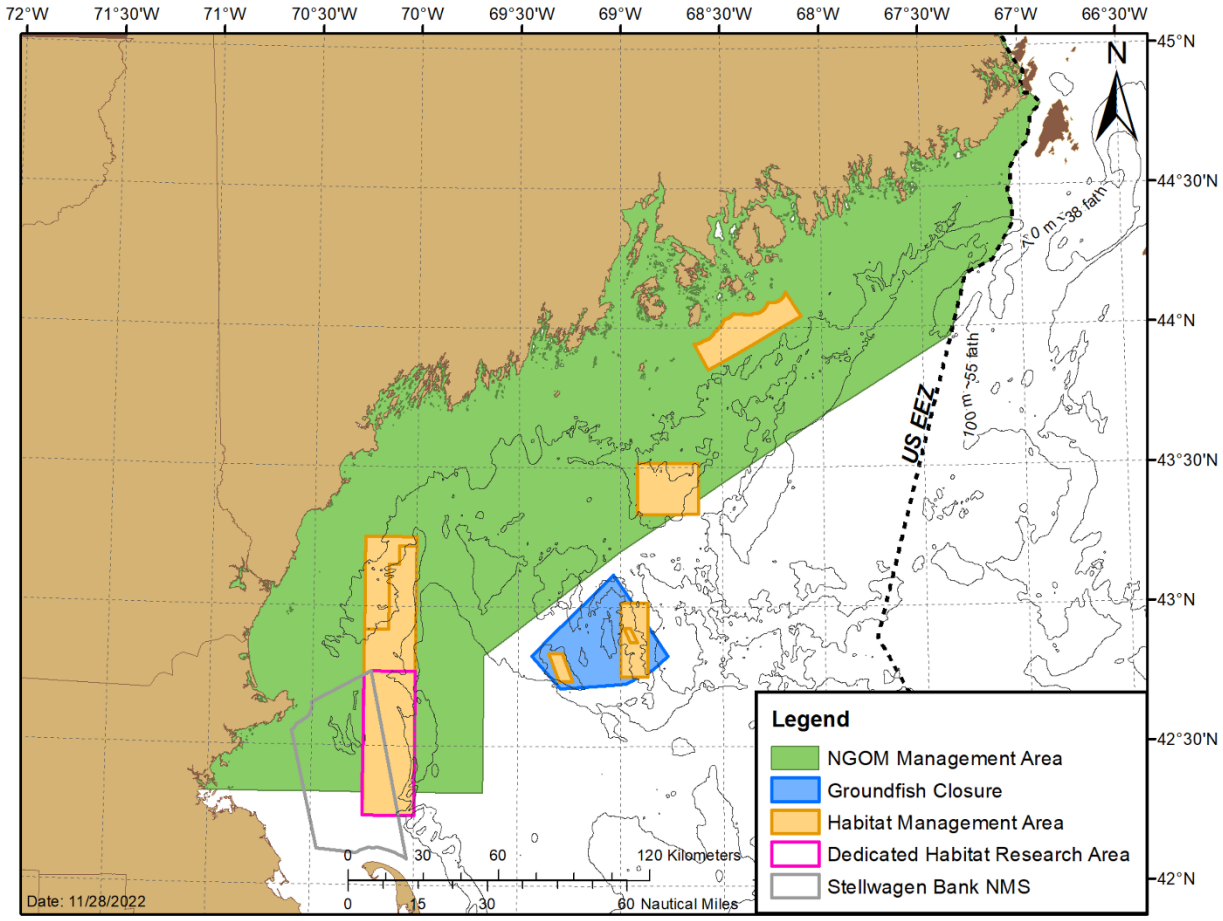
4.2 Action 2 – Northern Gulf of Maine Management and TAL Setting

Action 2 addresses scallop management in the Northern Gulf of Maine Management Area (Map 1).

4.2.1 Alternative 1 – No Action

Under Alternative 1 – No Action, the default specifications approved in Framework 34 for the NGOM Set-Aside would be in place for the 2023 fishing year. The NGOM Set-Aside would be set at 465,980 pounds, and there would be no value specified for the 2024 fishing year.

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.



4.2.2 Alternative 2 - Set NGOM TAL, with set-asides to support research, monitoring, and a directed LAGC fishery

Alternative 2 would specify a Northern Gulf of Maine Total Allowable Landings (NGOM TAL) limit for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed

LAGC fishery. Options 1 and 2 would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank only. Options 3 and 4 would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge.

All options under Alternative 2 would set total allowable landings for all permit categories in the management area, which would be reduced by 25,000 pounds to increase the overall scallop RSA (Table 6). The total allowable landings would also be reduced by 1% of the NGOM ABC (10,538 pounds) to support monitoring the directed scallop fishery in the NGOM (Table 6). The pounds deducted from the NGOM TAL would be added to the fishery-wide set-asides for research and monitoring. Framework 36 measures would also implement an accountability measure from 2021 triggered by a TAC overage. For FY2023, the NGOM Set-Aside would also be reduced by 17,918 pounds to account for the 2021 overage.

At or below the 800,000-pound level, the NGOM TAL would be allocated as NGOM Set-Aside, which would support directed LAGC fishing at 200 pounds per day. Over this value, the remaining NGOM TAL would be shared between the NGOM annual projected landings (APL) (i.e., allocated to the Limited Access and LAGC IFQ components) and additional allocation for the NGOM set-aside. None of the NGOM TAL options of Alternative 2 exceed 800,000 pounds; therefore, the remaining TAL after pounds are deducted for research and monitoring are allocated as NGOM Set-Aside for directed LAGC fishing (Table 6). RSA compensation fishing would be allowed in the NGOM, up to the 25,000 pound limit specified in the options of this alternative.

Fishing year 2024 default measures would be set at 75% of the 2023 NGOM Set-Aside value (Table 6).

Rationale: Alternative 2 utilizes data from the 2022 scallop surveys and is expected promote resource conservation by setting limits on total removals from the NGOM and implementing accountability measures for all permit categories fishing in the area. The NGOM Set-Aside approach preserves and supports a growing directed LAGC fishery in federal waters in the NGOM and distributes the NGOM TAL to all permit types as the biomass in the area grows. While most of the exploitable biomass in the management unit is on Stellwagen Bank, setting the NGOM TAL based on biomass estimates from Stellwagen, Ipswich Bay, and Jeffreys Ledge (Options 3 and 4) reflects the ability for vessels to fish within the entire management unit, and sets harvest limits using the scallop biomass from multiple areas. Options 1 and 2 take a more conservative approach by setting the NGOM TAL based on the area with the highest densities of scallops in the NGOM.

4.2.2.1 Option 1 – Set NGOM TAL at F=0.15 (Stellwagen Only)

The overall NGOM TAL would be set by applying a fishing mortality rate of F=0.15 to the exploitable biomass on Stellwagen Bank only. Under Option 1, the TAL for 2023 would be set at 357,149 pounds, and the NGOM Set-Aside would be set at 303,693 pounds. The 2024 default NGOM Set-Aside would be set at 227,770 pounds.

4.2.2.2 Option 2 – Set NGOM TAL at F=0.18 (Stellwagen Only)

The overall NGOM TAL would be set by applying a fishing mortality rate of F=0.18 to the exploitable biomass on Stellwagen Bank. Under Option 2, the TAL for 2023 would be set at 421,083 pounds, and the NGOM Set-Aside would be set at 367,627 pounds. The 2024 default NGOM Set-Aside would be set at 275,720 pounds.

4.2.2.3 Option 3 – Set NGOM TAL at F=0.15 (Stellwagen Bank, Ipswich Bay, Jeffreys Ledge)

The overall NGOM TAL would be set by applying a fishing mortality rate of F=0.15 to the exploitable biomass on Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. Under Option 3, the TAL for 2023 would be set at 434,311 pounds, and the NGOM Set-Aside would be set at 380,855 pounds. The 2024 default NGOM Set-Aside would be set at 285,641 pounds.

4.2.2.4 Option 4 – Set NGOM TAL at F=0.18 (Stellwagen Bank, Ipswich Bay, Jeffreys Ledge)

The overall NGOM TAL would be set by applying a fishing mortality rate of F=0.18 to the exploitable biomass on Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. Under Option 4, the TAL for 2023 would be set at 511,472 pounds, and the NGOM Set-Aside would be set at 458,016 pounds. The 2024 default NGOM Set-Aside would be set at 343,512 pounds.

Table 6 - Distribution of the NGOM TAL, set-asides, application of the accountability measure for the 2021 NGOM overage, and default NGOM set-aside (2024) for Alternative 2 Options 1 – 4. Values shown in pounds.

Section	4.2.2.1	4.2.2.2	4.2.2.3	4.2.2.4
	Option 1	Option 2	Option 3	Option 4
Fishing Mortality Rate	F=0.15	F=0.18	F=0.15	F=0.18
Area(s) Fished	Stellwagen	Stellwagen	Stellwagen, Ipswich, Jeffreys	Stellwagen, Ipswich, Jeffreys
2023 Total Allowable Landings	357,149	421,083	434,311	511,472
1% NGOM ABC for Observers	10,538	10,538	10,538	10,538
2023 RSA Contribution	25,000	25,000	25,000	25,000
2021 Overage - Payback	17,918	17,918	17,918	17,918
2023 NGOM Set-Aside	303,693	367,627	380,855	458,016
2024 Default NGOM Set-Aside	227,770	275,720	285,641	343,512

4.3 ACTION 3 - FISHERY SPECIFICATIONS AND ROTATIONAL MANAGEMENT

Allocations to the LA (94.5%) and LAGC IFQ (5.5%) components allocations are based on Annual Projected Landings (APL).

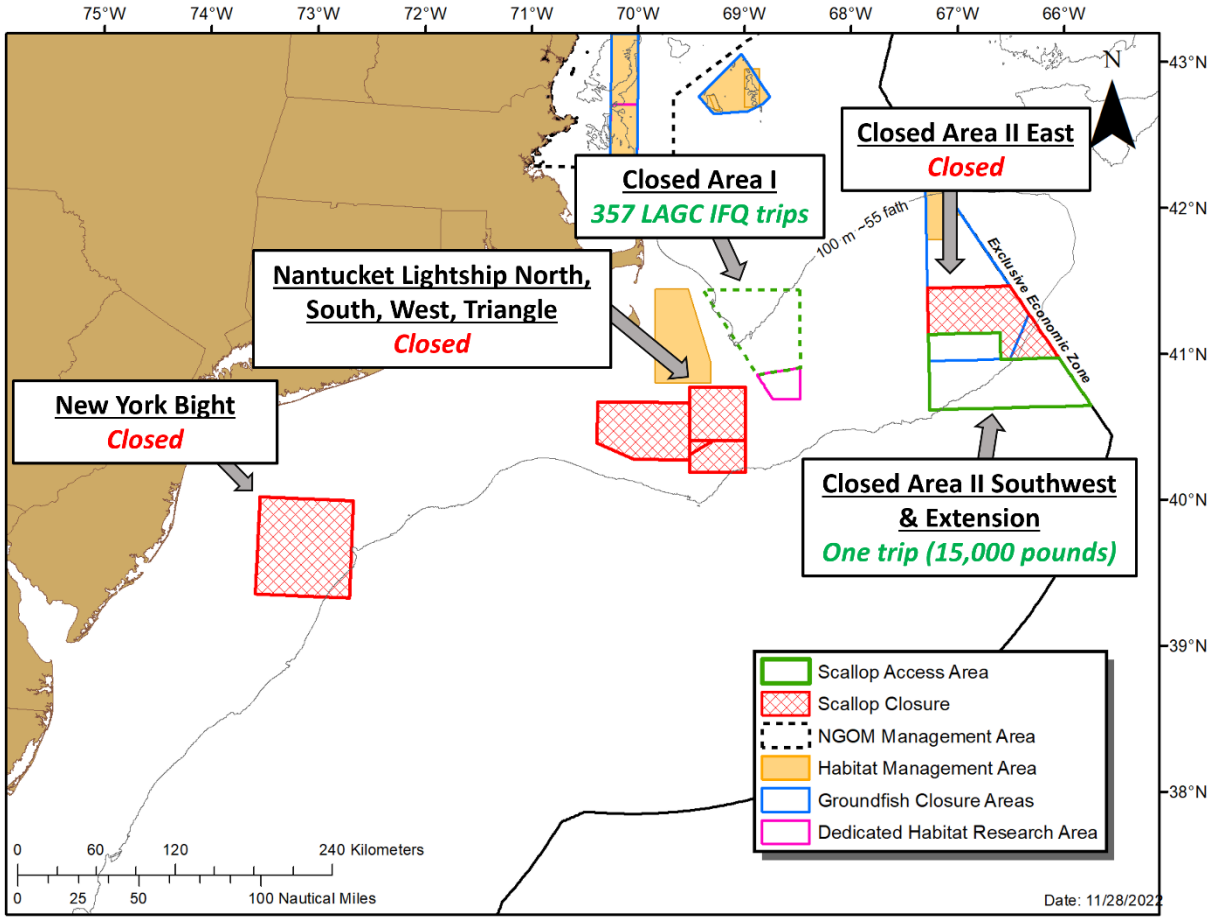
4.3.1 Alternative 1 – No Action (Default Measures)

Under Alternative 1 – No Action, the default specifications approved in Framework 34 would be in place for the 2023 fishing year and there would be no allocations specified for the 2024 fishing year. Default measures approved in Framework 34 include full-time Limited Access DAS set at 18, which would be 75% of the DAS allocated for FY2022. Part-time Limited Access vessels would receive 7.2 DAS, and Occasional Limited Access vessels would be allocated 1.5 DAS. No Action would allocate one 15,000-pound full-time Limited Access trip to Closed Area II (CAII SW and EXT) in FY2023.

Under the FW34 default measures for FY2023, the total LAGC IFQ allocation would be 1,295,996 pounds, which is equivalent to 75% of the total LAGC IFQ allocation for FY2022. No Action would allocate 357 LAGC IFQ access area trips to Closed Area I for FY2023.

The target TAC for vessels with an LAGC Incidental permit would be 50,000 pounds.

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



4.3.2 Alternative 2 – Two access area trips in Area II with 10,000-pound trip limit

Alternative 2 would allocate two (2) full-time limited access vessels access area trips to Area II (i.e., formerly "Closed Area II) with a possession limit of 10,000 pounds (Map 3). The total Area II access area allocation would be 20,000 pounds per full-time limited access vessel. The Area II boundary would be expanded compared to the configuration used for Closed Area II in FY2022 (see Alternative 1) to include Closed Area II Southwest, Closed Area II Extension, and Closed Area II East (Map 4). Coordinates of the Area II boundary under this alternative are provided in Map 4.

Alternative 2 would close the following areas for the entirety of FY2023: Area I (i.e., formerly "Closed Area I"), the Nantucket Lightship West, the New York Bight, and the Elephant Trunk. Coordinates for these closure areas are provided in Map XX.

Under Alternative 2, the Nantucket Lightship South would remain an access area for the first 60 days of FY2023 (i.e., through May 30, 2023) to allow limited access vessels to fish remaining FY2022 access area allocations to this area. On May 31, 2023, the Nantucket Lightship South and Nantucket Lightship Triangle would revert to open bottom and would be accessible to limited access vessels fishing open area days-at-sea and LAGC IFQ vessels fishing open trips. The Nantucket Lightship North would revert to open bottom, with the timing of the opening dependent on the alternative selected in Section 4.4 (Access Area Trip Allocations to the LAGC IFQ Component).

The specific allocations associated with Alternative 2 include:

- The FY2023 Annual Projected Landings (APL) for this alternative are 22.6 million pounds (open area F=0.46, 22 DAS), or 23.7 million pounds (open area F=0.51, 24 DAS) before set-asides are accounted for (i.e., RSA, observer, NGOM). The Research Set-Aside, Observer Set-Aside, and incidental catch total for 2023 is 800 mt or 1.76 million pounds. The NGOM Set-Aside would be additive to these APL values based on the Council preferred option in Action 2 (Section 4.2).
- Each full-time limited access vessel would be allocated a total of 20,000 Area II access area pounds and the trip limit would be set at 10,000 pounds per trip.
- Access area allocations would be set at 8,000 pounds for part time (PT) limited access vessels and 1,670 pounds for occasional limited access vessels. The LA PT trip limit would be set at 8,000 pounds and PT vessels would receive one trip to Area II. The occasional LA trip limit would be set at 1,670 pounds and occasional vessels would be able to fish their allocation in Area II.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated LA access area trips would be available in the same access areas defined by Framework 34 for FY2023 and the first 60 days of FY2024, even if the area is scheduled to close in FY2024 (Map XX). Vessels planning to fish FY2023 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, 2024.
- Research Set-Aside (RSA) compensation fishing would be allowed only in the open area under this alternative, though the Council could elect to allow LAGC IFQ vessels to fish RSA compensation in the NLS-North during the first 90 days of the fishing year under the action alternative being considered in Section 4.4.

FY2024 default measures under Alternative 2 would allocate 75% of FY2023 days at sea for the limited access component and 75% of FY2023 quota allocations to the LAGC IFQ component. No default access area trips would be allocated for FY2024 under this alternative.

Rationale: Focusing access area effort in Area II is in response to this region containing the highest level of exploitable biomass in 2022. Expanding the Area II boundary to include Closed Area II East will allow the fishery to target exploitable biomass that has been in a rotational closure since FY2020 and to spread effort out across a larger area compared to the configuration employed by the Council in FY2021 and

FY2022. The majority of scallops in Area II Access Area are considered exploitable and are supporting access area fishing in the current fishing year (i.e., FY2022).

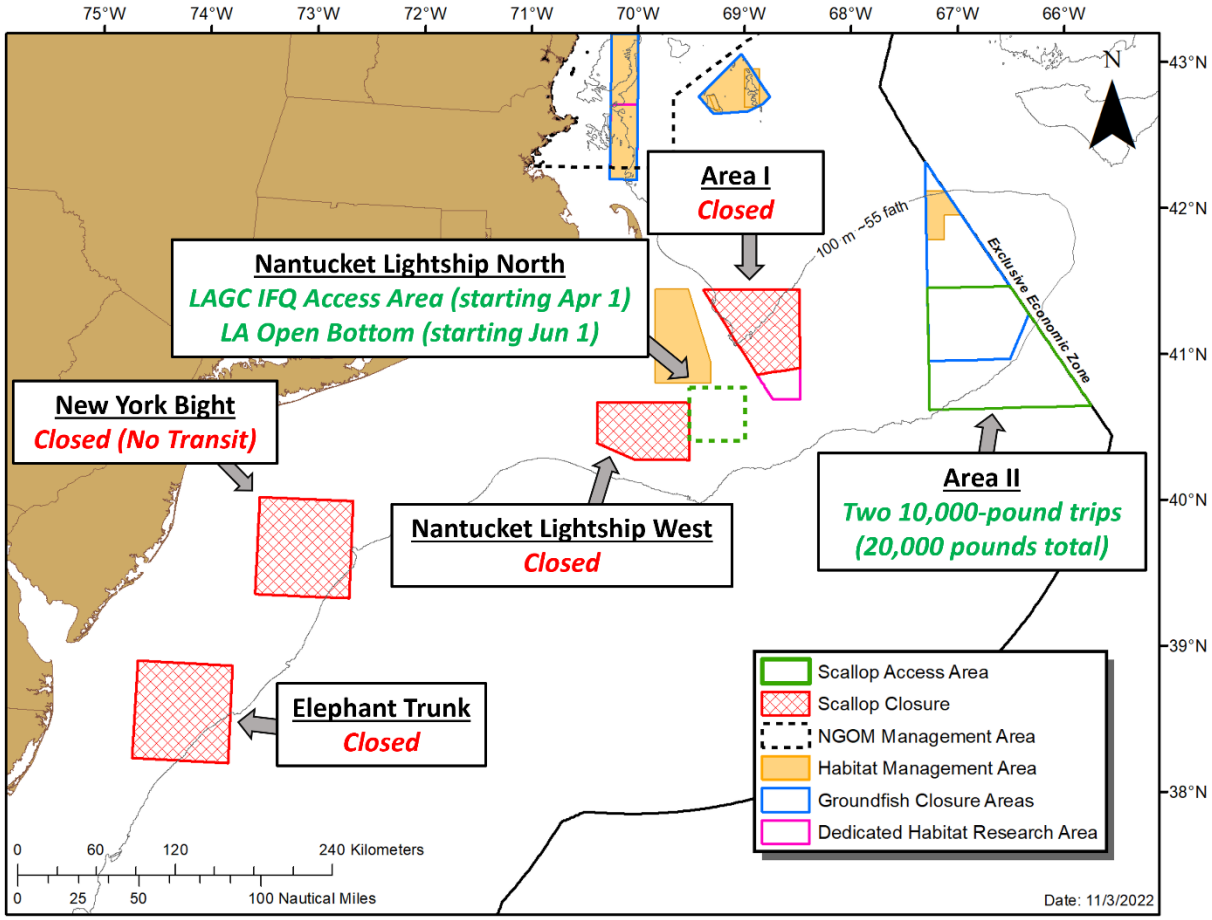
The strongest signal of recruitment observed in the 2022 surveys was in Area I and the Elephant Trunk. The 2022 surveys also observed recruitment in the Nantucket Lightship West, which was closed at the start of FY2022. The New York Bight was closed at the start of FY2022 to allow a large year class of scallops to grow in the absence of scallop fishing. Observations from the 2022 surveys suggest that scallops in the New York Bight would benefit from a continued closure in FY2023, with the expectation that this area could be accessible to the fishery in FY2024. Closures of Area I, the Elephant Trunk, and continued closures of the New York Bight and Nantucket Lightship West, are anticipated to optimize growth of juvenile scallops with the expectation of supporting scallop fishing in the future.

The 2022 surveys of the Nantucket Lightship South observed a substantial drop in biomass and reports from industry members suggested that catch rates in this area became too low to be viable in May of 2022. A large portion of FY2022 access area allocations to the Nantucket Lightship South has not been landed as a result of the downturn biomass in this area early in FY2022. Maintaining the Nantucket Lightship South access area boundary for the first 60 days of FY2023 will allow vessels with remaining FY2022 allocation to fish in this area if they elect to do so, before the area is reverted to open bottom. Given the low biomass in this area, reverting the NLS-South to open bottom is consistent with the principles the of rotational management system employed by the Council.

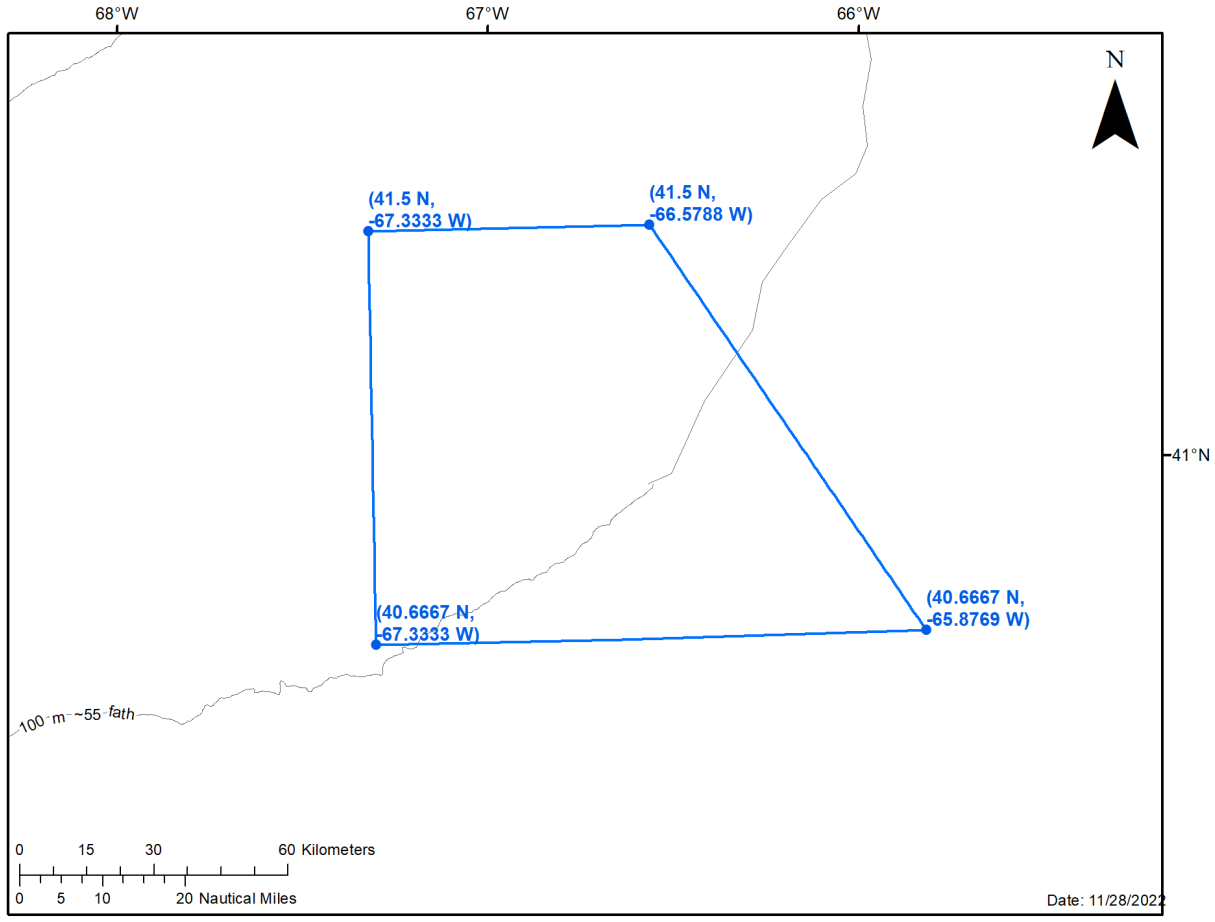
The Nantucket Lightship Triangle is a small area established by the Council in FY2020 that could be used for research purposes. The NLS-Triangle contains some biomass, but not enough to support equitable access by the limited access component of the fishery. Reverting the NLS-Triangle to open bottom after the first 60 days of FY2023 will allow for limited access vessels fishing days at sea and LAGC IFQ vessels fishing open trips to target the biomass in this area and is also expected to spread out open area in general. Reverting the area to open bottom after the first 60 days of FY2023 will align with the time of year when meat yield is at its peak. Given that fishing in either the NLS-South and NLS-Triangle could be expected to occur on the shared boundary of both areas, reverting the NLS-Triangle and NLS-South to open bottom on the same schedule (i.e., after the first 60 days of FY2023) avoids a situation where vessels could be fishing a small area of open bottom (i.e., NLS-Triangle) directly adjacent to vessels fishing access area allocations (i.e., NLS-South).

The Nantucket Lightship North has traditionally been a productive area that has been accessed by the scallop fishery only through the rotational management program. While some larger scallops were observed in the NLS-North in the 2022 surveys, little to no recruitment has been observed in this area for the past several years and there is not enough biomass to support equitable access by the fishery through the rotational management program. Reverting the NLS-North to open bottom will allow fishermen to target the larger scallops that persist in this area on open trips if they so choose, and is expected to spread open area effort out in general.

Map 3 – Spatial management under Alternative 2.



Map 4 – Approximate coordinates of the Area II Access Area under Alternative 2, Alternative 3, and Alternative 4.



4.3.2.1 Option 1 – Open Areas Fished at F=0.46 (22 DAS)

Option 1 would allocate 22 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.46. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 20,470,185 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,125,860 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,023,509 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 844,395 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 1 are shown in Table 7.

Table 7 – Summary of LA DAS allocations for each permit type at 22 DAS for FT LA vessels.

	FY 2023	FY 2024
FT LA	22	16.5
PT LA	8.8	6.6
Occasional	1.83	1.38

4.3.2.2 Option 2 – Open Areas Fished at F=0.51 (24 DAS)

Option 2 would allocate 24 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.51. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 21,570,292 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,186,366 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,078,515 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 889,775 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 2 are shown in Table 8.

Table 8 – Summary of LA DAS allocations for each permit type at 24 DAS for FT LA vessels.

	FY 2023	FY 2024
FT LA	24	18
PT LA	9.6	7.2
Occasional	2	1.5

4.3.3 Alternative 3 - Two access area trips in Area II with 12,000-pound trip limit

Alternative 3 would allocate two (2) full-time limited access vessels access area trips to Area II (i.e., formerly "Closed Area II) with a possession limit of 12,000 pounds (Map 5). The total Area II access area allocation would be 24,000 pounds per full-time limited access vessel. The Area II boundary would be expanded compared to the configuration used in FY2022 (see Alternative 1) to include Closed Area II Southwest, Closed Area II Extension, and Closed Area II East (Map 5). Coordinates of the Area II boundary under this alternative are provided in Map 4.

Alternative 3 would close the following areas for the entirety of FY2023: Area I (i.e., formerly "Closed Area I"), the Nantucket Lightship West, the New York Bight, and the Elephant Trunk. Coordinates for these closure areas are provided in Map XX.

Under Alternative 3, the Nantucket Lightship South would remain an access area for the first 60 days of FY2023 (i.e., through May 30, 2023) to allow limited access vessels to fish remaining FY2022 access area allocations to this area. On May 31, 2023, the Nantucket Lightship South and Nantucket Lightship Triangle would revert to open bottom and would be accessible to limited access vessels fishing open area

days-at-sea and LAGC IFQ vessels fishing open trips. The Nantucket Lightship North would revert to open bottom, with the timing of the opening dependent on the alternative selected in Section 4.4 (Access Area Trip Allocations to the LAGC IFQ Component).

The specific allocations associated with Alternative 3 include:

- The FY2023 Annual Projected Landings (APL) for this alternative are 23.9 million pounds (open area F=0.46, 22 DAS), or 25.0 million pounds (open area F=0.51, 24 DAS) before set-asides are accounted for (i.e., RSA, observer, NGOM). The Research Set-Aside, Observer Set-Aside, and incidental catch total for 2023 is 800 mt or 1.76 million pounds. The NGOM Set-Aside would be additive to these APL values based on the Council preferred option in Action 2 (Section 4.2).
- Each full-time limited access vessel would be allocated a total of 24,000 Area II access area pounds and the trip limit would be set at 12,000 pounds per trip.
- Access area allocations would be set at 9,600 pounds for part time (PT) limited access vessels and 2,000 pounds for occasional limited access vessels. The LA PT trip limit would be set at 9,600 pounds and PT vessels would receive one trip to Area II. The occasional LA trip limit would be set at 2,000 pounds and occasional vessels would be able to fish their allocation in Area II.
- The LAGC incidental target TAC would be set at 50,000 lbs.
- Allocated LA access area trips would be available in the same access areas defined by Framework 34 for FY2023 and the first 60 days of FY2024, even if the area is scheduled to close in FY2024 (Map XX). Vessels planning to fish FY2023 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, 2024.
- Research Set-Aside (RSA) compensation fishing would be allowed only in the open area under this alternative, though the Council could elect to allow LAGC IFQ vessels to fish RSA compensation in the NLS-North during the first 90 days of the fishing year under the action alternative being considered in Section 4.4.

FY2024 default measures under Alternative 3 would allocate 75% of FY2023 days at sea for the limited access component and 75% of FY2023 quota allocations to the LAGC IFQ component. No default access area trips would be allocated for FY2024 under this alternative.

Rationale: Focusing access area effort in Area II is in response to this region containing the highest level of exploitable biomass in 2022. Expanding the Area II boundary to include Closed Area II East will allow the fishery to target exploitable biomass that has been in a rotational closure since FY2020 and to spread effort out across a larger area compared to the configuration employed by the Council in FY2021 and FY2022. The majority of scallops in Area II Access Area are considered exploitable and are supporting access area fishing in the current fishing year (i.e., FY2022).

The strongest signal of recruitment observed in the 2022 surveys was in Area I and the Elephant Trunk. The 2022 surveys also observed recruitment in the Nantucket Lightship West, which was closed at the start of FY2022. The New York Bight was closed at the start of FY2022 to allow a large year class of scallops to grow in the absence of scallop fishing. Observations from the 2022 surveys suggest that scallops in the New York Bight would benefit from a continued closure in FY2023, with the expectation that this area could be accessible to the fishery in FY2024. Closures of Area I, the Elephant Trunk, and continued closures of the New York Bight and Nantucket Lightship West, are anticipated to optimize growth of juvenile scallops with the expectation of supporting scallop fishing in the future.

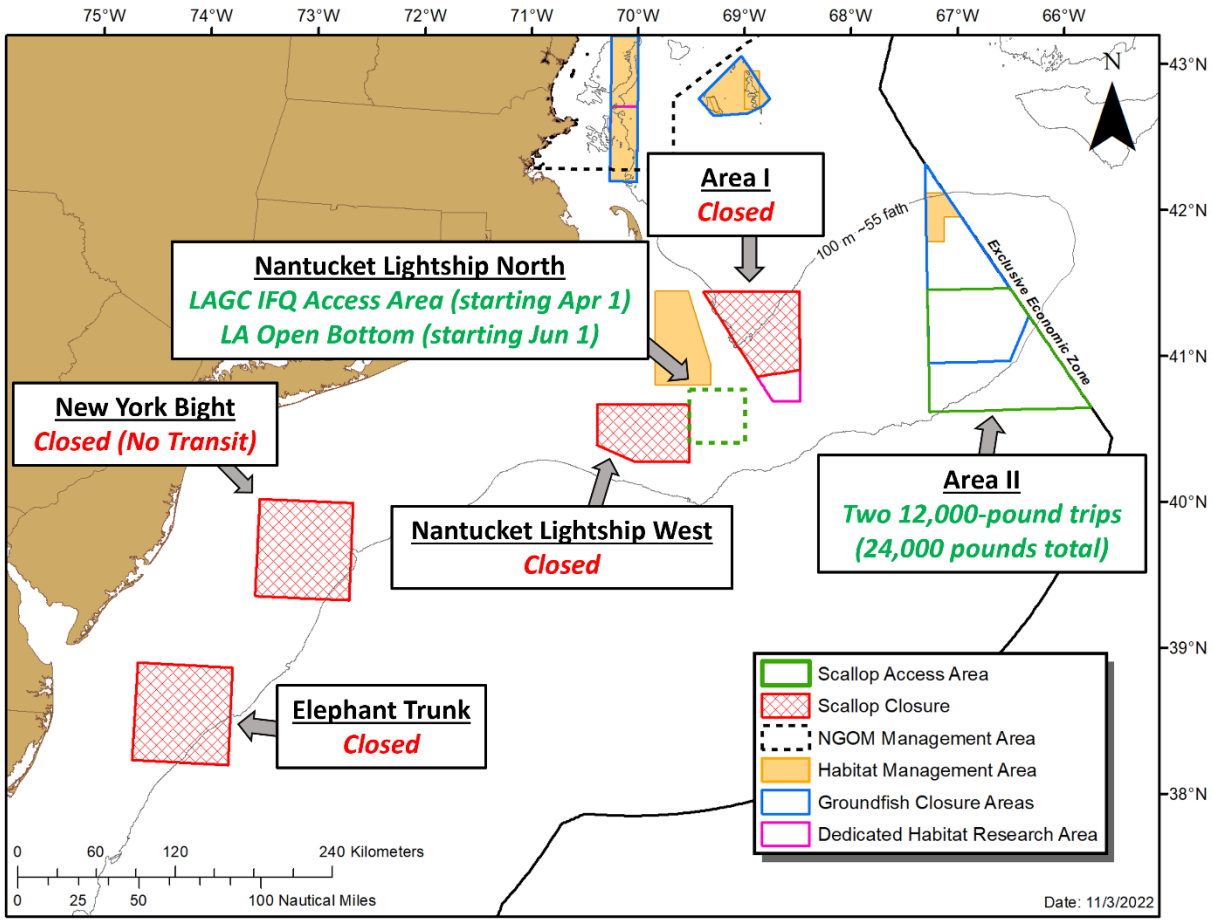
The 2022 surveys of the Nantucket Lightship South observed a substantial drop in biomass and reports from industry members suggested that catch rates in this area became to low to be viable in May of 2022. A large portion of FY2022 access area allocations to the Nantucket Lightship South has not been landed as a result of the downturn biomass in this area early in FY2022. Maintaining the Nantucket Lightship South access area boundary for the first 60 days of FY2023 will allow vessels with remaining FY2022 allocation to fish in this area if they elect to do so, before the area is reverted to open bottom. Given the

low biomass in this area, reverting the NLS-South to open bottom is consistent with the principles the of rotational management system employed by the Council.

The Nantucket Lightship Triangle is a small area established by the Council in FY2020 that could be used for research purposes. The NLS-Triangle contains some biomass, but not enough to support equitable access by the limited access component of the fishery. Reverting the NLS-Triangle to open bottom after the first 60 days of FY2023 will allow for limited access vessels fishing days at sea and LAGC IFQ vessels fishing open trips to target the biomass in this area and is also expected to spread out open area in general. Reverting the area to open bottom after the first 60 days of FY2023 will align with the time of year when meat yield is at its peak. Given that fishing in either the NLS-South and NLS-Triangle could be expected to occur on the shared boundary of both areas, reverting the NLS-Triangle and NLS-South to open bottom on the same schedule (i.e., after the first 60 days of FY2023) avoids a situation where vessels could be fishing a small area of open bottom (i.e., NLS-Triangle) directly adjacent to vessels fishing access area allocations (i.e., NLS-South).

The Nantucket Lightship North has traditionally been a productive area that has been accessed by the scallop fishery only through the rotational management program. While some larger scallops were observed in the NLS-North in the 2022 surveys, little to no recruitment has been observed in this area for the past several years and there is not enough biomass to support equitable access by the fishery through the rotational management program. Reverting the NLS-North to open bottom will allow fishermen to target the larger scallops that persist in this area on open trips if they so choose, and is expected to spread open area effort out in general.

Map 5 – Spatial management under Alternative 3.



4.3.3.1 Option 1 – Open Areas Fished at F=0.46 (22 DAS)

Option 1 would allocate 22 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.46. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 21,759,889 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,196,794 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,087,994 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 897,595 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 1 are shown in Table 7.

4.3.3.2 Option 2 – Open Areas Fished at F=0.51 (24 DAS)

Option 2 would allocate 24 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.51. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 22,857,791 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,257,179 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,142,890 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 942,884 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 2 are shown in Table 8.

4.3.4 Alternative 4 - Two access area trips in Area II with 14,000-pound trip limit

Alternative 4 would allocate two (2) full-time limited access vessels access area trips to Area II (i.e., formerly "Closed Area II) with a possession limit of 14,000 pounds (Map 6). The total Area II access area allocation would be 28,000 pounds per full-time limited access vessel. The Area II boundary would be expanded compared to the configuration used in FY2022 (see Alternative 1) to include Closed Area II Southwest, Closed Area II Extension, and Closed Area II East (Map 4). Coordinates of the Area II boundary under this alternative are provided in Map 4.

Alternative 4 would close the following areas for the entirety of FY2023: Area I (i.e., formerly "Closed Area I"), the Nantucket Lightship West, the New York Bight, and the Elephant Trunk. Coordinates for these closure areas are provided in Map XX.

Under Alternative 4, the Nantucket Lightship South would remain an access area for the first 60 days of FY2023 (i.e., through May 30, 2023) to allow limited access vessels to fish remaining FY2022 access area allocations to this area. On May 31, 2023, the Nantucket Lightship South and Nantucket Lightship Triangle would revert to open bottom and would be accessible to limited access vessels fishing open area days-at-sea and LAGC IFQ vessels fishing open trips. The Nantucket Lightship North would revert to open bottom, with the timing of the opening dependent on the alternative selected in Section 4.4 (Access Area Trip Allocations to the LAGC IFQ Component).

The specific allocations associated with Alternative 3 include:

- The FY2023 Annual Projected Landings (APL) for this alternative are 25.2 million pounds (open area F=0.46, 22 DAS), or 26.3 million pounds (open area F=0.51, 24 DAS) before set-asides are accounted for (i.e., RSA, observer, NGOM). The Research Set-Aside, Observer Set-Aside, and incidental catch total for 2023 is 800 mt or 1.76 million pounds. The NGOM Set-Aside would be additive to these APL values based on the Council preferred option in Action 2 (Section 4.2).
- Each full-time limited access vessel would be allocated a total of 28,000 Area II access area pounds and the trip limit would be set at 14,000 pounds per trip.
- Access area allocations would be set at 11,200 pounds for part time (PT) limited access vessels and 2,340 pounds for occasional limited access vessels. The LA PT trip limit would be set at 11,200 pounds and PT vessels would receive one trip to Area II. The occasional LA trip limit would be set at 2,340 pounds and occasional vessels would be able to fish their allocation in Area II.
- The LAGC incidental target TAC would be set at 50,000 lbs.

- Allocated LA access area trips would be available in the same access areas defined by Framework 34 for FY2023 and the first 60 days of FY2024, even if the area is scheduled to close in FY2024 (Map XX). Vessels planning to fish FY2023 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, 2024.
- Research Set-Aside (RSA) compensation fishing would be allowed only in the open area under this alternative, though the Council could elect to allow LAGC IFQ vessels to fish RSA compensation in the NLS-North during the first 90 days of the fishing year under the action alternative being considered in Section 4.4.

FY2024 default measures under Alternative 3 would allocate 75% of FY2023 days at sea for the limited access component and 75% of FY2023 quota allocations to the LAGC IFQ component. No default access area trips would be allocated for FY2024 under this alternative.

Rationale: Focusing access area effort in Area II is in response to this region containing the highest level of exploitable biomass in 2022. Expanding the Area II boundary to include Closed Area II East will allow the fishery to target exploitable biomass that has been in a rotational closure since FY2020 and to spread effort out across a larger area compared to the configuration employed by the Council in FY2021 and FY2022. The majority of scallops in Area II Access Area are considered exploitable and are supporting access area fishing in the current fishing year (i.e., FY2022).

The strongest signal of recruitment observed in the 2022 surveys was in Area I and the Elephant Trunk. The 2022 surveys also observed recruitment in the Nantucket Lightship West, which was closed at the start of FY2022. The New York Bight was closed at the start of FY2022 to allow a large year class of scallops to grow in the absence of scallop fishing. Observations from the 2022 surveys suggest that scallops in the New York Bight would benefit from a continued closure in FY2023, with the expectation that this area could be accessible to the fishery in FY2024. Closures of Area I, the Elephant Trunk, and continued closures of the New York Bight and Nantucket Lightship West, are anticipated to optimize growth of juvenile scallops with the expectation of supporting scallop fishing in the future.

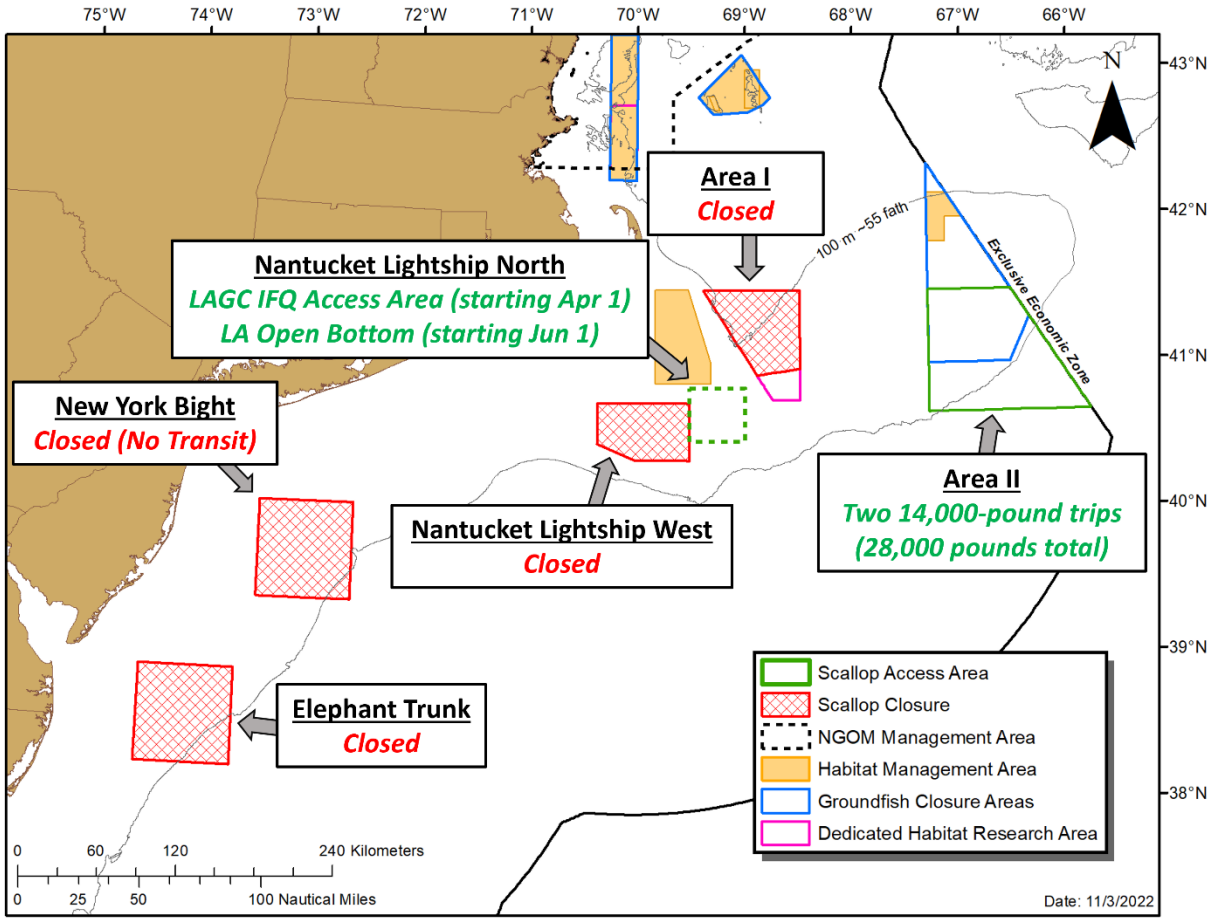
The 2022 surveys of the Nantucket Lightship South observed a substantial drop in biomass and reports from industry members suggested that catch rates in this area became to low to be viable in May of 2022. A large portion of FY2022 access area allocations to the Nantucket Lightship South has not been landed as a result of the downturn biomass in this area early in FY2022. Maintaining the Nantucket Lightship South access area boundary for the first 60 days of FY2023 will allow vessels with remaining FY2022 allocation to fish in this area if they elect to do so, before the area is reverted to open bottom. Given the low biomass in this area, reverting the NLS-South to open bottom is consistent with the principles the of rotational management system employed by the Council.

The Nantucket Lightship Triangle is a small area established by the Council in FY2020 that could be used for research purposes. The NLS-Triangle contains some biomass, but not enough to support equitable access by the limited access component of the fishery. Reverting the NLS-Triangle to open bottom after the first 60 days of FY2023 will allow for limited access vessels fishing days at sea and LAGC IFQ vessels fishing open trips to target the biomass in this area and is also expected to spread out open area in general. Reverting the area to open bottom after the first 60 days of FY2023 will align with the time of year when meat yield is at its peak. Given that fishing in either the NLS-South and NLS-Triangle could be expected to occur on the shared boundary of both areas, reverting the NLS-Triangle and NLS-South to open bottom on the same schedule (i.e., after the first 60 days of FY2023) avoids a situation where vessels could be fishing a small area of open bottom (i.e., NLS-Triangle) directly adjacent to vessels fishing access area allocations (i.e., NLS-South).

The Nantucket Lightship North has traditionally been a productive area that has been accessed by the scallop fishery only through the rotational management program. While some larger scallops were observed in the NLS-North in the 2022 surveys, little to no recruitment has been observed in this area for

the past several years and there is not enough biomass to support equitable access by the fishery through the rotational management program. Reverting the NLS-North to open bottom will allow fishermen to target the larger scallops that persist in this area on open trips if they so choose, and is expected to spread open area effort out in general.

Map 6 – Spatial management under Alternative 4.



4.3.4.1 Option 1 – Open Areas Fished at F=0.46 (22 DAS)

Option 1 would allocate 22 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.46. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 23,058,412 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,268,213 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,152,921 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 951,159 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 1 are shown in Table 7.

4.3.4.2 Option 2 – Open Areas Fished at F=0.51 (24 DAS)

Option 2 would allocate 24 days at sea to full time limited access vessels which is expected to result in an average open area fishing mortality rate of F=0.51. The specifical allocations associated with Alternative 2 Option 1 include:

- The APL after set-asides are removed would be 24,156,314 pounds.
- The LAGC IFQ (5.5%) allocation would be 1,328,597 pounds. The LAGC IFQ only (5% of the APL) allocation would be set at 1,207,816 pounds. The FY2024 default LAGC IFQ quota (5.5%) would be set at 75% of the FY2023 value, which would be 996,448 pounds.
- FY2023 and FY2024 (default) day at sea allocations for full-time, part-time, and occasional permits under Option 2 are shown in Table 8.

4.3.5 Alternative 5 – Status Quo

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

4.4.1 Alternative 1 – No Action (Default measures from FW34)

Alternative 1 would set LAGC IFQ access area trips at 357 trips to Area I with a possession limit of 800-pounds per trip, which is the number of trips specified through default measures in Framework 34. The LAGC IFQ fishery is allocated a fleet wide total number of access area trips and 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 34 specified a set number of LAGC IFQ access area trips in default measures to provide LAGC IFQ vessels fishing opportunities should updated specifications for FY2023 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 Area II Access Area Allocation to the Nantucket Lightship North and Area II

Under Alternative 2, the total number of access area trips allocated to the LAGC IFQ component would be the 800-pound trip equivalent of 5.5% of the access area allocation to the full time limited access component specified in Section 4.3. Table 9 shows the total number of LAGC IFQ trips that would be allocated based on the FT LA access area trip options being considered for FY2023 (i.e., two 10,000-pound trips per FT LA vessel, two 12,000-pound trips per FT LA vessel, and two 14,000-pound trips per FT LA vessel).

Alternative 2 would make the total LAGC IFQ access area trip allocation available in both Area II and the Nantucket Lightship North. There would not be a specific number of trips allocated to Area II or the Nantucket Lightship North, but rather, vessels would be able to fish in either area and trips would be counted against the total trip allocation. Once the total trip allocation is projected to have been taken, both areas would be closed to LAGC IFQ access area fishing for the remainder of the fishing year.

Under Alternative 2, the Nantucket Lightship North would be reserved as an access area for the LAGC IFQ component for the first 90 days of FY2023 (i.e., April 1, 2023 through June 30, 2023). During this time, the only fishing that could occur in the Nantucket Lightship North would be LAGC IFQ vessels fishing access area trips including trips that are fishing Research Set-Aside (RSA) compensation pounds. After the first 90 days of FY2023 (i.e., starting July 1, 2023), the Nantucket Lightship North would become available to the LA component as part of the open bottom and LA vessels could choose to fish there while operating under days at sea management. LAGC IFQ vessels would be able to continue fishing access area trips at an 800-pound possession limit in the Nantucket Lightship North until the total LAGC IFQ access area trip allocation is projected to have been caught. Once the total LAGC IFQ access area trip allocation is projected to have been caught, the Nantucket Lightship North would be considered part of the open bottom for the LAGC IFQ component and vessels could choose to fish open trips in this area at the 600-pound possession limit.

Rationale: Given the outlook for FY2023, access area fishing opportunities for the FT LA component are limited to Area II, which is on eastern Georges Bank. In the past, the Council has distributed the portion of Area II LAGC IFQ access area trips to nearshore areas to provide fishing opportunities to this component of the fishery, which is made up of smaller day-boats. Allowing LAGC IFQ access area trips to be fished in Area II and the Nantucket Lightship North provides access area fishing opportunities in both nearshore and offshore areas, though LAGC IFQ activity in Area II is expected to be minimal given its distance from shore. While biomass in the Nantucket Lightship North is too low to support access area effort by the LA component, larger scallops do exist in this area that could make LAGC IFQ trips viable. Reverting the area to open bottom after the first 90 days of FY2023 would allow LAGC IFQ vessels to fish access area trips at the 800-pound possession limit before the area could be targeted by the LA component of the fishery fishing under days at sea management. This is a unique approach that creates access area fishing opportunities for the LAGC IFQ component should they choose to fish trips in either area, and also creates more space for LA vessels fishing under days at sea management once the area reverts to open bottom on July 1, 2023.

Table 9 – The total access area allocation to the LAGC IFQ component under Alternative 2 based on the fishery specification options being considered in Section 4.3.

Specs. Alt.	FT LA AA Description	LAGC Trips to NLS-North/Area II	LAGC Trips to Area I
Alt. 4.3.1	No Action	0	357
Alt. 4.3.2	2 AII trips at 10K	476	0
Alt. 4.3.3	2 AII trips at 12K	571	0
Alt. 4.3.4	2 AII trips at 14K	666	0

4.5 Measures to Reduce Fishery Impacts

[PLACEHOLDER]

4.6 Considered but Rejected Alternatives

No alternatives in this action were considered but rejected.

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 2020). The summary of the management track assessment can be found at: https://apps-nefsc.fisheries.noaa.gov/saw/sasi/uploads/2020_scallop_unit_maindoc_rev.pdf

Overfishing is occurring if F is above F_{MSY}, and the stock is considered overfished if biomass is less than ½ B_{MSY}. The 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 scallops from 1975 - 2019

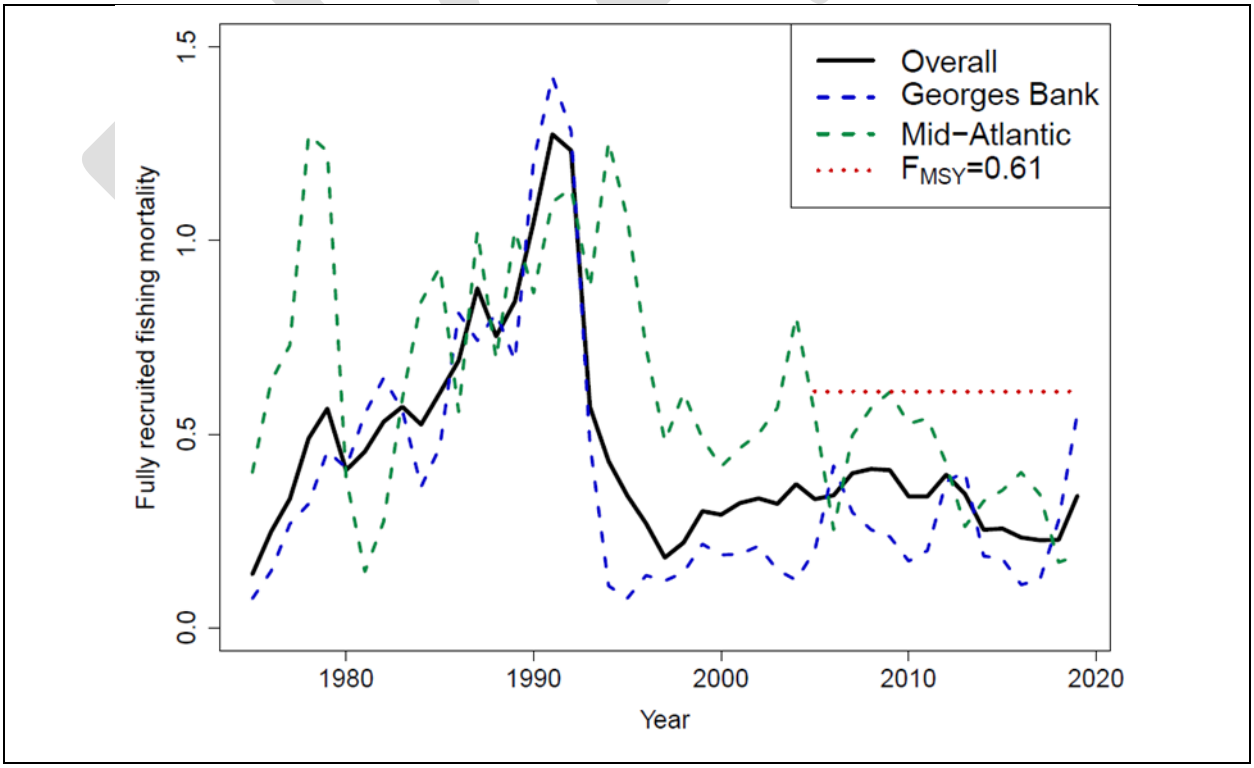


Table 10 – Atlantic sea scallop stock status from recent assessments.

	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

5.2.1.1 Seasonal Meat Yield

Scallop meat yield is known to vary seasonally, corresponding with spawning cycles that can occur twice per year (i.e., in the fall and spring). Scallops typically can lose up to 20% of their meat yield when they spawn (NEFSC 2018). Fishing mortality is correlated with seasonal meat yield trends, particularly in access areas where vessels do not have a time penalty when fishing; for example, vessels fishing during the time of year with low meat yield would need to harvest more scallops compared to when meat yield is high. Seasonal closures that focus access area effort during times of year when meat yield is high are being considered during development of FY2023 specifications (i.e., through this action).

A wide range of studies have focused on meat yield and spawning trends for Atlantic sea scallops. In particular, Appendix II of the 2018 benchmark assessment for scallops (SARC 65, NEFSC 2018) focused on shell height to meat weight relationships and accounted for seasonal meat yield anomalies for the Mid-Atlantic and Georges Bank regions. For Georges Bank and the Mid-Atlantic, meat yield peaked between May and July (Figure 3). Lower meat yields were estimated for both regions in the fall through early spring.

Figure 3 – Mean monthly meat weight anomalies on Georges Bank (left) and Mid-Atlantic (right) open areas from GAM predictions (source: SARC 65 Appendix II).

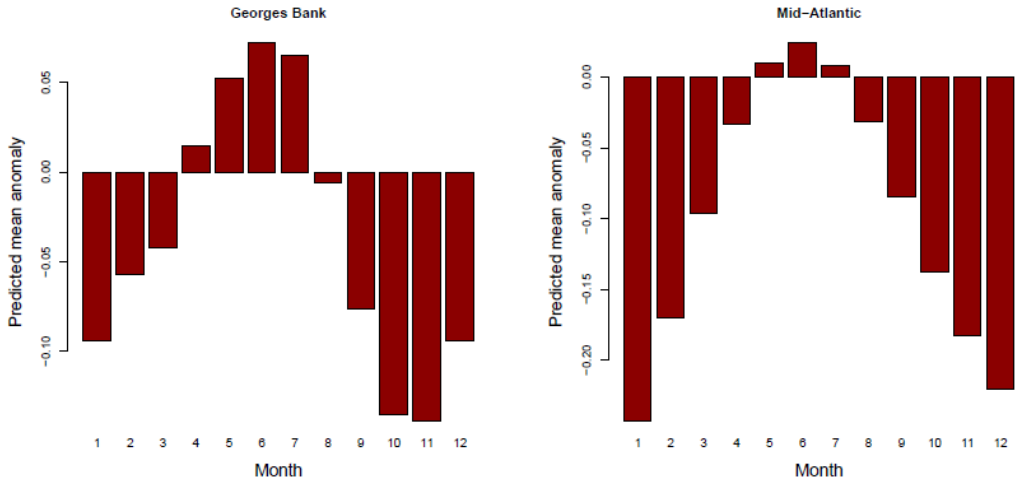


Figure App A2-7: Mean monthly meat weight anomalies on Georges Bank (left) and Mid-Atlantic (right) open areas from GAM predictions.

Hennen and Hart (2012) examined shell height to meat weight relationships and used a GLMM to account for the affect of season on meat yield. The authors noted that meat weights in the MAB were influenced by season. Weights were highest between April and August, and lowest during November to January (Figure 4). On GBK, a bimodal pattern is evident with peaks in December and June, and valleys in April and October.

Figure 4 – Seasonal anomalies in meat weight. The points were fit by a second degree Loess smooth with a 25% span. GBK, Georges Bank; MAB, Mid-Atlantic Bight (source: Hennen and Hart 2012, Fig.7).

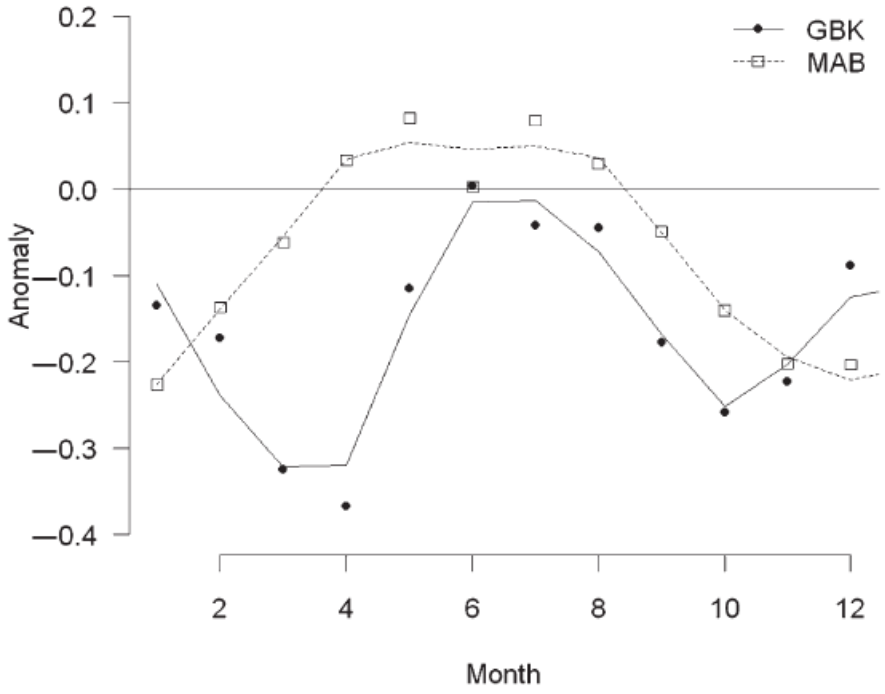


Figure 7. Seasonal anomalies in meat weight. The points were fit by a second-degree Loess smooth with a 25% span. GBK, Georges Bank; MAB, Mid-Atlantic Bight.

Thompson et al. (2014) focusing on identifying spawning events in CAI and CAII by measuring gonadosomatic indices, dry meat yield, and oocyte diameter to gauge spawning intensity. This study indicated a consistent signal in spawning during the study time period (2011, 2012, and 2013) in that scallops tended to spawn in the spring/early summer (April through June), as well as the early fall (October and September) (Figure 5). For both CAI and CAII, meat yield peaked in June throughout the study period, except for in CAI in 2011 which peaked in May.

Figure 5 – Mean dry gonosomatic index (GSI) in Closed Area I (CAI) and CAII in 2011 (A), 2012 (B), and 2013 (C). Vertical lines represent 95th confidence intervals (source: Thompson et al. 2014, Fig.2).

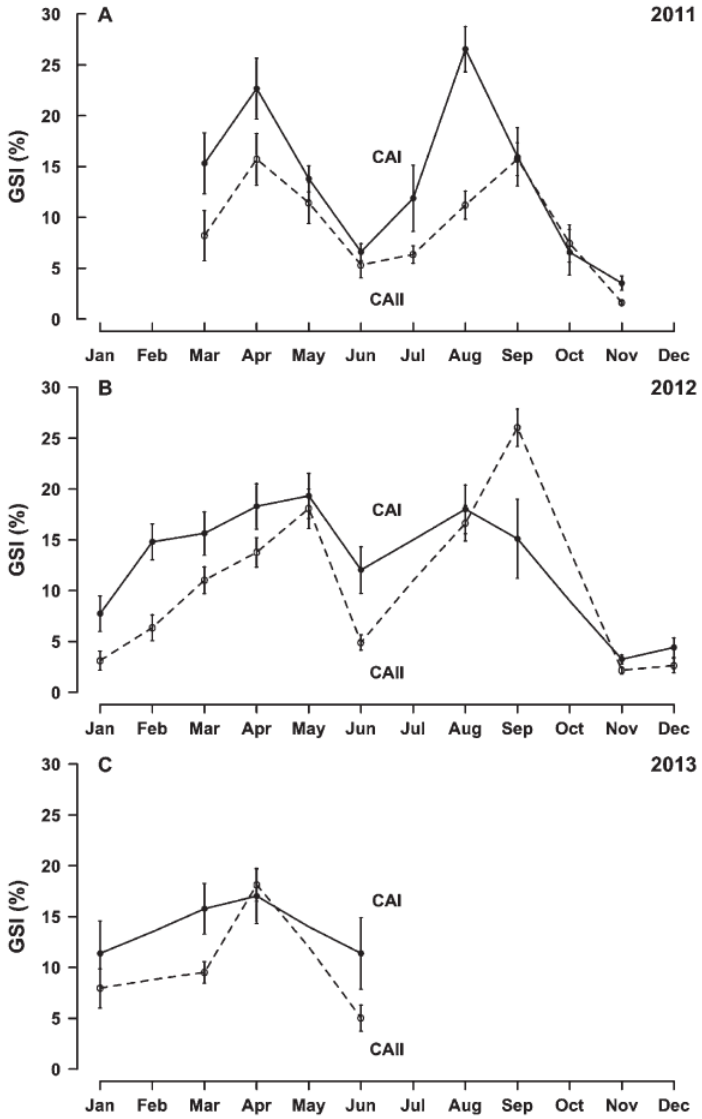


Figure 2. (A–C) Mean dry gonosomatic index (GSI) in Closed Area I (CAI) and CAII in 2011 (A), 2012 (B), and 2013 (C). Vertical lines represent 95% confidence intervals.

Figure 6 – Mean dry meat weight in Closed Ara I (CAI) and CAII in 2011 (A), 2012 (B), and 2013 (C). Vertical lines represent 95% confidence interval (source: Thompson et al. 2014, Fig.3).

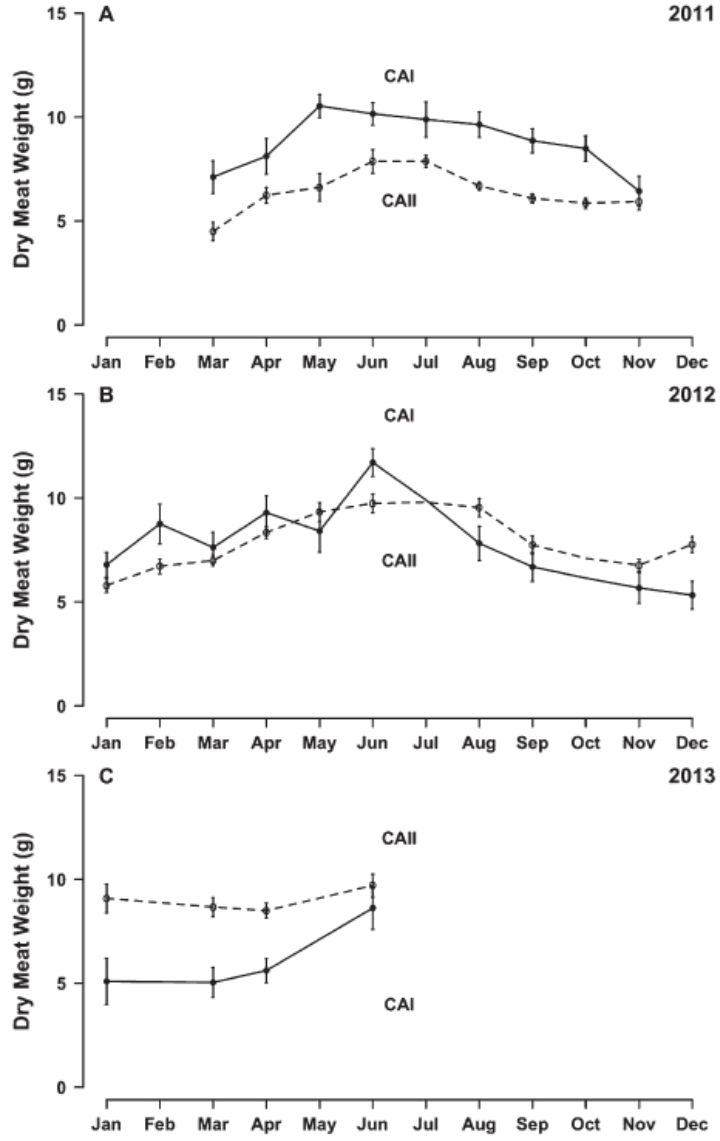


Figure 3. (A–C) Mean dry meat weight in Closed Area I (CAI) and CAII in 2011 (A), 2012 (B), and 2013 (C). Vertical lines represent 95% confidence interval.

5.2.2 Northern Gulf of Maine

The 2022 fishing year marked the first NGOM season under new management measures adopted through Amendment 21 to the Scallop FMP. Data on participation in the NGOM area by LAGC vessels since 2010 is provided below, along with information about permit movement within the LAGC component of the fishery.

5.2.2.1 Northern Gulf of Maine Fishery Data

Table 11 - Number of active vessels, total trips, average landings, and trips per vessel in the NGOM management area from 2010 - 2022. NMFS/GARFO, August 15, 2022.

FY	Mean	Median	Max	Active vessels	Total trips	Average Catch (lbs)
2010	7	6	15	11	81	70
2011	10	4	37	10	95	62
2012	6	1	27	10	60	79
2013	27	23	101	18	483	104
2014	20	11	80	26	507	156
2015	23	16	87	30	682	131
2016	15	15	43	38	567	174
2017	7	7	18	38	278	197
2018	19	20	42	40	751	184
2019	17	18	33	45	753	190
2020	22	22	40	47	1024	170
2021	14	15	29	49	691	190
2022	27	30	50	106	2894	207

Figure 7 - Range of trips per week, per vessel for fishing years 2010- 2022 in the Northern Gulf of Maine. Weeks included were only those when the Northern Gulf of Maine was open. NMFS/GARFO, August 15, 2022.

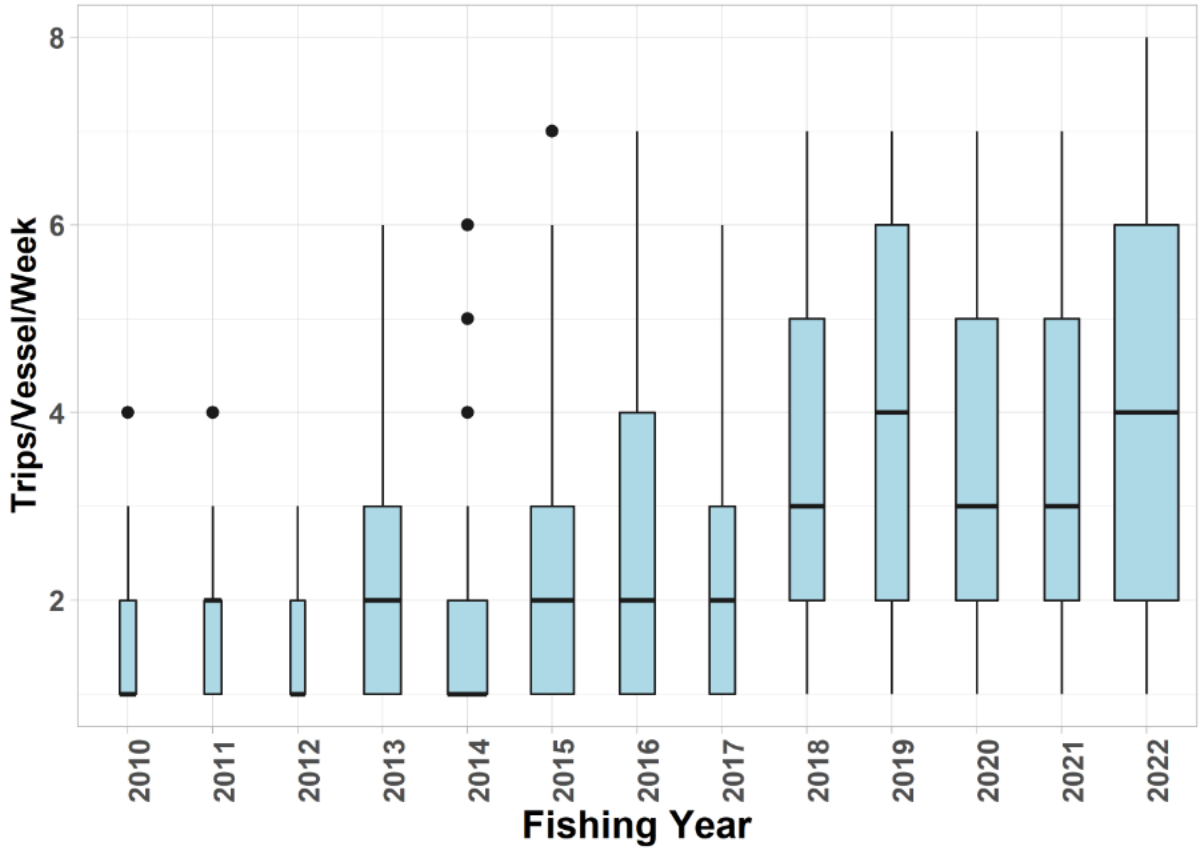


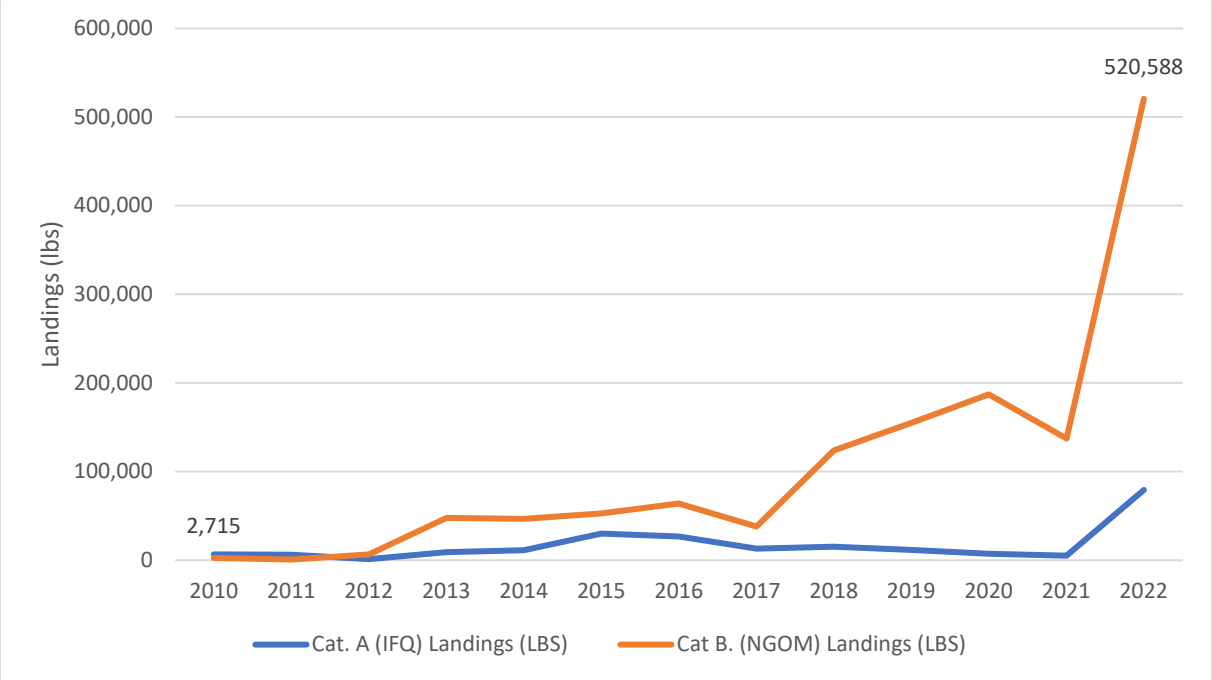
Table 12 - Vessels with multiple sailings/day, and total times this occurred.

FY	Vessels with multi trips	Number of multi trips
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	3	3
2015	0	0
2016	2	2
2017	3	3
2018	7	9
2019	7	14
2020	6	6
2021	2	2
2022	17	21

Table 13 - Number of LAGC Cat. A and Cat. B permits with declared trips to NGOM, 2010 - 2022.

Fishing Year	LGC A (IFQ	LGC B (NGOM)
2010	6	5
2011	6	4
2012	3	6
2013	7	11
2014	7	17
2015	8	20
2016	11	25
2017	10	26
2018	6	34
2019	6	39
2020	3	43
2021	5	44
2022	28	73

Table 14 - NGOM Landings by permits type (Cat. A & Cat. B), 2010 - 2022. Source: NMFS, August 1, 2022.



5.2.2.2 Permit Movement

Currently, LAGC B (NGOM) and LAGC C (Incidental) permit holders may move between these two permit categories annually, or mid-season when a permit is transferred to a new owner. LAGC A (IFQ) permit holders can make a one-time transition from IFQ to NGOM/Incidental.

A summary of permit movement from 2008-2022 (11 years) is in Table 15.

- 31 permits converted from IFQ (A) to NGOM/Inc (B/C)
- 6 permit switches occurred within a year (when a vessel was bought/sold), 5 times a permit switched to B from C.
- 39 permits moved from Incidental to NGOM across years (when renewing a permit)
- 4 moved from NGOM to incidental across years (when renewing a permit)

Table 15. Summary of LAGC conversions and switches between FY 2008 and FY 2022. Data from NMFS/GARFO, August 11, 2022.

Year	Conversion from A to B/C	From B to C Within a year	From C to B Within a year	From B to C Across Years	From C to B Across Years
2008	-	-	-	-	-
2009	0	0	0	0	3
2010	0	0	0	0	1
2011	1	0	0	0	0
2012	1	0	0	2	2
2013	2	0	0	0	0
2014	6	1	1	1	0
2015	0	0	2	0	0
2016	0	0	0	0	0
2017	3	0	0	0	1
2018	3	0	0	0	1
2019	2	0	1	0	1
2020	4	0	0	1	2
2021	6	0	1	0	2
2022	3	0	0	0	26
Total	31	1	5	4	39

Data for 2022 is based on requests received and processed as of August 12, 2022.

Table 16. Number of Scallop LAGC Cat. A (IFQ) MRIs with zero base allocation at the start of the fishing year as of August 11, 2022.

FY	MRI
2011	7
2012	5
2013	28
2014	46
2015	49
2016	66
2017	88
2018	87
2019	94
2020	104
2021	107
2022	102

Table 17 - LAGC IFQ permits with zero allocation by state and permit status (CPH or on a vessel). Data from NMFS/GARFO, August 15, 2022.

	CPH	Vessel
MA	28	28
NJ	9	14
Other	7	18
Total	43	60

Table 18 - Number of LAGC Category B permits issued to vessels, 2010 - 2022. Data from NMFS/GARFO, August 11, 2022.

Fishing Year	Total Cat B Permits
2010	105
2011	97
2012	90
2013	92
2014	90
2015	90
2016	93
2017	95
2018	99
2019	102
2020	109
2021	125
2022	158

Table 19 – Number of LAGC Category B permits issued to vessels in 2022 by homeport state. Data from NMFS/GARFO, August 11, 2022

State	Cat. B Permits
MA	74
ME	66
NC	5
NH	6
NJ	4
Other	4

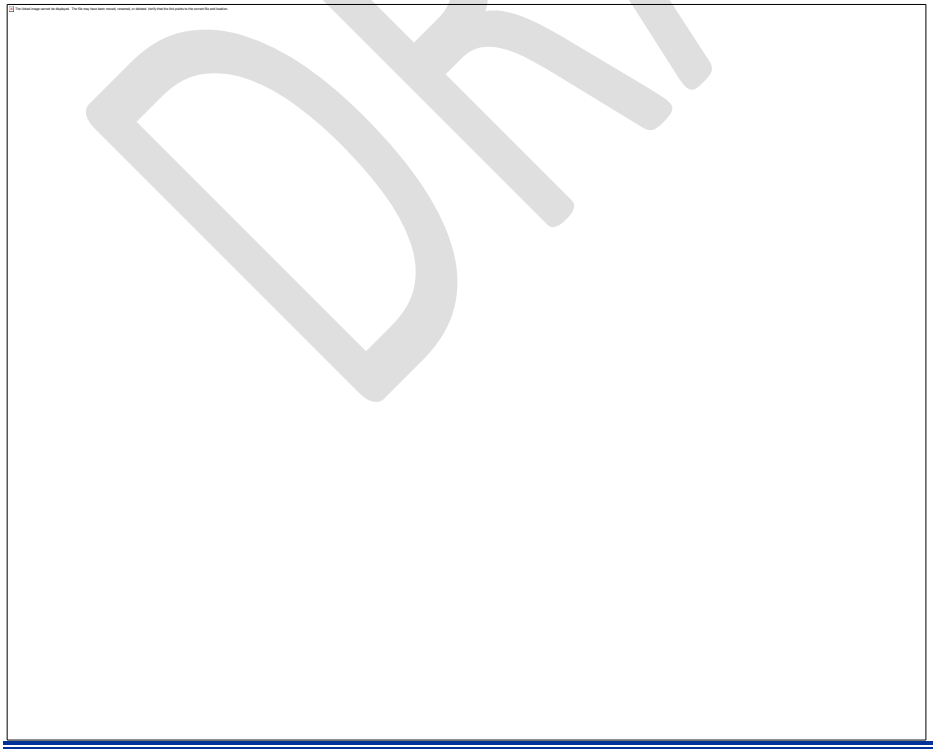
Table 20 - Number of LAGC permits, by category, held by Limited Access vessels in fishing year 2021 and 2022. Data from NMFS/GARFO, August 11, 2022.

	2021 FY	2022 FY
Cat A (IFQ)	40	40
Cat B (NGOM)	28	53
Cat C (Inc)	111	89

5.2.3 Closed Area I – LAGC Trip Landings Data

Figure 8 - Distribution of LAGC landings on CAI trips in FY2022. Source: NMFS/GARFO/APSD, September 13, 2022

Figure 9 - Distribution of LAGC IFQ trip length on CAI trips in FY2022. Source: NMFS/GARFO/APSD, September 13, 2022



5.2.4 Summary of 2022 Scallop Surveys

Table 21 - 2022 Combined survey abundance and biomass estimates

version 3 - Sept.14, 2022

This version updates the NLS-S using VIMS SHMW from 2016-2022, NYB Closure using VIMS SHMW from 2015-2022, MAB nearshore transcription error, and GOM/NGOM estimates using DMR 2021 SHMW with covariates.

		Dredge				DropCam				Habcam				Mean			
Region	Subarea	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt
GB	CL1ACC	4	95	90	23.3	37	524	235	14.2	10	215	13	22.1	17	278	84	16.4
GB	CL1-Sliver+S	3302	3955	1422	1.2	932	4876	2526	5.2	373	1578	33	4.2	1536	3470	966	2.3
GB	CL-2(N)	525	11092	4001	21.1	429	9209	2040	21.5	350	6916	175	19.7	435	9072	1498	20.9
GB	CL-2SE	645	11619	813	17.9	466	8131	1047	17.4	842	7631	248	9.1	651	9127	450	14.0
GB	CL-2SW	143	3783	384	26.8	99	2892	483	29.2	150	3105	158	20.7	131	3260	212	24.9
GB	CL2Ext	408	9371	951	23.1	575	9223	1405	16.0	501	7227	242	14.4	495	8607	571	17.4
GB	SF	764	11714	1207	15.4	537	6377	1479	11.9	627	7328	114	11.7	643	8473	637	13.2
GB	NLSAccN	44	857	63	21.8	71	923	606	13.0	65	990	41	15.3	60	923	204	15.4
GB	NLSAccS-Deep	162	2842	365	17.5	226	2973	1123	13.2	115	2043	42	17.7	168	2619	394	15.6
GB	NLS-W	7	293	31	39.1	36	784	356	21.8	8	202	16	24.1	17	426	119	25.1
GB	NF	216	3707	1664	17.1	92	2264	1081	24.6	315	4414	307	14.0	208	3462	669	16.7
GB	GSC	957	4745	557	5.0	597	9081	1256	15.2	411	5368	44	13.1	655	6398	458	9.8
GB	**TOTAL**	**7177**	**64073**	**4942**	**8.9**	**4097**	**57257**	**4537**	**14.0**	**3767**	**47017**	**538**	**12.5**	**5014**	**56116**	**2244**	**11.2**
MAB	BI	29	680	48	23.5					12	316	10	26.2	21	498	25	24.3
MAB	LI	225	5403	280	24.9					250	5764	51	23.1	238	5584	142	23.5
MAB	NYB	91	1183	93	13.2					50	1028	48	20.4	71	1106	52	15.7
MAB	NYB_Closure	423	8626	496	20.4					328	7041	106	21.5	376	7834	254	20.9
MAB	MAB_Nearshore	52	500	98	10.1					24	390	40	16.5	38	445	53	11.7
MAB	HCS	71	1142	97	16.2					49	1009	69	20.6	60	1076	60	17.9
MAB	ET	676	4733	259	6.9					691	4232	45	6.1	684	4483	131	6.6
MAB	DMV	141	756	100	5.6					89	615	8	6.9	115	686	50	6.0
MAB	VIR	69	327	47	4.7									69	327	47	4.7
MAB	**TOTAL**	**1777**	**23350**	**659**	**13.1**					**1493**	**20395**	**157**	**14**	**1670**	**22036**	**341**	**13.2**
GOM	WGOM Closure					62	2111	420	34.0					62	2111	420	34.0
GOM	Stellwagen South					29	373	43	12.9					29	373	43	12.9
GOM	**TOTAL**					**91**	**2484**	**422**	**27.3**					**91**	**2484**	**422**	**27.3**
NGOM	Stellwagen AOI					66	1337	420	20.3					66	1337	420	20.3
NGOM	Jeffreys					9	186	31	21.2					9	186	31	21.2
NGOM	Platts					6	125	35	20.5					6	125	35	20.5
NGOM	Ipswich					10	160	33	16.6					10	160	33	16.6
NGOM	*Total-no Stellwagen*					*25*	*471*	*99*	*58.3*					*25*	*471*	*99*	*58.3*
NGOM	**TOTAL**					**91**	**1808**	**519**	**19.9**					**91**	**1808**	**519**	**19.9**
TOTAL	**TOTAL**	**8954**	**87423**	**4986**	**9.8**	**4279**	**61549**	**4587**	**14.4**	**5260**	**67412**	**561**	**12.8**	**6774**	**79960**	**2328**	**11.8**

Figure 10 – The 2022 Georges Bank SAMS areas used for projections in FW36.

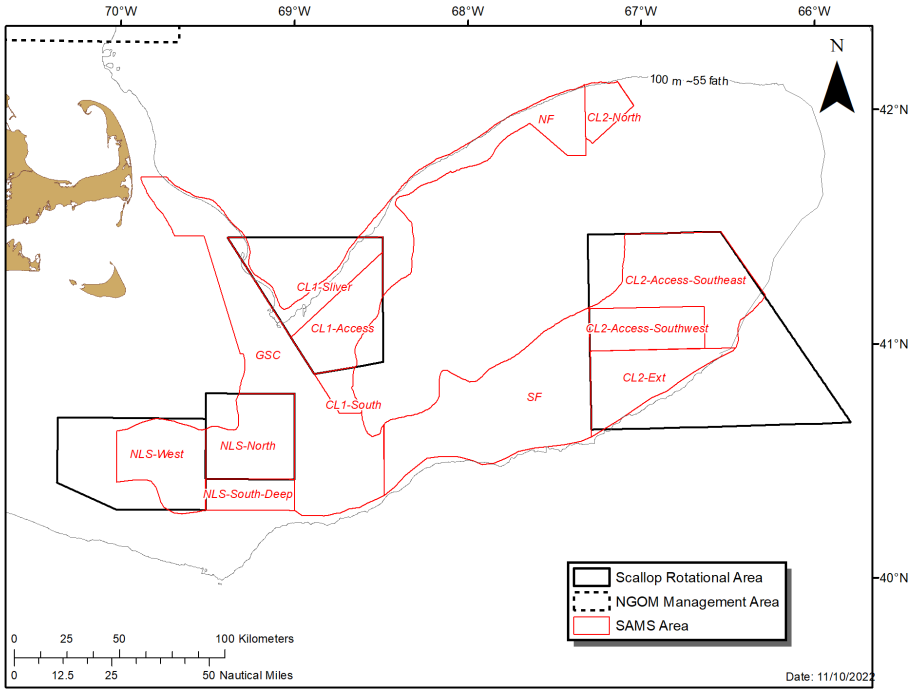
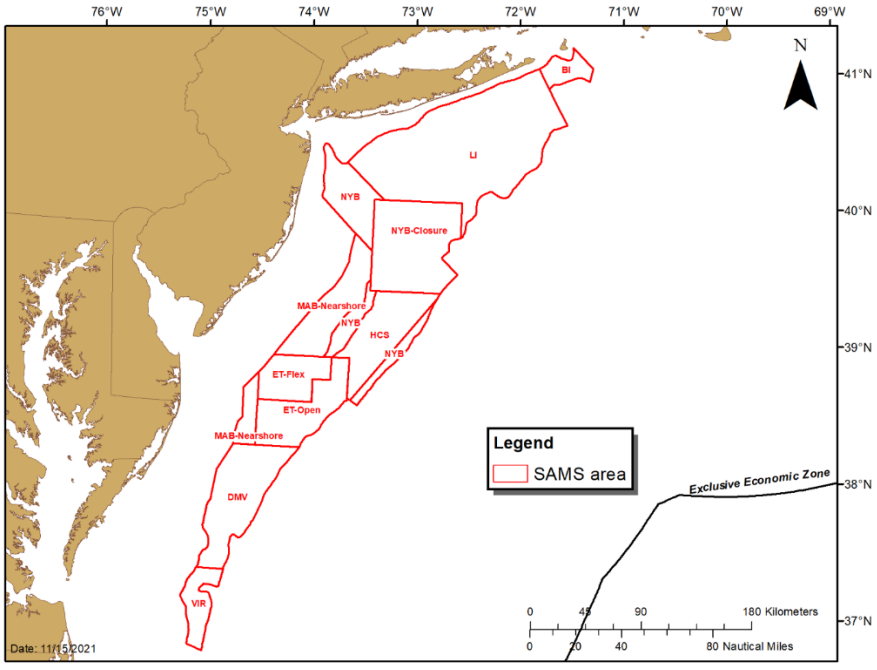


Figure 11 – The 2022 Mid-Atlantic SAMS Areas used for projections in FW36.



5.2.5 2022 Biomass Projections

See: [insert link when posted]

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 discarded, 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 22 for the current status of these species, which has been updated based on Northeast Fisheries Science Center (NEFSC) assessment results through 2020[1], the 2020 Skate Annual Monitoring Report, and Monkfish FW9 (see Section 6.1.2).

[1] NEFSC stock assessment results and supporting documentation can be accessed through the Stock Assessment Support Information (SASINF) portal at: https://apps-nefsc.fisheries.noaa.gov/saw/sasi/sasi_report_options.php

Table 22 – Status of non-target species known to be caught in scallop fishing gear, updated with assessment results through 2021.

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	Unknown	No
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 Stock Assessment Support Information (SASINF) portal: https://apps-nefsc.fisheries.noaa.gov/saw/sasi/sasi_report_options.php

Stock status information also available at the NMFS Stock SMART portal: https://www.st.nmfs.noaa.gov/stocksmart?app=browse-by-stock

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 23 summarizes anticipated catch limits of these four flatfish stocks for FY2023 as well as projected scallop fishery bycatch for FY2023 based on the range of specification alternatives in Action 4 (Section 4.3). More detailed information on bycatch projections are provided in Section 6.3. Table 24 describes a summary of sub-ACLs, projected bycatch, and realized bycatch from the scallop fishery from FY2013 – FY2022, as well as projected bycatch and sub-ACL allocations for FY2023. Out year bycatch projections 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: https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/h/nemultispecies.html

Table 23 – Comparison of 2023 Scallop Fishery flatfish sub-ACLs (mt) with the range of bycatch projections associated with specification alternatives in Section 4.3.

	OFL	US ABC	Scallop sub-ACL	Bycatch Projections
Stock	**2023**	**2023**	**2023**	**2023**
GB Yellowtail Flounder	unknown	XX	16.5	32-45
SNE/MA Yellowtail Flounder	XX	40	2	3
Northern Windowpane Flounder	unknown	160	31	106-126
Southern Windowpane Flounder	XX	XX	129	38-41

Table 24 – Comparison of recent flatfish sub-ACLs, scallop bycatch projections, and realized catch, FY2013-FY2021. 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
2020	sub-ACL	19	2	143	12
	Projected	23	2	143	33
	Actual	1.5	1	86	35
2021	sub-ACL	12	2	129	31
	Projected	16	3	72	29
	Actual	29	1	26	123
2022	sub-ACL	19	2	129	33
	Projected	15-19	2-3	73-81	86-111
	Actual	n/a	n/a	n/a	n/a
2023	sub-ACL	16.5	2	129	31
	Projected	32-45	3	38-41	106-126
	Actual	n/a	n/a	n/a	n/a

5.4 PROTECTED SPECIES

The following protected species are found in the environment in which the sea scallop fishery is prosecuted. Some 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 25 to facilitate consideration of the species most likely to interact with the scallop fishery relative to the preferred alternative.

Table 25 – 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
Oceanic whitetip shark (*Carcharhinus longimanus*)	Endangered	No
Giant Manta Ray (*Manta birostris)*	Threatened	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	ESA Designated	No
Northwest Atlantic Ocean DPS of Loggerhead Sea Turtle	ESA Designated	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 25, 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 (large whales, small cetaceans, or pinnipeds), or ESA-listed species of shortnose sturgeon, giant manta rays, oceanic white-tip sharks, Atlantic salmon, or hawksbill turtles. Further, this action is not likely to adversely modify or destroy designated critical habitats for the Northwest Atlantic Ocean DPS of loggerhead sea turtles or North Atlantic right whales. 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[2]. 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; NMFS 2021).

5.4.2 Species Potentially Impacted by the Alternatives Under Consideration

As noted in Table 25, ESA listed species of sea turtles and Atlantic sturgeon are the only protected species in the affected environment of the scallop fishery that have the potential to be adversely impacted by this fishery and the

[2] Marine Mammal Stock Assessment Reports (SARs) for the Atlantic Region; MMPA List of Fisheries (LOF); NMFS 2021; NMFS Observer Program, unpublished data; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports).

proposed Alternatives. To assist in making this determination, the June 17, 2021, Biological Opinion issued by NMFS on the operation of the scallop fishery was referenced (NMFS 2021). The 2021 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 is not likely to jeopardize the continued existence of the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, and the North Atlantic DPS of 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 over a five-year period. Reasonable and prudent measures and terms and conditions were also issued with the incidental take statement to minimize impacts of any incidental take.

To understand the potential risks that the 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, are provided.

5.4.2.1 Sea Turtles

5.4.2.1.1 Status and Trends

Four sea turtle species have the potential to be impacted by the proposed action: Northwest Atlantic Ocean DPS of loggerhead, Kemp's ridley, North Atlantic DPS of green, and leatherback sea turtles (Table 16). Although stock assessments and similar reviews have been completed for sea turtles none have been able to develop a reliable estimate of absolute population size. As a result, nest counts are used to inform population trends for sea turtle species.

For the Northwest Atlantic Ocean DPS of loggerhead sea turtles, there are five unique recovery units that comprise the DPS. Nesting trends for each of these recovery units are variable; however, Florida index nesting beaches comprise most of the nesting in the DPS (https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/). Overall, short-term trends for loggerhead sea turtles (Northwest Atlantic Ocean DPS) have shown increases; however, over the long-term the DPS is considered stable (NMFS 2021).

For Kemp's ridley sea turtles, from 1980 through 2003, the number of nests at three primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) increased 15 percent annually (Heppell et al. 2005); however, due to recent declines in nest counts, decreased survival of immature and adult sea turtles, and updated population modeling, this rate is not expected to continue and therefore, the overall trend is unclear (NMFS and USFWS 2015; Caillouett et al. 2018). In 2019, there were 11,090 nests, a 37.61% decrease from 2018 and a 54.89% decrease from 2017, which had the highest number (24,587) of nests; the reason for this recent decline is uncertain (see NMFS 2021). Given this and continued anthropogenic threats to the species, according to NMFS (2021), the species resilience to future perturbation is low.

The North Atlantic DPS of green sea turtle, overall, is showing a positive trend in nesting; however, increases in nester abundance for the North Atlantic DPS in recent years must be viewed cautiously as the datasets represent a fraction of a green sea turtle generation which is between 30 and 40 years (Seminoff et al. 2015). While anthropogenic threats to this species continue, taking into consideration the best available information on the species, NMFS (2021), concluded that the North Atlantic DPS appears to be somewhat resilient to future perturbations.

Leatherback turtle nesting in the Northwest Atlantic is showing an overall negative trend, with the most notable decrease occurring during the most recent time frame of 2008 to 2017 (NW Atlantic Leatherback Working Group

2018). The leatherback status review in 2020 concluded that leatherbacks are exhibiting an overall decreasing trend in annual nesting activity (NMFS & USFWS 2020). Given continued anthropogenic threats to the species, according to NMFS (2021), the species' resilience to additional perturbation both within the Northwest Atlantic and worldwide is low.

5.4.2.1.2 Occurrence and Distribution

During the development of Framework 26 to the Scallop FMP in 2015, 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 is a summary of the information in FW26 with any updates since the issuance of the framework provided. For additional details on the sources of information used to develop this section, refer to Section 4.3.2.1 of Framework 26. Further 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 the NMFS Biological Opinion on the Scallop FMP (NMFS 2021); sea turtle status reviews and biological reports (Conant et al. 2009; Hirth 1997; NMFS & USFWS 1995; 2007a; b; 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; 2020), 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 (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly et al. 1995a; Epperly et al. 1995b; Mitchell et al. 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 (Epperly et al. 1995b; 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; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 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 (Braun-McNeill & Epperly 2004; Epperly et al. 1995a; Epperly et al. 1995b; Epperly et al. 1995c; 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 (Epperly et al. 1995b; 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). In the portion of the scallop fishery operating in the NGOM, hard-shelled sea turtles are most likely to be present, and overlap with the scallop fishery from June through September; however, their presence, albeit lower, is still possible from October through December (NMFS 2021).

- **Leatherback sea turtles**

Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (Dodge et al. 2014; James et al. 2005; James et al. 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; James et al. 2005; Murphy et al. 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; James et al. 2005; James et al. 2006).

5.4.2.1.3 Gear Interactions

As in Section 5.4.2.1.2, 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 (Braun-McNeill & Epperly 2004; Braun-McNeill et al. 2008; Braun & Epperly 1996; Dodge et al. 2014; Epperly et al. 1995a; Epperly et al. 1995b; Griffin et al. 2013; James et al. 2005; James et al. 2006; Mitchell et al. 2003; Morreale & Standora 2005; NMFS & USFWS 1992; Shoop & Kenney 1992; TEWG 2009). Thus, sea turtles often occupy many of the same ocean areas used 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 (Epperly et al. 2002; Haas et al. 2008; Henwood & Stuntz 1987; Lutcavage et al. 1997; Murray 2011; NMFS 2012; Sasso & Epperly 2006; Warden 2011a; c).

- **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 (NEFSC 2016; 2017; 2018; Murray 2015a; 2021) . There is insufficient data available to conduct a robust model-based analysis to estimate sea turtle interactions with scallop dredge gear outside the Mid-Atlantic. As a result, the bycatch estimates and the discussion below are based on observed sea turtle interactions in scallop dredge gear in the Mid-Atlantic. 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. Note, 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.

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 2020a; Murray 2015a; 2021).

Most recently, Murray (2021) estimated loggerhead interactions in the Mid-Atlantic scallop dredge fishery from 2015-2019. The average annual estimate of loggerhead sea turtle interactions (observable and inferred) in scallop dredge gear was 155 loggerhead sea turtles per year (95% CI: 3-22; Murray 2015a), with 53 of these interactions being lethal. These 155 loggerheads equate to 31 adult equivalents per year, and 11 adult equivalent mortalities (Murray 2021). The estimated number of interactions from 2015-2019 is higher than in 2009-2014; however, Murray (2021) notes that there could be a number of reasons for this higher estimate. This includes, a higher number of dredge hours in the Mid-Atlantic (greater effort) between 2015-2019 compared to 2009-2014, as well as the analyses using a different method to estimate interactions compared to previous years estimates (i.e., used a stratified ratio estimator instead of a generalized additive model; Murray 2021).

- **Sea Scallop Trawl Gear**

Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso and Epperly 2006; NMFS Observer Program, unpublished data). Since 1989, the date of our earliest observer records for federally managed fisheries, sea turtle interactions with trawl gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2008; Murray 2015b; Murray 2020; NMFS Observer Program, unpublished data; Warden 2011 a, b). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with trawl gear in this region. As a result, the bycatch estimates and discussion below are for trawl gear in the Mid-Atlantic and Georges Bank.

Murray (2020) provided information on sea turtle interaction rates from 2014-2018 (the most recent five-year period that has been statistically analyzed for trawls). Interaction rates were stratified by region, latitude zone, season, and depth. The highest loggerhead interaction rate (0.43 turtles/day fished) was in waters south of 37º N during November to June in waters greater than 50 meters deep. The greatest number of estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters less than 50 meters deep. Within each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads (Murray 2020).

Based on Murray (2020)[3], from 2014-2018, 571 loggerhead (CV=0.29, 95% CI=318-997), 46 Kemp's ridley (CV=0.45, 95% CI=10-88), 20 leatherback (CV=0.72, 95% CI = 0-50), and 16 green (CV=0.73, 95% CI=0-44) sea turtle interactions were estimated to have occurred in bottom trawl gear in the Mid-Atlantic region over the five-year period. On Georges Bank, 12 loggerheads (CV=0.70, 95% CI=0-31) and 6 leatherback (CV=1.0, 95% CI=0-20) interactions were estimated to have occurred from 2014-2018. An estimated 272 loggerhead, 23 Kemp's ridley, 13 leatherback, and 8 green sea turtle interactions resulted in mortality over this period (Murray 2020b). Subsequently, Linden (2020) partitioned out the sea turtle takes that were estimated to have occurred in trawls catching scallops between 2014-2018 using effort data from Vessel Trip Reports (VTRs) and estimated interaction rates from Murray (2020) (Table 26).

[3] (Murray 2018; 2020b) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2015b; Murray & Orphanides 2013b; Warden 2011b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be similar to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007; Murray & Orphanides 2013b; Orphanides 2010).

Table 26 – Estimated sea turtle takes attributed to scallop trawls between 2014–2018. Mean with lower and upper 95% confidence intervals presented for each species (Linden 2020; NMFS 2021).

Sea Turtle Species	Mean	lower	upper
Loggerhead	6.60	1.34	12.83
Kemp's ridley	0.89	0.41	1.51
Leatherback	0.18	0.00	0.43
Green	0.26	0.00	0.76

5.4.2.2 Atlantic Sturgeon

5.4.2.2.1 Status and Trends

Atlantic sturgeon, from any DPS, are identified as having the potential to be impacted by the proposed action (Table 30). The ASMFC released a new benchmark stock assessment for Atlantic sturgeon in October 2017 (ASMFC 2017). Based on historic removals and estimated effective population size, the 2017 stock assessment concluded that all five Atlantic sturgeon DPSs are depleted relative to historical levels. However, the 2017 stock assessment does provide some evidence of population recovery at the coastwide scale, and mixed population recovery at the DPS scale (ASMFC 2017). The 2017 stock assessment also concluded that a variety of factors (i.e., bycatch, habitat loss, and ship strikes) continue to impede the recovery rate of Atlantic sturgeon (ASMFC 2017).

5.4.2.2.2 Atlantic Sturgeon 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 Atlantic sturgeon DPSs in the affected environment of the scallop fishery. Below, is a summary of the information provided in FW 26, with any updates (i.e., literature) since the issuance of the framework provided. 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), NMFS (2021), 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 et al. 1984; Dovel & Berggren 1983; Dunton et al. 2012; Dunton et al. 2015; Dunton et al. 2010; Erickson et al. 2011; Kynard et al. 2000; Laney et al. 2007; O'Leary et al. 2014; Stein et al. 2004b; Waldman et al. 2013; Wirgin et al. 2015a; Wirgin et al. 2015b; 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 et al. 2015a; Wirgin et al. 2015b; 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 et al. 2013; Dunton et al. 2012; O'Leary et al. 2014; Waldman et al. 2013; Wirgin et al. 2015a; Wirgin et al. 2015b; 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 et al. 2004a; b); 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; b; 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.

5.4.2.2.3 Gear Interactions

According to the NMFS Biological Opinion on the sea scallop fishery issued on June 17, 2021, 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 scallops. However, NEFOP observer data has recorded one (1) Atlantic sturgeon interaction with scallop dredge gear targeting Atlantic sea scallops; this sturgeon was released alive (NMFS 2021).

5.5 PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

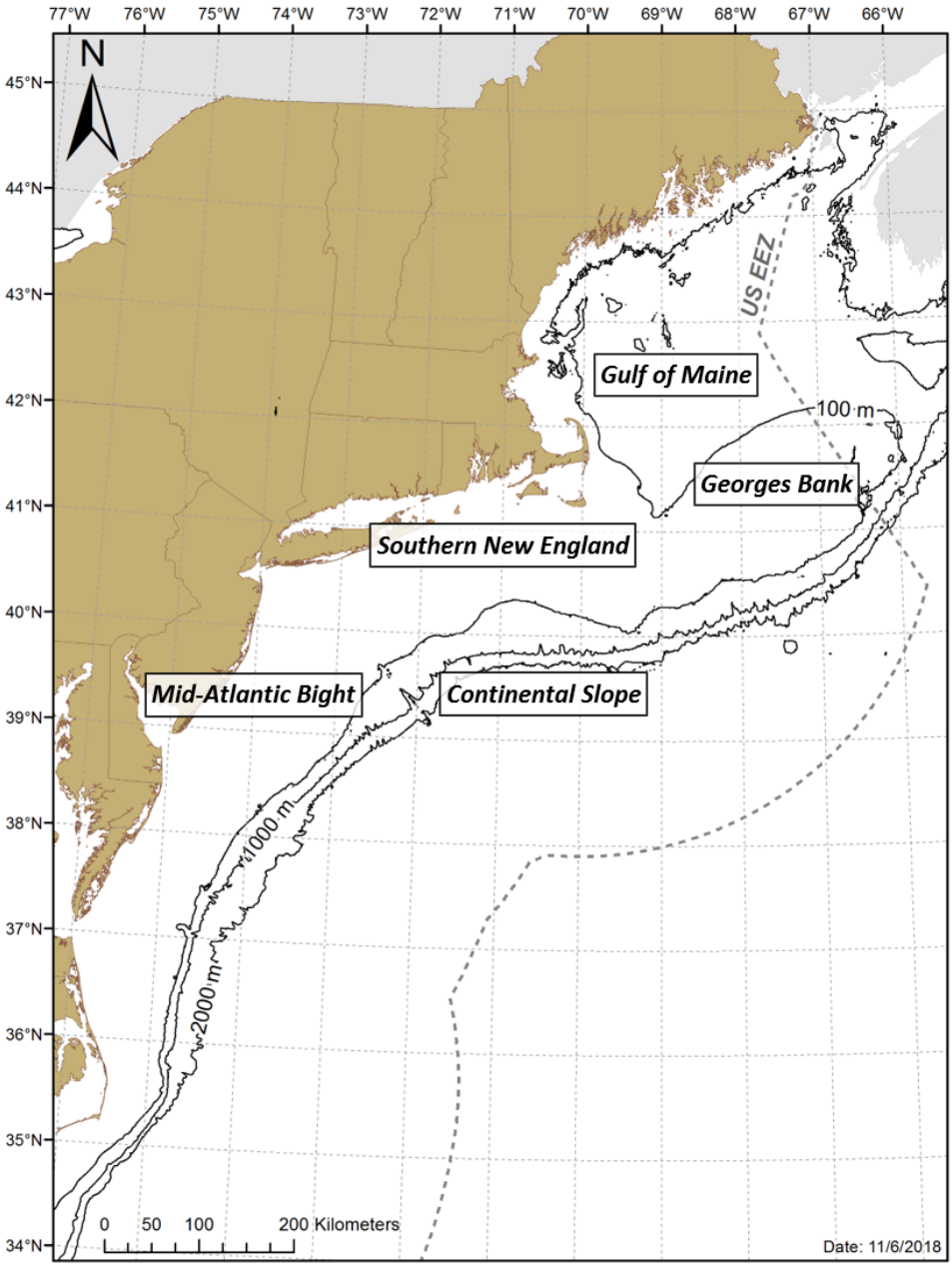
The Northeast U.S. Shelf Ecosystem includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream to a depth of 2,000 m (Map 7) (Sherman et al. 1996). Four distinct sub-regions 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 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 surfclam, 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. EFH designations for NEFMC-managed species are provided here: https://s3.us-east-1.amazonaws.com/nefmc.org/NEFMC_EFH_Designations.pdf. Table 27 describes information on the geographic area, depth, and EFH description MAFMC-managed species.

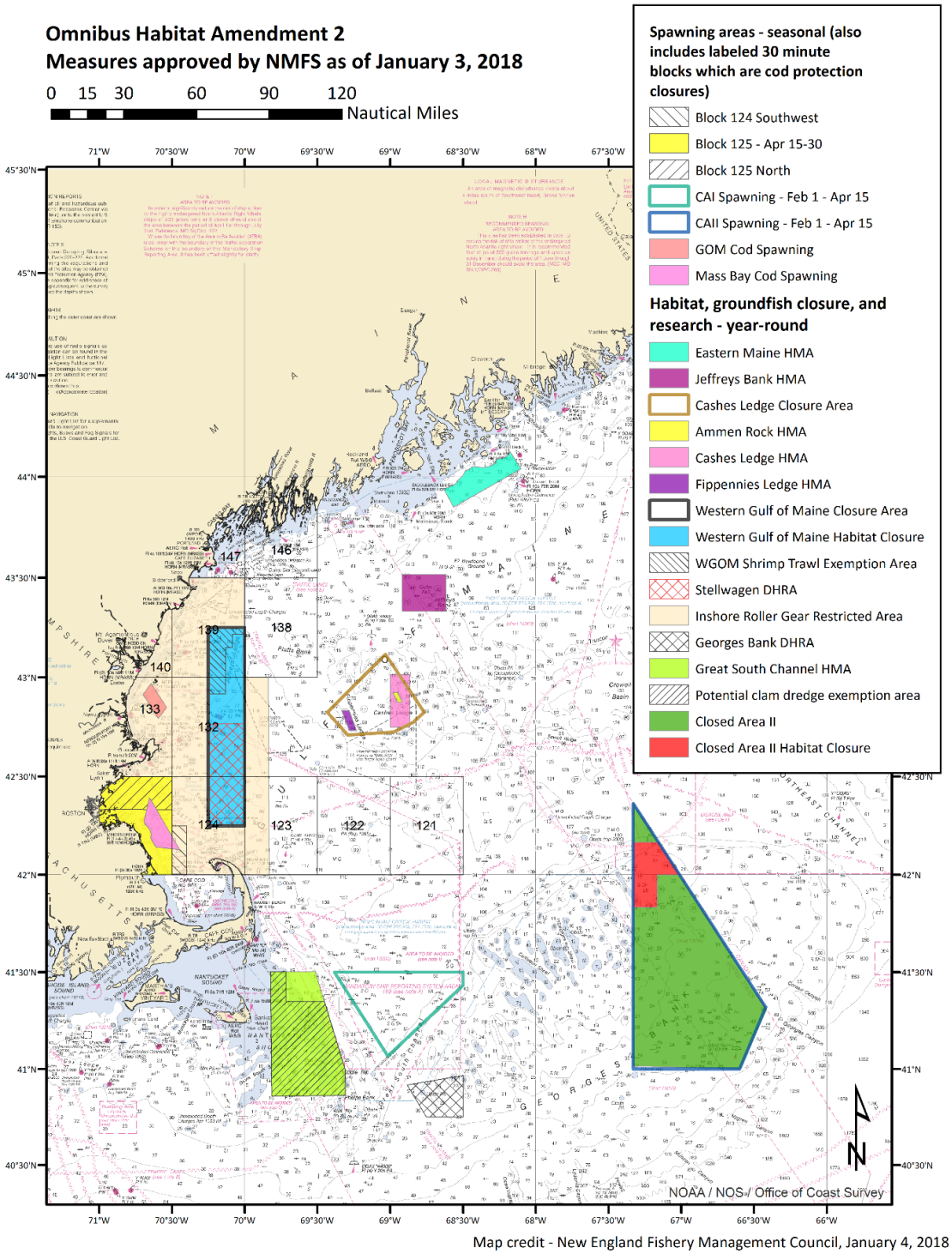
Another purpose of OHA2 was to evaluate existing habitat management areas and develop new habitat management areas. To assist with this effort, an analytical approach was developed to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types 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. The model has since been updated and is referred to as the Fishing Effects model. More information is available here: https://www.nefmc.org/library/fishing-effects-model. A final decision regarding OHA2 was published by the NMFS on January 3, 2018, with implementation

of the amendment on April 9, 2018. Map 8 shows the approved habitat management areas and seasonal spawning areas. For more detailed descriptions of the approved OHA2 areas the reader is referred to the Council website (OHA2 FEIS, Vol. 2).

Map 7 – Northeast U.S. Shelf Ecosystem and geographic extent of the US sea scallop fishery.



Map 8 – 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 27 – Geographic distributions and habitat characteristics of Essential Fish Habitat designations for benthic fish and shellfish species managed by the 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
Atlantic surfclam	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
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
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
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
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
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

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
* 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.				

5.6 HUMAN COMMUNITIES

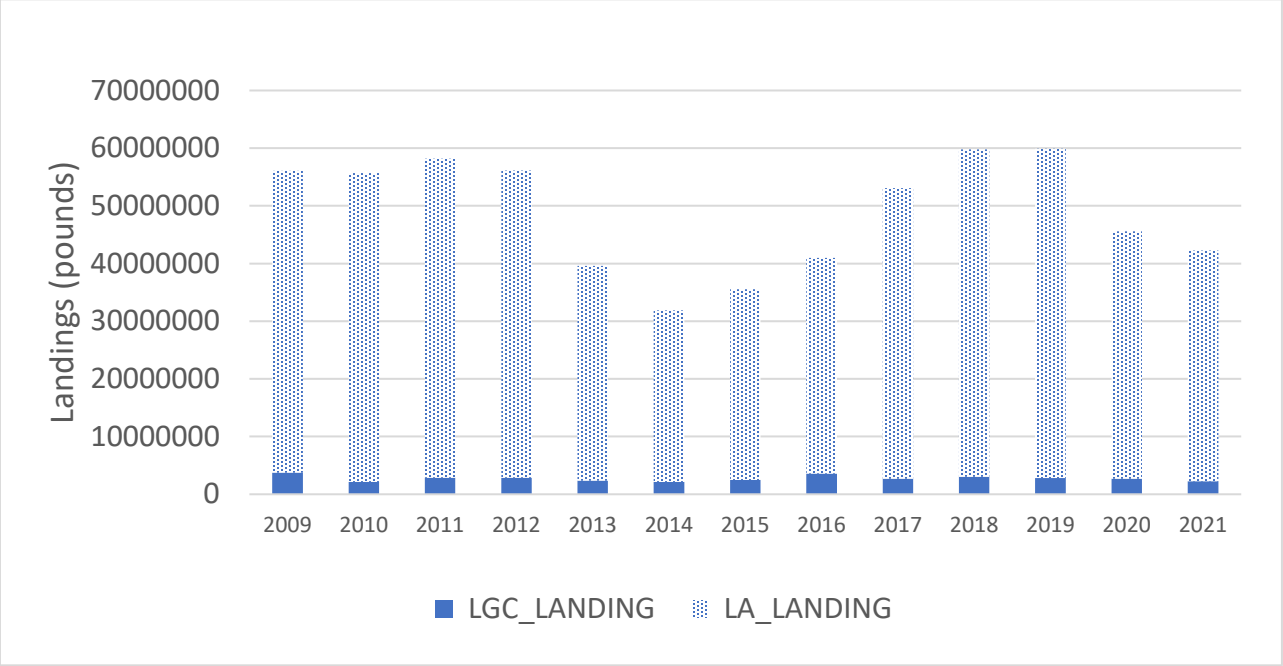
5.6.1 Economic Trends in the Sea Scallop Fishery

5.6.1.1 Trends in landings, prices and revenues

During fishing years 2009-2021, scallop landings ranged from about 32 to 60 million pounds. In FY2021, the total scallop landings from all permit categories decreased to about 42.25 million pounds, i.e., about 7 percent decrease from 2020 landings. Most of the scallop landings were attributed to limited access (LA) vessels. The landings in FY2020 partly declined due to Covid-19 for the health safety concern of harvesting crews beside a lower projected landing in FW33. Landings from LA vessels significantly decreased by about 14 million pounds from roughly 57 million pounds of scallops in 2019 to about 43 million pounds in 2020 and 40 million pounds in 2021 (Table 28 and Figure 12).

Landings by the LGC vessels declined after 2009 as a result of the implementation of Amendment 11, which transitioned the open access general category fishery to a limited access program and capped overall catch of this component at 5.5% of the fishery wide ACL. Landings by the LGC fishery (i.e., IFQ, NGOM and incidental permits) slightly decreased in 2020 to about 2.69 million from 2.83 million pounds in 2019 (Table 28 and Figure 12). The landings in 2021 further declined by about 17% to 2.24 million compared to the 2020 landings.

Figure 12. Scallop landings (in lbs.) by permit category (FY2009-FY2021).



Note: LGC only landing (IFQ or NGOM but excludes INCI); LA landing = (SC_% =T)

Scallop landings, revenue, and ex-vessel price per pound have fluctuated over the FY2009 to FY2021 time period. Landings and revenue are closely related in that increases in overall landings drives increases in overall revenue. Variability in ex-vessel price is correlated with landings volume – for example, upward trends in landings have led to downward trends in average ex-vessel price per pound (Table 28 and Figure 13). Interannual variability in landings, revenue, and average ex-vessel price per pound over the past ten fishing years is displayed in Table 28 and Figure 13.

In more recent fishing years, average scallop price remained at about $13.11 per pound during 2014-2016, but it fell to slightly above $10 per pound in 2017 due to an increase in scallop landings. The prices in 2018 and 2019 were $9.37 per pound and $9.17 per pound, respectively. Although price declined in 2019 relative to 2018 or prior years, scallop revenue increased to about $562 million in 2018. In 2019, revenue declined slightly to $553 million. In 2020, revenue further declined to $476.53 million even though price increased compared to 2019. However, both scallop price and revenues increased significantly in 2021 even though scallop landings in 2021 was lower compared to 2020.

Overall scallop price increased by about 46% in 2021 compared to 2020. Overall scallop price increased to about $16 per pound in 2021 compared to $11 per pound in 2020. Scallop revenue was about $686 million in 2021 compared to about $507 million in 2020. Although landing declined by about 7 percent, but revenue increased by 39% in 2021 compared to 2020. Increase in scallop price and revenue in 2021 was due to strong consumer demand together with some inflationary pressure in the general economy in recent years (Table 28 and Figure 13).

Figure 13. Trends in total scallop revenue and ex-vessel price per pound (both in 2021 $) by fishing year (LA & LAGC fisheries)

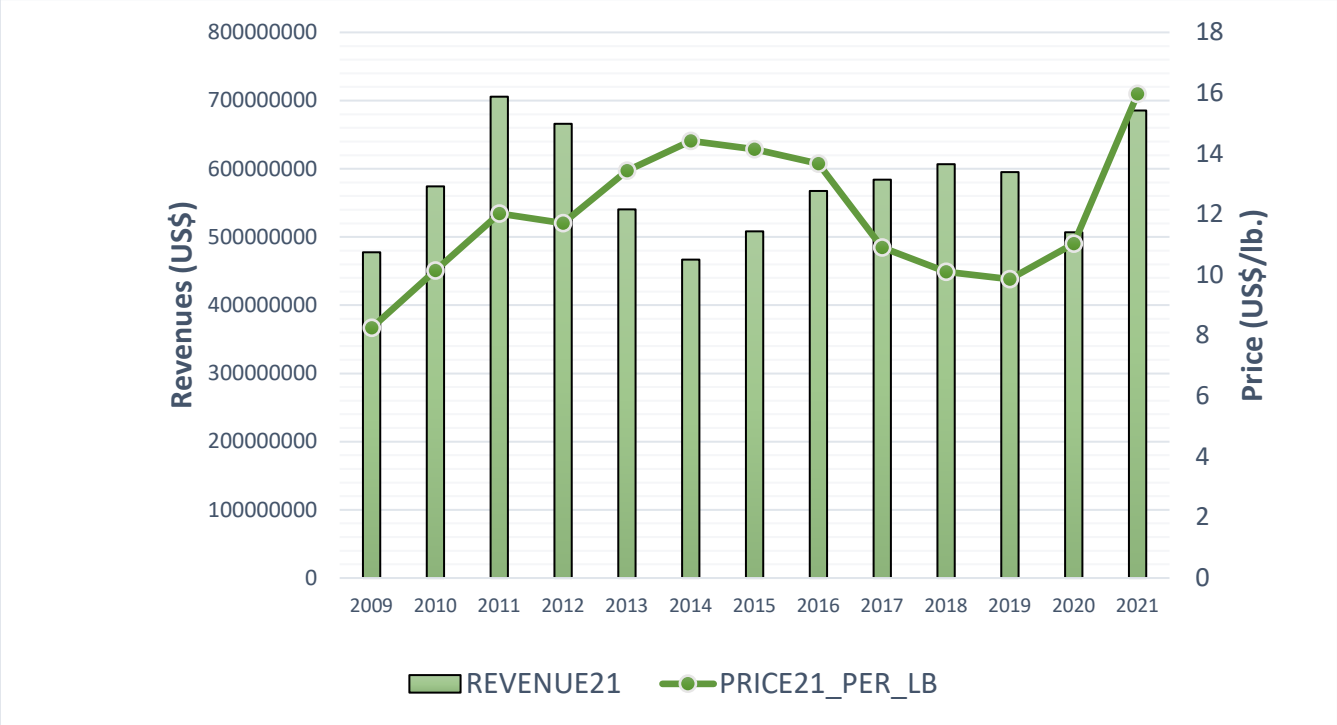


Table 28. Sea scallop landings (also by permit category), revenues, and average prices (FY2009-FY2021).

Fish Years	Landings (pounds)			Total Revenues		Price per pound
	LGC	LA	Total landings	Nominal $	Real $ (in 2021$)	Real $ (in 2021$)
2009	3,765,498	52,301,210	56,066,708	$372,538,290	$477,613,192	$8.25
2010	2,176,421	53,502,413	55,678,834	$453,655,482	$574,247,446	$10.14
2011	2,876,064	55,277,566	58,153,630	$578,711,169	$705,745,328	$12.02
2012	2,897,587	53,222,797	56,120,384	$552,769,693	$665,987,582	$11.71
2013	2,372,607	37,221,866	39,594,473	$459,432,949	$540,509,352	$13.44
2014	2,177,549	29,713,331	31,890,880	$401,510,760	$466,872,977	$14.42
2015	2,492,802	33,056,153	35,548,955	$437,143,932	$508,306,898	$14.15
2016	3,611,174	37,358,052	40,969,226	$493,734,421	$567,510,828	$13.67
2017	2,695,546	50,366,902	53,062,448	$519,841,358	$584,091,414	$10.90
2018	3,035,292	56,764,997	59,800,289	$552,162,845	$606,772,357	$10.10
2019	2,831,163	57,088,022	59,919,185	$553,506,651	$595,168,442	$9.86
2020	2,690,329	42,895,068	45,585,397	$476,533,997	$506,951,061	$11.03
2021	2,244,352	40,005,620	42,249,972	$685,487,418	$685,487,418	$15.97

Table 29. Average scallop landings and revenues (in 2021 dollars) per vessel for FT and FT SMD vessels.

Fish Year	Landings in lbs.		Average Landings per vessel (lbs.)		Average Revenue per vessel (in 2021 dollars)	
	FT	FT SMD	FT	FT SMD	FT	FT SMD
2009	41,411,655	7,298,416	169,027	137,706	$1,414,926	$1,083,748
2010	42,779,955	6,792,986	169,762	130,634	$1,729,618	$1,291,360
2011	44,097,327	7,309,724	175,687	140,572	$2,109,321	$1,695,026
2012	42,749,294	7,063,239	169,640	135,832	$1,990,202	$1,554,717
2013	30,791,957	4,094,184	123,168	78,734	$1,659,985	$1,021,899
2014	24,836,675	3,179,401	98,951	61,142	$1,428,772	$860,019
2015	27,036,665	4,079,589	108,581	78,454	$1,540,138	$1,069,286
2016	29,781,474	4,821,326	119,126	92,718	$1,649,156	$1,161,877
2017	39,668,120	7,173,447	157,413	137,951	$1,705,439	$1,477,616
2018	45,463,988	7,861,387	183,323	145,581	$1,851,022	$1,459,846
2019	44,174,333	9,036,925	177,407	167,350	$1,743,235	$1,613,458
2020	34,571,542	5,849,129	138,286	106,348	$1,516,575	$1,124,682
2021	31,744,061	5,610,754	125,968	102,014	$2,026,760	$1,475,350

The average annual scallop revenue per vessel for both full-time (FT) and full-time small dredge (FT-SMD) fluctuated with annual landings during 2009-2021. Average revenue per FT vessel substantially increased from $1.51 million in 2020 to $2.02 million in 2021. Similarly, average revenue for FT-SMD vessels also increased from $1.12 million per vessel in 2020 to $1.47 million per vessel in 2021 (Table 29 and Figure 15). The average scallop revenue per FT vessel peaked at $2.1 million (in 2021 dollars) in 2011 as a result of higher landings combined with an increase in ex-vessel prices but declined to $1.43 million in 2014.

Figure 14. Trends on average scallop landings per full-time vessel by permit category.

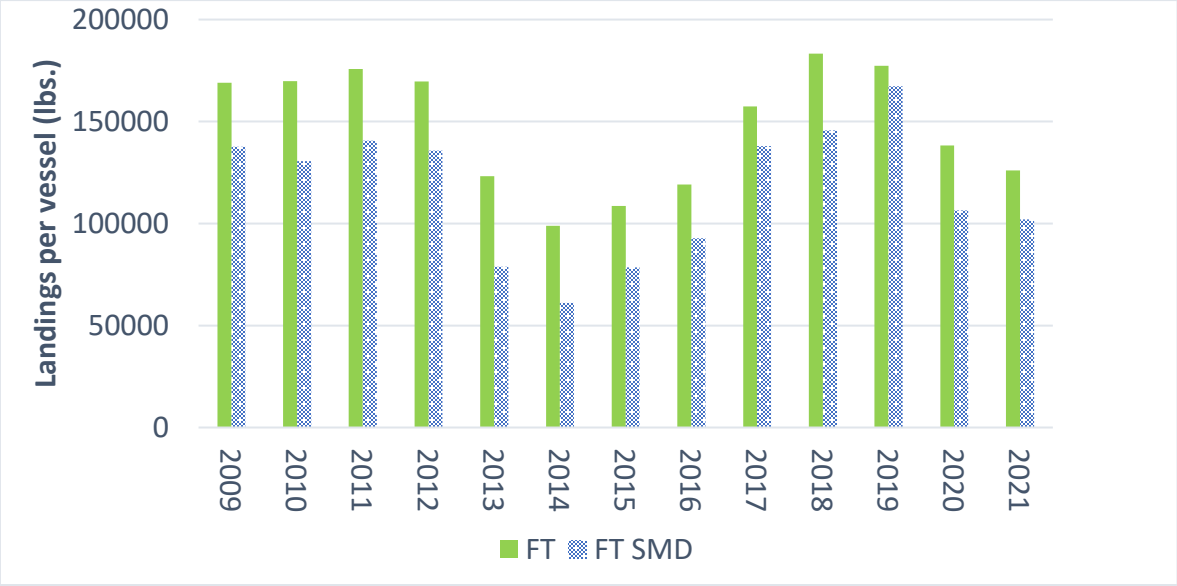
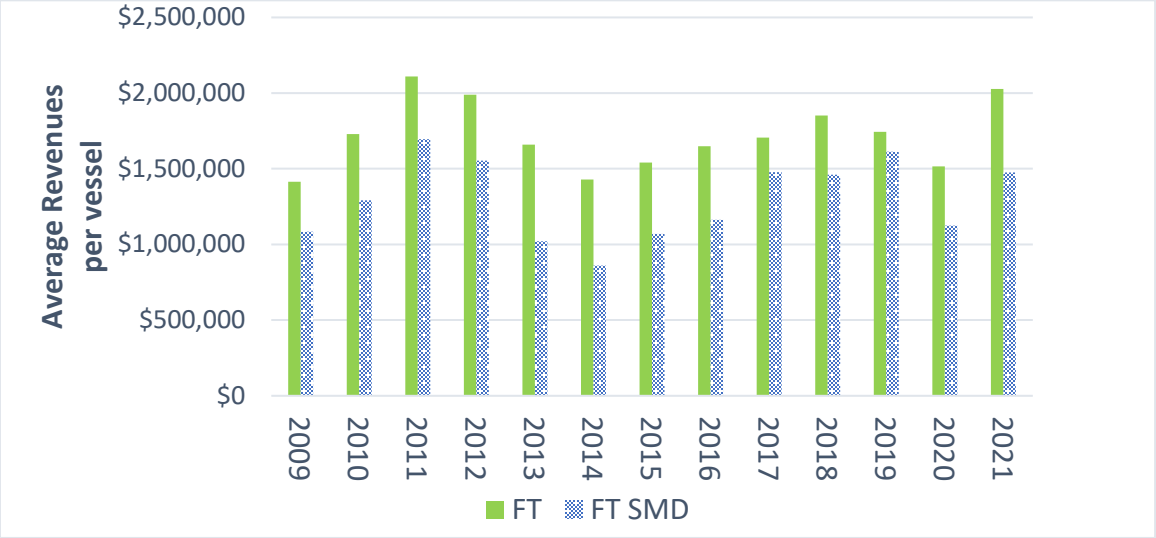
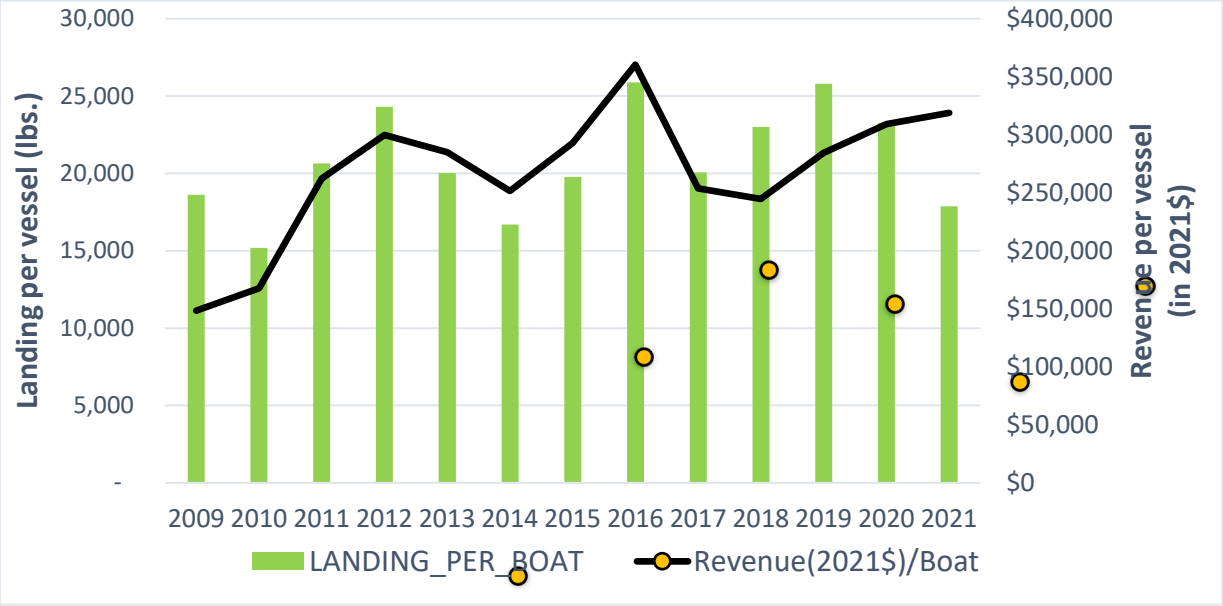


Figure 15. Trends in average scallop revenue per full-time vessel by permit category (in 2021 $)



The revenue per vessel by IFQs vessel has increased over time since 2011. The revenue per boat peaked to about $360,400 in 2016 but declined to around $245,000 in 2018. The revenue per vessel has gradually increased to $284,000 in 2019, $309,000 in 2020 and $318,000 in 2021 (Figure 16). While revenues depend on scallop prices, but the LAGC scallop price in turn largely dependent on the landing volume of the LA component rather than LAGC landings alone.

Figure 16. Average scallop landings and scallop revenue per vessel (in 2021 $) for LAGC-IFQ only boats



5.6.1.1.1 Trends in landings by permit category for limited access vessels

Table 30 and Table 31 describe scallop landings by LA vessels by gear type and permit category. Most limited access category effort is from vessels using scallop dredges, including small dredges. There are 11 full-time limited access vessels authorized to use a trawl (FT-NET) (Table 44). Table 31 shows that the percentage of

landings by FT trawl permits has remained around 3% of total limited access scallop landings in recent years.[4] About 79% of the scallop pounds were landed by vessels with full-time dredge (FT) permits and 14% landed by vessels with full-time small dredge (FT-STD) permits in 2021. Including the FT-NET vessels that use dredge gear, the percentage of scallop pounds landed by dredge gear amounted to about 96% of the total scallop landings during FY2009-2021.

Table 30. Scallop landings (lbs.) by limited access vessels by permit category

Fish Year	'FT'	'FT-SMD'	'FT-NET'	'PT'	'PT-SMD'	Total (lbs.)
2009	41,411,655	7,298,416	1,847,312	226,968	1,516,859	52,301,210
2010	42,779,955	6,792,986	1,788,545	238,648	1,902,279	53,502,413
2011	44,097,327	7,309,724	1,937,170	211,192	1,722,153	55,277,566
2012	42,749,294	7,063,239	1,756,899	210,977	1,442,388	53,222,797
2013	30,791,957	4,094,184	1,226,997	154,673	954,055	37,221,866
2014	24,836,675	3,179,401	880,098	107,759	709,398	29,713,331
2015	27,036,665	4,079,589	933,717	140,919	865,263	33,056,153
2016	29,781,474	4,821,326	1,279,350	199,145	1,276,757	37,358,052
2017	39,668,120	7,173,447	1,740,087	218,980	1,566,268	50,366,902
2018	45,463,988	7,861,387	1,619,563	-	1,820,059	56,764,997
2019	44,174,333	9,036,925	1,954,719	-	1,922,045	57,088,022
2020	34,571,542	5,849,129	1,283,172	-	1,191,225	42,895,068
2021	31,744,061	5,610,754	1,418,312	-	1,232,493	40,005,620

Table 31. Percentage of scallop landings by limited access vessels by permit category

Fish Year	'FT'	'FT-SMD'	'FT-NET'	'PT'	'PT-SMD'
2009	79.18	13.95	3.53	0.43	2.9
2010	79.96	12.7	3.34	0.45	3.56
2011	79.77	13.22	3.5	0.38	3.12
2012	80.32	13.27	3.3	0.4	2.71
2013	82.73	11	3.3	0.42	2.56
2014	83.59	10.7	2.96	0.36	2.39
2015	81.79	12.34	2.82	0.43	2.62
2016	79.72	12.91	3.42	0.53	3.42
2017	78.76	14.24	3.45	0.43	3.11
2018	80.09	13.85	2.85	-	3.21
2019	77.38	15.83	3.42	-	3.37
2020	80.60	13.64	2.99	-	2.78
2021	79.35	14.02	3.55	-	3.08

[4] There were only 11 FT trawl permits in 2015. VTR data during 2009-2013 showed that over 90% of the scallop pounds by the FT trawl permitted vessels were landed using dredge gear (10 vessels) since these vessels are allowed to use dredge gear even though they have a trawl permit. All of the part-time trawl and occasional trawl permits were converted to small dredge vessels.

5.6.1.1.2 Trends in landings for the Limited Access General Category IFQ component

Beginning in FY2010, the LAGC IFQ component was allocated 5% of the estimated scallop catch resulting in a decline in landings by the general category vessels[5] compared to years prior. The Council's IFQ program report presented on June 2017 provides a detailed review of the trends of the IFQ fishery during 2010-2015.[6] Table 32 presents the number of LAGC IFQ-only permits (i.e., excluding LA vessels with IFQ permits) and their scallop landings during 2009-2021. In FY2021, the landings by LAGC IFQ vessels slightly decreased to 2.04 million pounds compared to 2.47 million pounds in FY2020.

Table 32. Active LAGC IFQ vessels and landings (excluding LA vessels w/ IFQ permits), FY2009 to FY2021.

Fish Year	No. of Permit (IFQ only)	IFQ only landings lbs.	Fish Year	No. of Permit (IFQ only)	IFQ only landings lbs.
2009	202	3,759,904	**2016**	135	3,493,944
2010	143	2,170,666	**2017**	129	2,588,370
2011	139	2,870,826	**2018**	123	2,828,934
2012	118	2,869,312	**2019**	101	2,605,933
2013	115	2,302,402	**2020**	106	2,466,530
2014	126	2,103,751	**2021**	114	2,038,782
2015	122	2,413,760			

5.6.1.2 Trends in effort allocations and LPUE

With the implementation of Amendment 10, LA vessels were allocated days-at-sea (DAS) for open areas and area specific access area trips with no open area trade-offs. [7] Total day-at-sea usage for the limited access component averaged at about 25,000 days during 2009-2012, ranged from 16,000 to 19,000 days during 2013-2015, and has increased to around 23,400 days during 2016-2018. During 2019-2021, total DAS in LA fleet is little over 25,000 (Figure 17).[8]

[5] The general category scallop fishery has always been a comparatively small but diverse part of the overall scallop fishery. Beside LAGC-IFQ permits, there is also a separate limited entry program for general category fishing in the Northern Gulf of Maine (NGOM). Furthermore, a separate limited entry incidental catch permit (INCI) was adopted that will permit vessels to land and sell up to 40 pounds of scallop meat per trip while engaged in other fisheries. During the transition period to the full implementation of Amendment 11, the general category vessels were allocated 10% of the scallop TAC.

[6] http://s3.amazonaws.com/nefmc.org/3.170615_Draft_LAGC_IFQ_ProgramReview_wAppendicies.pdf

[7] Although the vessels could no longer use their access area allocations in the open areas, Amendment 10 and Frameworks 16 to 18 continued to include an automatic DAS charge of 12 DAS for each access area trip until it was eliminated by NMFS.

[8] The total day-at-sea (TDAS) includes transit time and the time spent in scallop fishing in both open and access areas. LPUE estimates derived is, thus, for all areas.

Table 33. DAS and access area allocations per full-time vessel

Year+	Action	DAS	AA trips	CA I	CA II	NLS	HC	ETA	DMV	Poss. Limit
2008	FW19	35	5	Closed	Closed	1 trip	Closed	4 trips	Closed	18,000
2009	FW19	42	5	Closed	1 trip	Closed	Closed	3 trips	1 trip	18,000
2010	FW21	38	4	Closed	Closed	1 trip	Closed	2 trips	1 trip	18,000
2011	FW22 and EA	32	4	1.5 trips	0.5 trips	Closed by emergency	1 trip	converted to open area	1 trip	18,000
2012	FW22 and EA	34	4	1 trip**	1 trip	0.5 trips	1.5 trips	Closed (Dec 12, 2012, by EA)	Closed by EA (trips converted to CA1)	18,000
2013[1]	FW24	33	2	118 trips***	182 trips	116 trips	210 trips	Closed	Closed	13,000
2014[1]	FW25	31	2	Closed	197 trips	116 trips	Closed	Closed	313 trips****	12,000
2015	FW26	30.86	3 *****	Closed	Closed	Closed	Merged into one Mid-Atlantic AA, but inshore part of ETA closed			17,000
2016	FW27	34.55	3	Closed	Closed	Closed ~	Merged into one Mid-Atlantic AA, but inshore part of ETA closed			17,000
2017	FW28	30.41	4	Closed	1	1	1, plus another trip to ETA rotational area			18,000
2018	FW29	24	6	1	Closed	2 NLS-W, 1 NLS-S	2			18,000
2019	FR30	24	7	1	Closed	3 in NLS-W	3			18,000
2020	FW32	24	5	.5 FLEX	1	.5 NLS-North, 1 NLS-South	2			18,000
2021	FW33	24	4	856 GC trips, RSA	1.5	1.5 NLS-South	1			18,000
2022	FW34	24	3		2	1 NLS-South				15,000
2023	FW36	TBD	TBD	TBD	TBD	TBD	TBD			TBD

[1] Access area trips were allocated to FT LA vessels using a lottery. Numbers shown are total trips allocated per area (not per vessel).
* FW18 also allowed vessels to exchange 2006 CA2 and NL trips for ETA 2007 trips
**1 trip after emergency action May 2012 (157 vessels get initial trip per FW22 and 156 get CA1 trip converted from initial DMV trip)
*** FW25 then allows unused trips to be carried over to future year
**** Vessels given choice of Delmarva trip or 5 DAS
***** Vessels were not allocated trips in access areas, instead a poundage was allocated with a possession limit
~ NL– north open to LAGC only
+ Information in this table prior to FY2008 and before the implementation of limited access program in scallop fishery is available in FW30 or preceding scallop frameworks.

Between 2009 and 2021, total DAS usage by all LA vessels have ranged from just over 27,000 DAS (in 2010) to just over 16,000 DAS (in 2014) (Figure 17). LA DAS usage is driven by the number of open-area DAS allocated to the FT LA fleet, the number of access area trips allocated to FT LA vessels, and LPUE in access areas. While LPUE increased from FY2016 to FY 2018, increasing in access area allocations contributed to total days fished. LPUE for LA vessels declined kept declining from FY2019 to FY2021.

Figure 17. Total DAS-used (Date landed – Date sailed) and LPUE by all LA vessels (includes LA vessels with LGC permit)

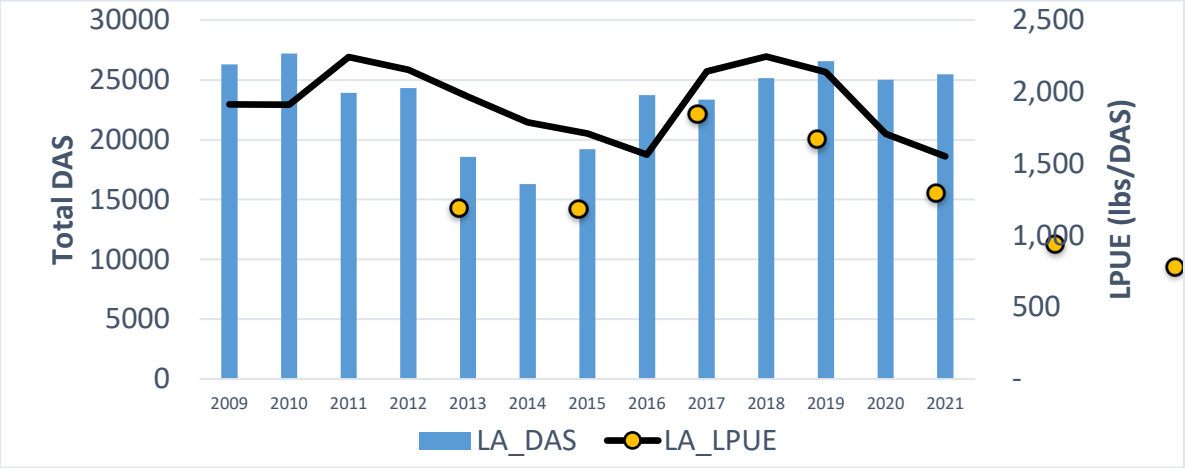
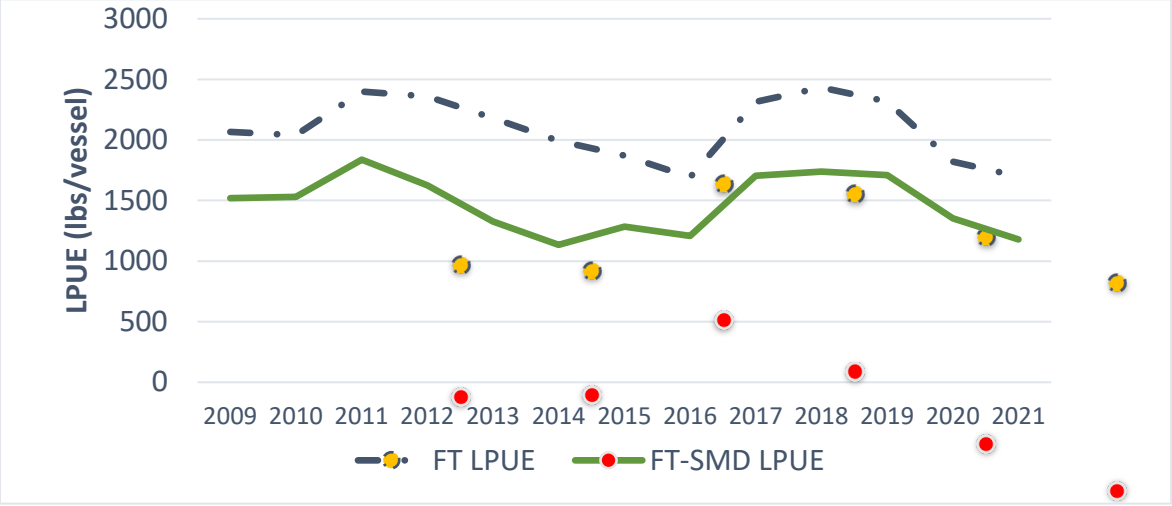


Figure 18 shows that LPUE for full-time dredge (FT) vessels has been consistently higher than LPUE for full time small dredge (FT-SMD) vessels, and that LPUE for both categories has trended in a similar manner between 2009 and 2021. In FY2021, LPUE for FT and FT-SMD vessels were 1,699 pounds per day and 1,178 pounds per day, respectively. LPUEs have trended down since FY2019 and are near the lowest level (Figure 18).

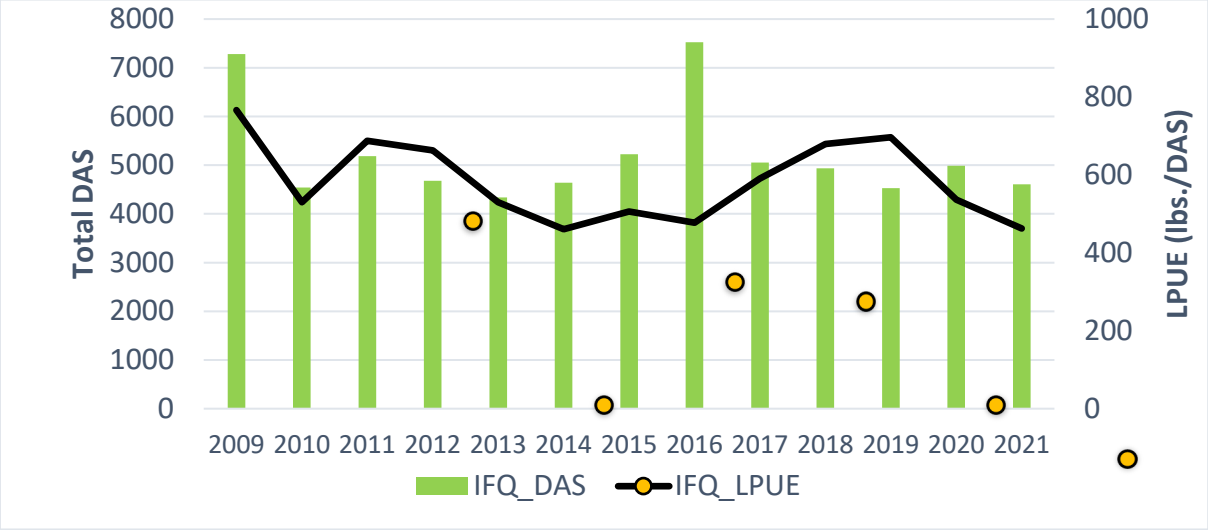
Figure 18. LPUE for full-time LA vessels by permit category (includes steam time)



DAS for LAGC IFQ vessels (IFQ only) declined substantially by about 40 percent from its highest level at 7,524 DAS in 2016 to 4,606 DAS in 2021. LPUE for LAGC IFQ vessels was lower during the 2013-2017 time period

compared to the FY2009-2012 time period. LPUE for LAGC IFQ vessels increased from 477 pounds per day in 2016, to 697 pounds per day in 2019 but declined to 663 pounds per day in 2021 (Figure 19).

Figure 19. LPUE and DAS-used for LAGC-IFQ only vessels (includes steam time, excludes LA vessels with IFQ permit)



5.6.1.2.1 Open Area DAS, Landings, and LPUE

Open area DAS for an individual FT vessel in different fishing year since 2008 along with the status of access areas and possession limit is presented in Table 33.

The total DAS, landings and LPUE estimates for open area by months during 2009 to 2022. Open area LPUE has declined in recent years are provided in Table 34. In FY2021, open area TDAS was 8213 days with total landings of 17.67 million pounds. LPUE in open area is estimated to be about 2033 pounds per DAS.

Table 34. Open Area DAS, Landings, and LPUE by month and year (calendar and fishing year)

Average of LPUE	MONTH												Calendar Year	Fish Year
YEAR	1	2	3	4	5	6	7	8	9	10	11	12	LPUE_Open	LPUE_Open
2010					2,618	2,304	2,363	2,292	2,289	2,035	2,017	2,227	2,268	
2011	2,379	2,385	3,196	3,002	3,062	2,887	2,851	2,813	2,539	2,193	1,822	1,786	2,576	2,561.94
2012	2,211	2,382	3,173	2,911	2,902	2,956	3,133	2,696	2,304	2,097	1,915	2,673	2,613	2,656.94
2013	2,759	2,364	3,586	3,328	3,131	2,739	2,526	2,273	2,119	1,957	1,508	1,557	2,487	2,372.65
2014	1,975	1,774	2,405	2,572	2,408	2,099	1,699	1,875	1,710	1,520	1,149	1,381	1,881	1,784.69
2015	1,547	1,050	1,853	1,757	1,965	1,645	1,435	1,325	1,086	987	1,139	1,225	1,418	1,473.11
2016	1,831	1,431	1,857	1,941	1,976	1,891	1,829	1,845	1,718	1,453	1,199	1,377	1,696	1,647.67
2017	1,491	1,196	2,900	2,595	3,150	2,707	2,615	2,580	2,493	2,073	1,587	1,573	2,247	2,341.40
2018	1,881	2,651	1,633	3,293	2,693	2,680	2,457	2,373	2,036	2,024	1,581	1,660	2,247	2,328.00
2019	2,560	2,814	1,764	3,811	2,516	2,908	2,546	2,216	1,988	1,484	1,632	1,407	2,304	2,165.36
2020	1,867	1,839	1,769	2,549	1,826	2,041	1,903	1,741	1,449	1,272	1,007	1,441	1,725	1,652.84
2021	1,538	1,603	1,464	2,695	2,032	2,212	2,394	2,098	1,744	1,495	1,345	1,920	1,878	2,032.57
2022	2,186	2,449	1,821	2,169	2,195	2,280	2,102	248					2,172	

Sum of OPEN_POUNDS	MONTH												Calendar Year	Fish Year
YEAR	1	2	3	4	5	6	7	8	9	10	11	12	Sum LBS_Open	Sum LBS_Open
2010					6,409,611	4,261,861	1,288,439	2,867,821	4,243,302	2,955,339	1,101,726	559,986	23,688,085	
2011	629,066	1,348,144	2,360,814	4,118,589	7,593,001	6,617,012	4,334,311	265,114	852,865	1,164,417	536,362	272,300	21,635,382	30,189,132
2012	629,305	1,445,042	1,760,945	3,578,670	6,861,539	5,746,076	2,713,656	3,199,531	1,380,436	1,084,992	317,283	799,484	22,102,997	29,354,034
2013	761,229	1,150,193	2,124,248	4,145,784	6,347,425	3,862,451	3,270,333	2,918,145	2,229,762	961,388	218,140	349,915	20,157,559	28,174,327
2014	491,724	1,255,012	1,344,280	4,778,893	5,250,286	3,422,274	1,876,072	1,749,004	1,627,092	621,174	285,169	173,124	15,004,195	21,845,676
2015	336,912	381,396	981,668	2,898,340	2,780,890	2,371,399	2,133,866	1,721,816	719,364	339,318	246,206	234,019	10,546,878	15,375,118
2016	189,765	758,467	1,153,922	1,213,221	3,628,568	3,615,671	3,170,416	2,807,293	1,786,350	706,162	368,702	263,806	16,346,968	20,040,032
2017	480,579	845,342	2,348,492	833,808	3,089,281	3,200,933	3,393,064	4,061,477	1,884,869	2,114,398	550,909	298,966	18,593,897	24,481,940
2018	298,964	1,094,504	1,312,275	2,141,553	2,076,785	3,294,850	2,884,412	2,373,599	1,115,999	990,869	373,474	295,472	13,405,460	19,196,220
2019	710,099	1,286,544	1,652,564	1,025,259	587,935	2,505,956	4,186,953	2,848,585	1,523,949	518,512	128,329	74,600	12,374,819	16,573,439
2020	462,478	743,532	1,967,351	541,636	285,430	1,662,689	2,773,441	1,837,188	1,388,786	615,836	164,842	178,626	8,906,838	12,861,931
2021	464,846	962,943	1,985,668	4,324,959	2,298,695	1,333,733	2,085,998	1,988,696	1,430,094	687,295	216,078	267,551	10,308,140	17,666,565
2022	604,234	947,813	1,481,419	1,265,538	2,321,033	2,938,953	2,046,909	52,006					7,358,901	

Charge=DAS

Sum of CHARGE	MONTH												Calendar Year	Fish Year
YEAR	1	2	3	4	5	6	7	8	9	10	11	12	TDAS_open	TDAS_open
2010					2,448	1,850	545	1,251	1,854	1,452	546	251	10,198	
2011	264	565	739	1,372	2,480	2,292	1,520	94	336	531	294	152	7,700	10,702
2012	285	607	555	1,229	2,365	1,944	866	1,187	599	517	166	299	7,943	10,490
2013	276	487	592	1,246	2,027	1,410	1,295	1,284	1,052	491	145	225	7,929	10,724
2014	249	708	559	1,858	2,180	1,630	1,104	933	952	409	248	125	7,581	10,579
2015	218	363	530	1,650	1,415	1,442	1,487	1,300	662	344	216	191	7,057	9,871
2016	104	530	622	625	1,837	1,912	1,733	1,522	1,040	486	308	192	9,028	11,304
2017	322	707	810	321	981	1,183	1,297	1,574	756	1,020	347	190	7,348	9,855
2018	159	413	804	650	771	1,230	1,174	1,000	548	490	236	178	5,626	7,948
2019	277	457	937	269	234	862	1,644	1,286	767	349	79	53	5,273	7,306
2020	248	404	1,112	212	156	814	1,458	1,055	959	484	164	124	5,214	7,686
2021	302	601	1,356	1,605	1,131	603	871	948	820	460	161	139	5,133	8,215
2022	276	387	813	584	1,057	1,289	974	209					3,529	

Source: GARFO

5.6.1.3 Trends in the size composition of scallop landings

The share of market grades as a proportion of total scallop landings has fluctuated over time. Inter-annual variation is driven by the size/age of year classes in the fishery, as well as the timing of harvest (meat weight anomaly). Table 35 and Table 36 illustrate landings by market grades in pounds and as a percentage to total landings. In FY2021, U10 landing share declined to 14 percent from 16 percent in FY2020.

Table 35. Scallop landings by market category (lbs.)

Fish year	U10	11 to 20	21 to 30	31+	Unknown	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	10,856,965	41,365,184	6,930,184	65,768	880,567	60,098,667
2019	11,944,335	38,171,190	8,154,785	1,061,243	1,053,266	60,384,819
2020	7,680,431	26,585,538	7,013,746	3,967,575	713,057	45,961,206
2021	6,056,458	21,654,887	9,824,152	4,641,362	760,029	42,936,888

Table 36. Size composition of scallops (in percent)

Fish Year	U10	11 to 20	21 to 30	31+	Unknown
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	5.3	2.75
2017	19.00	54.84	23.61	0.72	1.83
2018	18.07	68.83	11.53	0.11	1.47
2019	19.78	63.21	13.50	1.75	1.74
2020	16.71	57.84	15.26	8.63	1.55
2021	14.11	50.43	22.88	10.81	1.77

Table 37. Composition of scallop revenue by size (percent of total scallop revenue)

Fish Year	U10	11 to 20	21 to 30	31+	Unknown
2009	18.1%	59.37%	20.08%	0.27%	2.18%
2010	20.18	58.37	19.59	0.12	1.73
2011	14.93	76.48	5.85	0.52	2.22
2012	19.29	72.4	6.16	0.11	2.04
2013	23.17	60.43	13.85	0.32	2.25
2014	27.89	56.48	12.11	0.77	2.75
2015	21.04	56.67	19.95	0.45	1.94
2016	16.52	45.46	31.16	4.08	2.74
2017	25.18	50.2	21.88	0.77	2.07
2018	20.79	65.43	12.09	0.85	1.58
2019	22.37	61.36	12.69	3.62	2.04
2020	18.30	59.41	14.87	6.68	1.73
2021	22.5	48.54	19.85	7.20	1.91

Larger scallops fetched higher prices than smaller scallops which led to an increase in overall average scallop prices since FY2009 (Table 38). An increase or decrease in prices of U10 scallops corresponds to annual landings for this market category. Price per pound (in 2021 dollars) for U10 landings reached a high point in 2016 at $19.63 but declined to $13.63 in 2020. Average U10 price was record high in 2021 at $25.32, and it was over $35 per pound for some months in 2021. Similarly, the average price of 11-20 count scallops was around $16.82 per pound, and average price of 21-30 and 31-40 count scallops ranged between approximately $14.54 and $11.52 per pound in FY2021. Overall scallop prices in FY2021 were record high for nearly all market grade scallops.

Table 38. Price of scallop per pound by market category (in 2021 dollars)

Fish Years	Price U10	Price 11-20	Price 21-30	Price 31-40	Price 41+	Price Unknown
2009	$10.22	$7.94	$7.53	$7.96	$8.41	$11.08
2010	$13.41	$10.20	$10.54	$10.50	$10.29	$12.46
2011	$13.34	$12.22	$12.80	$12.56	$9.76	$16.18
2012	$13.11	$11.84	$12.09	$11.46	-	$19.01
2013	$15.57	$13.40	$13.53	$12.67	$9.99	$16.44
2014	$16.85	$14.32	$14.06	$12.55	$8.10	$16.45
2015	$17.65	$13.73	$13.50	$12.60	$8.24	$15.93
2016	$19.63	$13.86	$12.40	$10.65	$10.71	$14.72
2017	$14.86	$11.26	$10.69	$10.10	$10.17	$13.38
2018	$12.52	$10.11	$10.39	$9.97	$12.91	$11.95
2019	$12.51	$10.26	$9.65	$8.84	$8.61	$11.31
2020	$13.63	$13.50	$11.53	$7.78	$8.48	$13.50
2021	$25.32	$16.82	$14.54	$11.52	$12.75	$18.01

5.6.1.4 Trends in permits by permit plan and category

Table 39 shows the number of active limited access vessels by permit category during 2009-2021 fishing years. The scallop fishery is primarily full-time permits, with a small number of part-time (PT) permits. There are no occasional (OC) permits left in the fishery since 2009, as these were converted to part-time small dredge (PT-SMD). Of these permits, the majority are dredge vessels, with a small number of full-time small dredge (FT-SMD) and full-time trawl (FT-NET) permit holders.9 There were a total of 250 active full time limited access vessels in 2021. The number of LA vessels that also held an LAGC permit is shown in Table 40. The number of unique limited access permits in 2021 is shown in Table 41.

Table 39. Number of limited access vessels by permit category and gear

Permit Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
FT	245	252	251	252	250	251	249	250	252	248	249	250	250
FT-Net	11	11	11	11	11	11	11	11	11	10	11	11	11
FT-SMD	53	52	52	52	52	52	52	52	52	54	54	55	54
Sub-total FT	**309**	**314**	**315**	**314**	**313**	**314**	**312**	**312**	**311**	**313**	**308**	**316**	**315**
PT	2	2	2	2	2	2	2	2	2	0	0	0	0
PT-SMD	32	32	32	31	31	31	32	32	31	31	32	30	29
Sub-total PT	**32**	**34**	**34**	**33**	**32**	**34**	**33**	**34**	**33**	**32**	**32**	**30**	**29**
Grand Sum	**343**	**349**	**348**	**348**	**346**	**347**	**346**	**347**	**348**	**343**	**346**	**346**	**344**

Table 40. LAGC permits held by limited access (LA) vessels by permit category.

Calendar Year	'LA vessels w/ IFQ permit'	'LA vessels w/ NGOM permit'	'LA vessels w/ INCI permit'
2009	40	26	111
2010	40	27	113
2011	40	27	113
2012	41	27	111
2013	38	27	112
2014	40	27	113
2015	40	27	113
2016	40	27	113
2017	40	27	113
2018	39	27	113
2019	40	27	109
2020	41	25	113
2021	38	28	112

[9] The permit numbers shown in the Table 39 include duplicate entries because replacement vessels receive new permit numbers and when a vessel is sold, the new owner would get a new permit number.

Table 41. Unique scallop permits and category for the 2021 application year

Permit Category	2021	Permit Category	2021
Full-time	250	Part-time	0
Full-time small dredge	54	Part-time small dredge	29
Full-time net boat	11	Part-time trawl	0
Total full-time	**315**	**Total part-time**	**29**
Total Limited Access	**344**		

Table 42 shows that the number of LAGC permits, including LAGC permits held by LA vessels. The number of LAGC permits declined considerably after 2009 as a result of the Amendment 11 provisions. The numbers of LAGC permits by category, excluding the LAGC permits held by LA vessels, are shown in Table 43.

Table 42. LAGC permits (LAGC permits held by LA vessels are included)

	No. of permits qualified under A11 program)		
Calendar Year	**IFQ**	**NGOM**	**INCI**
2009	238	33	167
2010	198	36	167
2011	181	34	168
2012	164	39	177
2013	156	49	173
2014	166	52	168
2015	163	53	158
2016	172	60	165
2017	166	60	148
2018	166	68	149
2019	150	72	133
2020	143	72	137
2021			

Table 43. Active LAGC permits after Amendment 11 implementation (excludes LAGC permits held by LA vessels).

Year	**IFQ**	**NGOM**	**INCI**
2009	199	7	55
2010	161	9	54
2011	141	7	55
2012	122	12	66
2013	119	22	61
2014	124	25	55
2015	122	27	45
2016	134	32	52
2017	129	33	35
2018	127	39	36
2019	108	44	24
2020	102	46	24
2021	112	51	24

The trends in the estimated number of active LA vessels are shown in Table 44 by permit plan. The number of full-time permits authorized to use trawls (FT-NET) has remained consistent over time, though the majority of these vessels have elected to use dredge gear in recent years (Table 44).[10] Table 45 shows the number of active LAGC vessels by permit category excluding those LA vessels which have both LA and LAGC permits.

[10] Majority of these vessels (10 out of 11 in 2010) landed scallops using dredge even though they had a trawl permit.

Table 44. Active vessels (i.e., vessels with scallop landings) during FY2009-2021

Fish Year	'FT'	'PT'	'FT-SMD'	'PT-SMD'	'FT-NET'	Total
2009	245	2	53	32	11	343
2010	252	2	52	32	11	349
2011	251	2	52	32	11	348
2012	252	2	52	31	11	348
2013	250	2	52	31	11	346
2014	251	2	52	31	11	347
2015	249	2	52	32	11	346
2016	250	2	52	32	11	347
2017	252	2	52	31	11	348
2018	248	0	54	31	10	343
2019	249	0	54	32	11	346
2020	250	0	55	30	11	346
2021	252	0	55	29	11	347

Table 45. No. of active vessels with LAGC permits by permit category (excludes LA vessels w/ LGC permit)

Fish Year	IFQ only	NGOM only	INCI only
2009	202	8	59
2010	143	9	51
2011	139	8	55
2012	118	11	65
2013	115	24	58
2014	126	25	53
2015	122	24	44
2016	135	31	51
2017	129	35	35
2018	123	40	36
2019	101	46	24
2020	106	48	25
2021	114	53	20

5.6.1.5 Trends in limited access (LA only) and "IFQ only" permits by home port and primary port states.

Scallop permits are valuable economic assets because they allow permit holders to access a lucrative fishery. Thus, fishermen are incentivized to conserve the scallop resource and increase productivity to maximize economic benefits. The majority of LA vessels have home state and primary port states of landing in Massachusetts, followed by New Jersey, Virginia, and North Carolina (Table 46 and Table 47). The number of vessels by home port state and port of landing have remained about same across the 2009-2021 time period, suggesting that permit transfers across states are minimal.[11] The number of LAGC IFQ permits are also

[11] The Council generally describes changes in the scallop fishery at the community level based on both port of landing, and home port state. A port of landing is the actual port where fish and shellfish have been landed. A home port is the port identified by a vessel owner on a vessel permit application and is where supplies are purchased, or crews are hired. Statistics based on port of landing begin to describe the benefits that other fishing related businesses

summarized by both homeport state and primary port state as identified by the permit owner in Table 48 and Table 49.

Table 46. Number of limited access permits (LA only) by home state

HPST	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CT	10	10	10	10	9	9	9	10	10	9	8	4	3
FL	4	4	4	4	3	3	3	3	3	3	3	3	3
MA	145	147	148	149	149	150	145	145	145	147	143	144	148
ME	4	3	3	3	3	3	3	3	3	2	2	1	1
NC	41	40	39	38	40	39	41	41	38	38	42	44	38
NJ	84	90	92	91	92	94	91	92	96	94	98	99	96
NY	3	4	3	2	2	1	0	0	1	1	0	0	0
PA	5	5	4	3	3	3	3	3	3	3	3	3	2
RI	2	3	2	2	2	2	2	2	2	2	2	2	2
VA	43	45	45	46	42	44	52	46	45	44	45	46	53
Total	**341**	**351**	**350**	**348**	**345**	**348**	**349**	**345**	**346**	**343**	**346**	**346**	**346**

Table 47. Number of limited access permits (LA only) by primary port state

PPST	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CT	10	10	10	10	9	9	9	10	10	9	8	4	3
MA	146	148	149	150	150	153	148	148	147	149	146	148	152
ME	4	3	3	3	3	3	3	3	3	2	2	1	1
NC	26	25	24	23	25	25	29	29	27	26	30	31	29
NJ	88	93	94	94	94	95	93	95	100	98	102	104	101
NY	2	3	3	2	2	1	0	0	1	1	0	0	0
PA	1	1	1	1	1	1	1	1	0	0	0	0	0
RI	2	3	2	2	2	2	2	2	2	2	2	2	2
VA	62	64	64	63	59	60	64	58	56	56	56	56	57
Total	**341**	**350**	**350**	**348**	**345**	**349**	**349**	**346**	**346**	**343**	**346**	**346**	**345**

(such as dealers and processors) derive from the landings made in their port. Alternatively, statistics based on homeport gives an indication of the benefits received by vessel owners and crew from that port. However, during this analysis the PDT in the past have observed that many vessels declare a primary port for the year and it may not always match up with the actual port that a vessel landed the majority of scallop catches for the year. Therefore, these results should take that into consideration.

Table 48. No. of LAGC (IFQ only) permits by home state ports (exclude LA vessels w/ IFQ permit)

HPST	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CT	3	2	1	2	3	4	3	3	3	3	3	3	4
DE	1	2	2	2	2	2	2	2	3	0	1	1	1
FL	1	1	0	0	0	0	0	0	0	0	0	0	0
GA	1	1	0	0	0	0	0	0	0	0	0	0	0
MA	60	44	43	37	36	40	41	44	46	48	42	43	49
MD	8	5	4	3	2	2	2	4	3	3	2	3	3
ME	9	6	3	4	3	3	5	3	6	9	7	4	4
NC	30	22	16	9	10	9	10	12	8	8	6	5	6
NH	4	2	3	3	2	2	1	1	1	1	0	0	0
NJ	54	48	44	40	39	43	40	43	39	37	32	29	33
NY	17	15	15	13	12	13	12	12	11	11	10	10	11
PA	1	1	1	1	1	1	0	0	0	0	0	0	0
RI	5	5	6	6	6	4	4	4	4	4	4	4	3
TX	0	0	0	1	1	1	1	1	1	1	1	0	0
VA	5	4	3	3	2	3	2	4	3	3	2	1	1
Total	**199**	**158**	**142**	**124**	**119**	**127**	**123**	**133**	**128**	**128**	**110**	**103**	**115**

Table 49. No. of LAGC (IFQ only) permits by primary port state (excludes LA vessels w/ IFQ permit)

PPST	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CT	3	2	1	2	3	4	3	4	4	4	4	4	4
DE	0	0	0	0	0	0	0	1	1	0	1	1	1
FL	2	2	0	0	0	0	0	0	0	0	0	0	0
GA	1	1	0	0	0	0	0	0	0	0	0	0	0
MA	60	45	44	38	37	41	42	45	47	49	42	43	50
MD	10	8	7	6	5	5	5	6	6	4	3	4	3
ME	8	5	3	4	3	3	5	3	6	9	7	4	3
NC	27	21	15	9	10	9	10	13	9	8	7	4	5
NH	4	1	2	2	1	1	0	0	0	0	0	0	0
NJ	55	48	45	41	40	44	40	43	39	35	30	30	34
NY	17	15	15	13	12	13	12	11	10	10	9	9	11
PA	0	0	0	0	0	0	0	0	0	2	2	2	0
RI	6	6	6	6	6	4	4	4	4	4	4	4	3
VA	5	4	3	3	2	3	2	3	2	3	1	0	1
Total	**198**	**158**	**142**	**124**	**119**	**127**	**123**	**133**	**128**	**128**	**110**	**105**	**115**

5.6.1.6 Foreign trade (import, export, and re-export) of scallops in FY2017-FY2021

Historically, China, Canada, and Japan have been the major exporters of various scallop products to the U.S. Recently, the U.S. imported a significant volume of scallops from Peru. In FY2021, the U.S. imported about 62

million lbs. or $393 million of scallop products primarily from Japan, China, Canada, Argentina, and Peru. U.S. imports of scallop products in 2021 increased significantly in both volume and value compared to 2020.

In FY2021, the top five destinations for U.S. scallop exports have been Canada, Netherlands, France, South Korea and United Kingdom. The U.S. exported about 6.67 million pounds or $72 million value of scallop products largely to these countries. Scallop exports in 2021 marginally declined relative to FY2020. The U.S. also re-exported some of its imports at a re-export value of about $29 million, primarily to France and Canada. The re-export value in FY2021 increased by about $8 million compared to FY2020. Table 50 presents the volume and values (in nominal dollars) of U.S. imports, exports, and re-exports of scallops with major countries during FY2017-2021. It also provides average import and export prices for scallop products for the same period.

Table 50. Summary of U.S. scallop trades with top five countries during FY2017-FY2021.

Import 2017			Export 2017			Re-Export 2017		
Countries	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**
China	17.86	$49.06	Canada	4.16	$39.82	France	1.53	$9.63
Canada	8.14	$78.69	Netherlands	2.73	$21.71	Canada	0.61	$4.10
Japan	4.46	$43.86	France	1.57	$14.46	China (HK)	0.08	$0.35
Mexico	4.17	$16.67	Belgium	1.02	$7.81	Netherlands	0.06	$0.51
Argentina	3.89	$19.71	U.K.	0.9	$7.32	U.K.	0.04	$0.42
Other	4.5	$21.65	Other	3.55	$28.41	Other	0.09	$0.66
SUM Imports	**43.02**	**$229.65**	**SUM Exports**	**13.95**	**$119.53**	**SUM Re-export**	**2.41**	**$15.65**
Import 2018			**Export 2018**			**Re-export 2018**		
Countries	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**
China	17.86	$49.06	Canada	4.16	$39.82	France	1.53	$9.63
Canada	8.14	$78.69	Netherlands	2.73	$21.71	Canada	0.61	$4.10
Japan	4.46	$43.86	France	1.57	$14.46	China (HK)	0.08	$0.35
Mexico	4.17	$16.67	Belgium	1.02	$7.81	Netherlands	0.06	$0.51
Argentina	3.89	$19.71	U.K.	0.9	$7.32	U.K.	0.04	$0.42
Other	4.5	$21.65	Other	3.55	$28.41	Other	0.09	$0.66
SUM Imports	**43.02**	**$229.65**	**SUM Exports**	**13.95**	**$119.53**	**SUM Re-export**	**2.41**	**$15.65**
Import 2019			**Export 2019**			**Re-Export 2019**		
Countries	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**
China	7.93	$17.91	Canada	4.03	$39.94	France	2	$12.62
Canada	7.82	$75.70	Netherlands	2.17	$16.19	Canada	0.7	$4.36
Argentina	3.69	$16.05	France	1.51	$14.14	Belgium	0.09	$0.60
Peru	5.43	$22.94	U.K.	0.89	$7.54	China (HK)	0.02	$0.10
Japan	6.39	$53.16	Belgium	0.82	$6.87			
France	1.15	$2.30	Australia	0.34	$2.83			
Other	4.59	$20.98	Other	2.86	$23.80	Other	0.09	$0.58
SUM Imports	**37**	**$209.04**	**SUM Exports**	**12.62**	**$111.31**	**SUM Re-export**	**2.9**	**$18.26**
Import 2020			**Export 2020**			**Re-Export 2020**		
Countries	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**
Canada	7,99	$81.76	Canada	3.48	$33.32	France	2.04	$11.68
Japan	5,51	$41.43	Netherlands	0.85	$6.20	Canada	1.20	$6.74
Peru	9.93	$36.32	France	0.42	$4.05	Netherlands	0.10	$0.93
Argentina	5.39	$19.28	Belgium	0.29	$2.25	Argentina	0.14	$0.77
China	8.34	$18.85	Uk	0.21	$2.11	Belgium	0.05	$0.28
Other	23.66	197.64	Other	5.25	$47.93	Other	3.53	$20.40
SUM Imports	**41.46**	**$220.01**	**SUM Exports**	**6.75**	**$61.32**	**SUM Re-export**	**3.55**	**$20.53**
Import 2021			**Export 2021**			**Re-Export 2021**		
Countries	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**	**Countries**	**mil lbs.**	**mil $**
Japan	17.03	$149.50	Canada	2.76	$31.9	France	3.75	19.60
China	12.95	$32.32	Netherlands	1.56	$15.31	Canada	1.10	8.55
Canada	9.89	$111.82	France	0.41	$4.93	Peru	0.04	0.23
Argentina	7.08	$26.60	South Korea	0.27	$3.14	Japan	0.01	0.18
Peru	5.97	$38.40	UK	0.26	$2.27	Colombia	0.01	0.06
Other	23.66	$35.28	Other	1.39	$14.4	Other	0.01	$.22
SUM Imports	**61.68**	**$393.92**	**SUM Exports**	**6.67**	**$71.95**	**SUM Re-export**	**4.93**	**$28.84**
Price (dollar/pound) in current dollar								
Import Price 2017		$6.27	Export Price 2017		$8.69	Re-Export Price 2017		$6.87
Import Price 2018		$5.34	Export Price 2018		$8.57	Re-Export Price 2018		$6.49
Import Price 2019		$5.65	Export Price 2019		$8.82	Re-Export Price 2019		$6.30
Import Price 2020		$5.31	Export Price 2020		$9.07	Re-Export Price 2020		$5.79
Import Price 2021		$6.39	Export Price 2021		$10.79	Re-Export Price 2021		$5.85

5.6.1.7 Trip and Fixed costs

Trip and fixed cost estimates for LA and LAGC IFQ vessels for FY2020 and FY 2021 will be provided in the Appendix for Economic Models.

5.6.2 Fishing Communities

Considering the socioeconomic impacts on fishing communities of proposed fishery regulations is required by NEPA (NEPA 1970) and the MSA, particularly National Standard 8 (MSA 2007) which defines a "fishing community" as "a community which is 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)). Here, "fishing communities" are those with substantial involvement in or dependence on the Atlantic sea scallop fishery.

5.6.2.1 Scallop Fishing Communities Identified

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.

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. These criteria are as adopted in Amendment 21 when the NOAA Fisheries Community Social Vulnerability Indicators were added (NEFMC 2021).

Primary Port Criteria. 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 (Table 51):

- At least $5M average annual revenue of sea scallops, 2010-2017 (Table 52);
- 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.
- A ranking of high for engagement in or reliance on the scallop fishery on average in 2013-2017 according to the NOAA Fisheries Community Social Vulnerability Indicators (Table 53).

Secondary Port Criteria. 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, 2010-2017.
- A ranking of medium-high for engagement in or reliance on the scallop fishery on average in 2013-2017 according to the NOAA Fisheries Community Social Vulnerability Indicators.

Scallop Primary and Secondary Ports. Based on these criteria, there are 14 primary ports and 9 secondary ports in the sea scallop fishery (Table 51). 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

(58%), 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 impractical 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. Ports are further described in Amendment 21. Community profiles are available from the NEFSC Social Sciences Branch website and in Clay et al (2007). The Northeast Ocean Data Portal has interactive maps to help understand where dredge fisheries based in these ports have been active at sea over time.

Table 51 – Primary and secondary ports in the sea scallop fishery.

State	Community	Average revenue, 2010-2017[a]			Top 10 landing port, 2013-2017[b]		Engagement or Reliance Indicator		Primary/ Secondary
		>$500K	>$5M	≥50% scallops	LA	LAGC	Med-high	High	
ME	Cutler						√		Secondary
	Beals						√		Secondary
MA	Gloucester	√						√	Primary
	Sandwich	√							Secondary
	Provincetown	√				√	√		Primary
	Chatham	√						√	Primary
	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	Pt. Pleasant/Pt. Pleasant Beach	√	√		√	√		√	Primary
	Barnegat Light/Long Beach	√	√	√	√	√		√	Primary
	Atlantic City	√							Secondary
	Wildwood	√	√	√					Primary
	Cape May	√	√	√	√	√		√	Primary
MD	Ocean City	√							Secondary
VA	Hampton/Seaford	√	√	√	√				Primary
	Newport News	√	√	√				√	Primary
NJ	Hobucken							√	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.

Table 52 – Fishing revenue in top sea scallop ports, calendar years 2010-2017.

Port	Average revenue, 2010-2017		
	All fisheries	Sea scallops only	% sea scallops
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/Pt. Pleasant Beach, NJ	$25.4M	$11.6M	46%
Narragansett/Pt. Judith, RI	$42.1M	$7.2M	17%
Stonington, CT	$6.9M	$4.8M	69%
Provincetown, MA	$4.7M	$2.2M	47%
Wildwood, NJ	$4.6M	$4.4M	96%
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= about 200)	**$1,046.3M**	**$460.4M**	**44%**

Note: Inflation adjusted to 2017 dollars. Shaded rows are primary ports.
Source: NMFS dealer data, accessed October 2018.

Table 53 – Scallop fishing community engagement and reliance indicators, 2013-2017 average.

State	Community	Engagement	Reliance
ME	Cutler	Low	Medium-High
	Beals	Low	Medium-High
MA	Gloucester	High	Low
	Chatham	Medium-High	High
	Provincetown	Medium-High	Medium-High
	New Bedford	High	Medium-High
RI	Narragansett/Pt. Judith	High	Medium
NY	Montauk	Medium-High	Medium
NJ	Point Pleasant	High	Medium
	Barnegat Light/Long Beach	High	High
	Cape May	High	High
VA	Newport News	High	Low
NC	Hobucken	Low	High

Note: includes communities that have a ranking of at least medium-high for engagement or reliance.
Source: NOAA Fisheries Community Social Vulnerability Indicators.

5.6.2.2 Social and Gentrification Pressure Vulnerabilities

The NOAA Fisheries Community Social Indicators (see also Jepson & Colburn 2013) are quantitative measures that describe different facets of social and economic well-being that can shape either an individual's or community's ability to adapt to change. The indicators represent different facets of the concepts of social and gentrification pressure vulnerability to provide context for understanding the vulnerabilities of coastal communities engaged in and/or reliant on commercial fishing activities. Provided here are these indicators for the primary and secondary scallop ports (Table 54).

The Social Vulnerability Indicators. There are five social vulnerability indicators; the variables for which represent different factors that may contribute to a community's vulnerability. The **Labor force structure** index characterizes the strength/weakness and stability/instability of the labor force. The **Housing characteristics** index measures infrastructure vulnerability and includes factors that indicate housing that may be vulnerable to coastal hazards. The **Personal disruption** index represents factors that disrupt a community member's ability to respond to change because of personal circumstances affecting family life such as unemployment or educational level. The **Poverty** index is a commonly used indicator of vulnerable populations. The **Population composition** index shows the presence of populations who are traditionally considered more vulnerable due to circumstances often associated with low incomes and fewer resources. A high rank in any of these indicates a more vulnerable population.

Almost half of the scallop port communities exhibit medium-high to high vulnerability in at least one of the five social vulnerability indicators. Across scallop ports, there is a contrast between ports that have low social vulnerability across indicators (11 ports score "low" in at least four indicators) and those that are high (4 ports are at least "medium-high in three or more indicators).

Gentrification Pressure Indicators. Gentrification pressure indicators characterize factors that, over time, may indicate a threat to the viability of a commercial or recreational working waterfront, including the displacement of fishing and fishing-related infrastructure. The **Housing Disruption** index represents factors that indicate a fluctuating housing market where some fishing infrastructure displacement may occur due to rising home values and rents. The **Retiree migration** index characterizes areas with a higher concentration of retirees and elderly people in the population. The **Urban sprawl** index describes areas with increasing population and higher costs of living. A high rank in any of these indicates a population more vulnerable to gentrification.

Almost all scallop ports scored medium-high to high in at least one of the three gentrification pressure indicators. This suggests that shoreside fishing infrastructure and fishing family homes may face rising property values (and taxes) from an influx of second homes and businesses catering to those new residents, which may displace the working waterfront. Across all scallop ports, the highest indicator of vulnerability is housing disruption.

Combined Social and Gentrification Pressure Vulnerabilities. Overall, 16 of the 23 port communities have medium to high levels of vulnerability for four or more of the eight indicators (combined social and gentrification pressure). This indicates high social and gentrification pressure vulnerability overall for both the primary and secondary communities. New Bedford, MA and Atlantic City and Wildwood, NJ have six indicators at the medium to high level.

Table 54 – Social vulnerability and gentrification pressure in primary and secondary scallop ports, 2018.

State	Community	Social vulnerability					Gentrification pressure		
				Environmental Justice indicators					
		Labor Force Structure	Housing Characteristics	Personal Disruption	Poverty	Population Composition	Housing Disruption	Retiree Migration	Urban Sprawl
ME	Cutler (s)	Medium	Med-High	Low	Medium	Low	Med-High	Low	Low
	Beals (s)	Medium	n/a*	Low	Low	Low	Med-High	Low	Low
MA	Gloucester (p)	Low	Low	Low	Low	Low	Medium	Low	Medium
	Sandwich (s)	Low	Low	Low	Low	Low	Med-High	Medium	Medium
	Provincetown (p)	Medium	Low	Low	Low	Low	High	Med-High	Med-High
	Chatham (p)	High	Low	Low	Low	Low	High	High	Medium
	Harwich/Harwichport/Barnstable (s)	Low	Low	Low	Low	Low	Med-High	Medium	Medium
	Fairhaven (p)	Low	Medium	Low	Low	Low	Medium	Medium	Medium
	New Bedford (p)	Low	Medium	Med-High	High	Med-High	Medium	Low	Med-High
RI	Narragansett/Pt. Judith (p)	Medium	Low	Low	Low	Low	Med-High	Medium	Low
CT	Stonington (p)	Low	Low	Low	Low	Low	Low	Medium	Low
	New London (s)	Low	Medium	High	High	Med-High	Low	Low	Low
NY	Montauk (p)	Medium	Low	Low	Low	Low	High	Med-High	Med-High
	Hampton Bays/Shinnecock (s)	Low	Low	Low	Low	Medium	High	Medium	Med-High
NJ	Pt. Pleasant/Pt. Pleasant Beach (p)	Medium	Low	Low	Low	Low	High	Medium	Med-High
	Barnegat Light/Long Beach (p)	High	Low	Low	Low	Low	High	High	Med-High
	Atlantic City (s)	Medium	Medium	High	High	High	High	Low	Low
	Wildwood (p)	Med-High	Medium	High	High	Low	High	Medium	Low
	Cape May (p)	Med-High	Low	Low	Low	Low	High	High	Medium
MD	Ocean City (s)	Medium	Med-High	Low	Low	Low	Med-High	Med-High	Low
VA	Hampton/Seaford (p)	Low	Medium	Medium	Medium	Medium	Medium	Low	Low
	Newport News (p)	Low	Medium	Medium	Medium	Med-High	Low	Low	Low
NC	Hobucken (p)	Low	n/a	Medium	High	Low	n/a	Med-High	n/a

Source: NOAA Fisheries Community Social Indicators.
*n/a indicates ranking is not available due to incomplete data. (p) = scallop primary port. (s) = Scallop secondary port

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 55.

Table 55 – General definitions for terms used to summarize impacts on VECs.

General Definitions				
VEC	**Resource Condition**	**Impact of Action**		
		Positive (+)	Negative (-)	No Impact (0)
Target and Non-target Species	Overfished status defined by the MSA	Alternatives that would maintain or are projected to result in a stock status above an overfished condition*	Alternatives that would maintain or are projected to result in a stock status below an overfished condition*	Alternatives that do not impact stock / populations
ESA-listed Protected Species (endangered or threatened)	Populations at risk of extinction (endangered) or endangerment (threatened)	Alternatives that contain specific measures to ensure no interactions with protected species (e.g., no take)	Alternatives that result in interactions/take of listed resources, including actions that reduce interactions	Alternatives that do not impact ESA listed species
MMPA Protected Species (not also ESA listed)	Stock health may vary but populations remain impacted	Alternatives that will maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions with/take of marine mammal species that could result in takes above PBR	Alternatives that do not impact MMPA Protected Species
Physical Environment / Habitat / EFH	Many habitats degraded from historical effort (see condition of the resources table for details)	Alternatives that improve the quality or quantity of habitat	Alternatives that degrade the quality, quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human Communities (Social and economic impacts)	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities
	Impact Qualifiers			
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible	To such a small degree to be indistinguishable from no impact		
	Slight (sl), as in slight positive or slight negative)	To a lesser degree / minor		
	Moderately (M) positive or negative	To an average degree (i.e., more than "slight", but not "high")		
	High (H), as in high positive or high negative	To a substantial degree (not significant unless stated)		
	Significant (in the case of an EIS)	Affecting the resource condition to a great degree, see 40 CFR 1508.27.		
	Likely	Some degree of uncertainty associated with the impact		

*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the MSA status, but this must be justified within the impact analysis.

6.2 IMPACTS ON ATLANTIC SEA SCALLOPS (BIOLOGICAL IMPACTS)

6.2.1 Action 1 – Overfishing 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 56 – Comparison of the No Action OFL/ABC from FW34 with updated OFL and ABC estimates for 2023 and 2024 (Alternative 2).

	FY	OFL	ABC including discards	Discards	ABC with discards removed
Alt. 1 – No Action	2023	34,941	27,606	4,406	23,200
Alt. 2 – Updated OFL and ABC	2023	27,504	22,631	2,803	19,828
	2024	29,151	23,289	3,083	20,206

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 2023, which were adopted by the Council through FW34 (Table 56). The No Action ABC including discards is 27,606 mt, or about 61 million pounds. The OFL values for No Action is substantially higher than the update OFL for 2023 (7,437 mt difference). The declining legal limits (OFL and ABC) are the result of several years of below average recruitment and declining overall biomass. In 2023, survey biomass reached its lowest level since 1999. The proposed ABC for FY2022 including discards is 22,631 mt, or about 49.9 million pounds. This is a roughly 17-million pound decrease in the ABC from the 2022 value, and a roughly 11 million pound decrease from 2023 default values under No Action.

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 slight positive impact. The best available data should be used to set ABC, which would include updated survey and fishery data from 2022 that is used in Alternative 2 compared to older data used in the No Action ABC (Alternative 1).

6.2.1.2 Updated OFL and ABC for FY 2023 and FY 2024

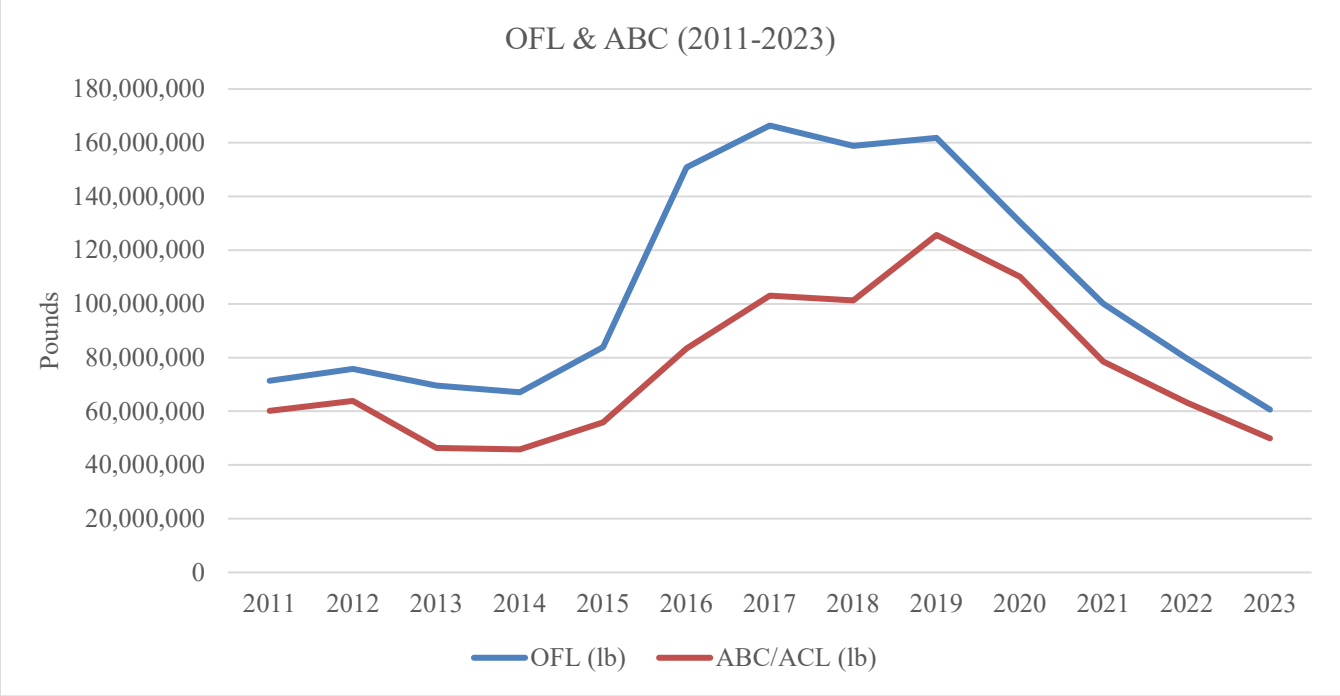
The FY 2023 and FY 2024 OFL and ABC values that were recommended by the SSC are summarized in Table 60. This year, the SSC recommended including scallop biomass from several areas of the Gulf of Maine as part of the OFL and ABC.

The FY 2023 OFL is lower than No Action, though the OFL is expected to increase in 2024 (still below 2023 default level). The 2023 ABC is 25% lower than the ABC for 2022 that was approved in Framework 34, which continues a downward trend of both OFL and ABC values for the fishery over the last 5 years (Table 57). The declines in both the OFL and ABC are the result of several years of below-average recruitment, and the decline of

the exceptional 2012 and 2013 year-classes that supported record landings for the fishery in 2018 and 2019. There are several cohorts on Georges Bank, including pre-recruits, recruits, and adult scallops. In 2023, 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 slightly 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 slight positive impacts

Table 57 - Scallop OFL and ABC values in pounds, FY 2011 – FY 2023.



6.2.2 Action 2 - Northern Gulf of Maine Management and TAL Setting

6.2.2.1 Alternative 1 – No Action

Under No Action, the NGOM Set-Aside would be set at 465,980 pounds for FY2023. There would be no NGOM set-aside specified for FY 2024, and the area would close to directed scallop fishing.

6.2.2.2 Alternative 2 - Set NGOM TAL, with set-asides to support research, monitoring, and a directed LAGC fishery

Alternative 2 would specify a Northern Gulf of Maine Total Allowable Landings (NGOM TAL) limit for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed LAGC fishery. Option 1 (F=0.15) and Option 2 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank only. Options 3 (F=0.15) and Option 4 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge.

6.2.2.3 2023 NGOM TAL Options

All four NGOM TAL options utilize a conservative F rate for setting harvest levels (F=0.15 and F=0.18). The NGOM covers several banks and ledges, and vessels can choose to fish anywhere within the management unit. The NGOM set-aside (expected landings) increases as F rates increase and as the area that is assumed to be fished expands (i.e. just Stellwagen vs. Stellwagen and Ipswich and Jeffreys). When comparing between the four TAL options, the option with the most positive biological impacts would be considered Option 1, and the option with the least positive impacts would be Option 4. Under Options 3 and 4, if more harvest occurs on Stellwagen Bank than expected, the realized F rate may be higher than an F=0.15 or F=0.18. However, with the application on the 2021 accountability measure, harvests under all scenarios would be reduced. Growth assumptions for the Stellwagen Bank area of the NGOM are uncertain and could be overestimated. The area where most of the fishing is expected to holds relatively high densities of scallops that are considered to be exploitable. Recent experience has shown higher levels of mortality when directed fishing occurs on high densities of scallops, such as in the NLS and CAII regions. Scallops in the Stellwagen Bank area are six years old, and still have growth potential. Stellwagen Bank is the most productive area in the NGOM, and there are no other strong year classes in the management unit.

6.2.3 Summary of Biological Information

The following describes the short-term (ST) and long-term (LT) impacts of fishery removals for each specification scenario in Action 3. 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 2023 are expected to be revisited again through a future action.

6.2.3.1 Overall Fishing Mortality and Outlook

- All the Action 3 alternatives have a total estimate of short-term fishing mortality that is lower than the upper limit used for setting fishery allocations for the fishery overall. The annual catch target (ACT) includes an overall fishing mortality limit of 0.39 for the total fishery (Section 3.3). The range of total fishing mortality under consideration is between 0.18 Alternative 1 (No Action) and a high of 0.295 for Alternative 5 (Status Quo). The overall F rates for options in Alternatives 2, 3, and 4 range from 0.22 at 22 DAS and two 10,000 pound access area trips to 0.26 at 24 DAS and two 14,000 pound access area trips. While overall fishing mortality remains lower than legal limits, there are important trade-offs in the ST about where F may occur spatially in open bottom fishing.
- Total fishing mortality is constrained so that average fishing mortality does need exceed FMSY (0.61) in open areas. 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 36 that would meet or exceed the average open area F at the upper bound of F=0.61. Alternatives in Section 4.3 consider open area F rates at two DAS options of 22 DAS and 24 DAS.
- When compared to estimates of the overall F from the preferred alternatives in recent actions (FW25 – 34), the estimates of overall (total) F rates for all alternatives under consideration are similar to the estimated F rates from 2021 and 2022, by generally higher than overall F rates between the period of 2016 - 2020. The forecasted overall F rate has been increasing for several year, and is likely to be similar to 2022 levels (higher or lower). The general increase in overall F was expected as the exceptional 2012 and 2013 year classes have moved through the fishery with below average recruitment for an extended period after 2013. This increase in total F is also a result of the partial approval of OHA2, which opened areas with high scallop biomass to fishing. Prior to OHA2, those scallops were surveyed and included in the calculation of overall F.
- Alternatives are modeled over the short-term and long-term (15 years) to make comparisons about the LT impacts of management decisions for the coming fishing year. The LT forecasts can help to identify

trade-offs between ST management measures by comparing how impacts of harvest in year 1 effect the scallop resource when applying the same assumptions across all alternatives. The LT forecasts apply a fixed fishing mortality rate of F=0.48 for open areas in all years after 2023, and adjust rotational management in years 2-4. In year 5, all rotational areas are opened, and fished at F=0.48. The simulation in FW36 assumes that the NYB closure will re-opened as an access area in 2024. Since the Council generally sets specifications for one or two years, the LT estimates should be interpreted as relative comparisons between measures, and not absolute values of future landings and economic impacts.

- The short term and long-term forecasts shown in Figure 21 illustrate some of the near-term trade-offs in terms of overall F between the options. The model is also suggesting that the range of alternatives developed for FY2023 would result in similar outcomes of F over the ST and LT under similar assumptions of fishing behavior over that time.
- Figure 22 illustrates the range of F rates predicted for each area in the SAMS model. The Status Quo run which allocated two trips to CAII (10 million pounds of landings from CAII-SW and EXT) would result in fishing in that area of over 1.3 to achieve those trips. The range of the inner quartiles is similar for each DAS option (22 and 24), while there is variation in the median for those runs that comes from different F rates associated with access area fishing in Area II.

The risk of overfishing is 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 and recent forecasts have been overly optimistic. In recent years when the projected F rate has been compared with estimated F rates from the most recent stock assessment, the hindcast or "realized" F has been above the average projected F in the Framework (see Figure 27). Even so, overall F was well below the current FMSY.

Figure 20 - Comparison of total fishing mortality (F) estimates in FW36 Alternatives with the preferred alternatives from recent Frameworks.

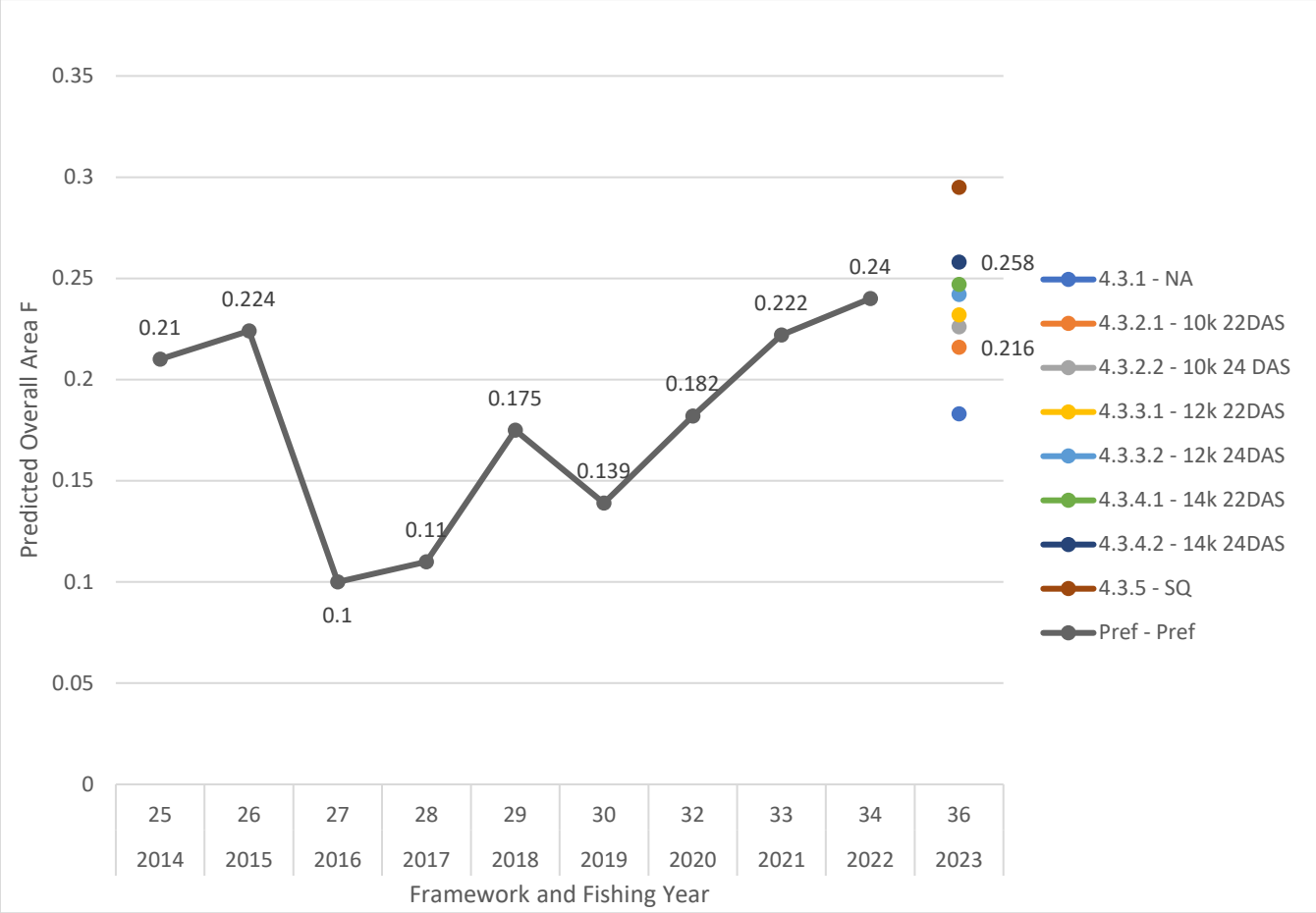


Figure 21 - Comparison of overall F over the Short Term and Long Term.

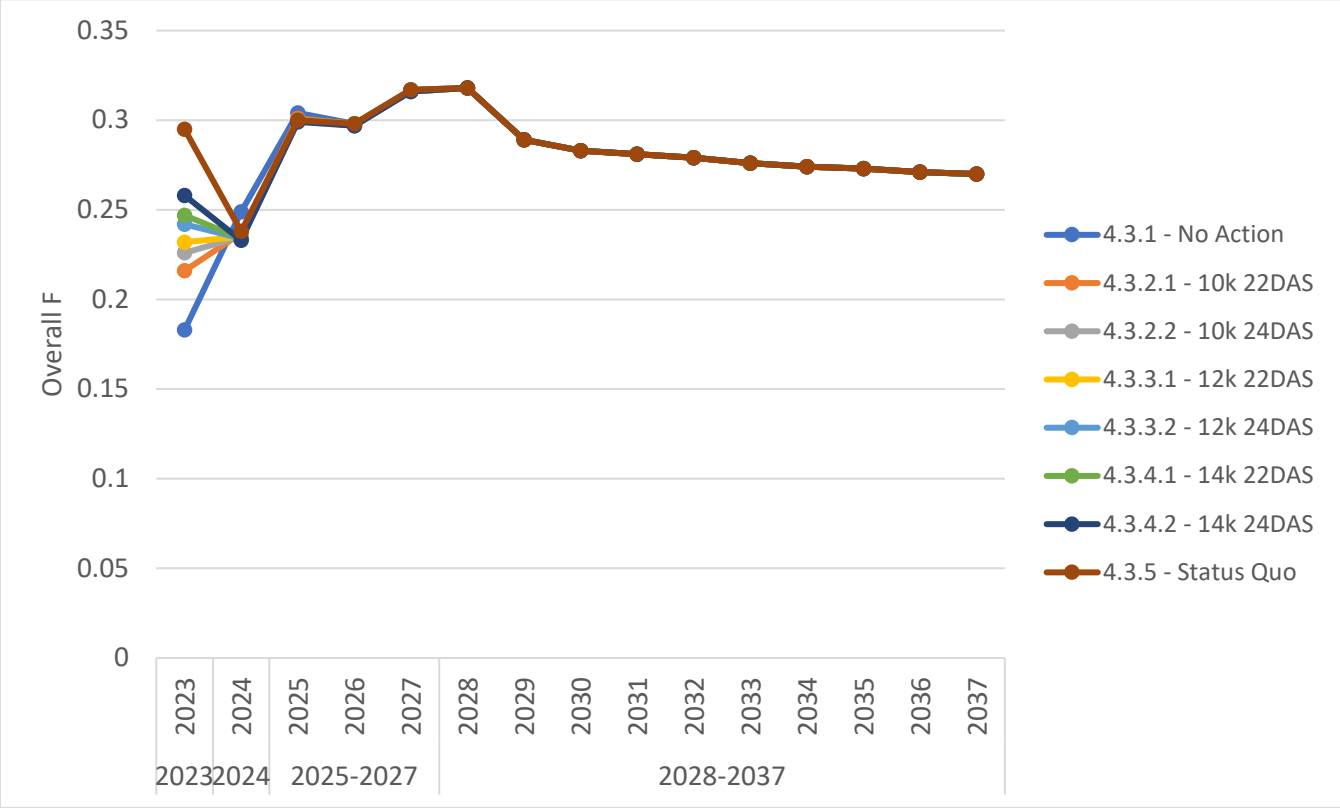
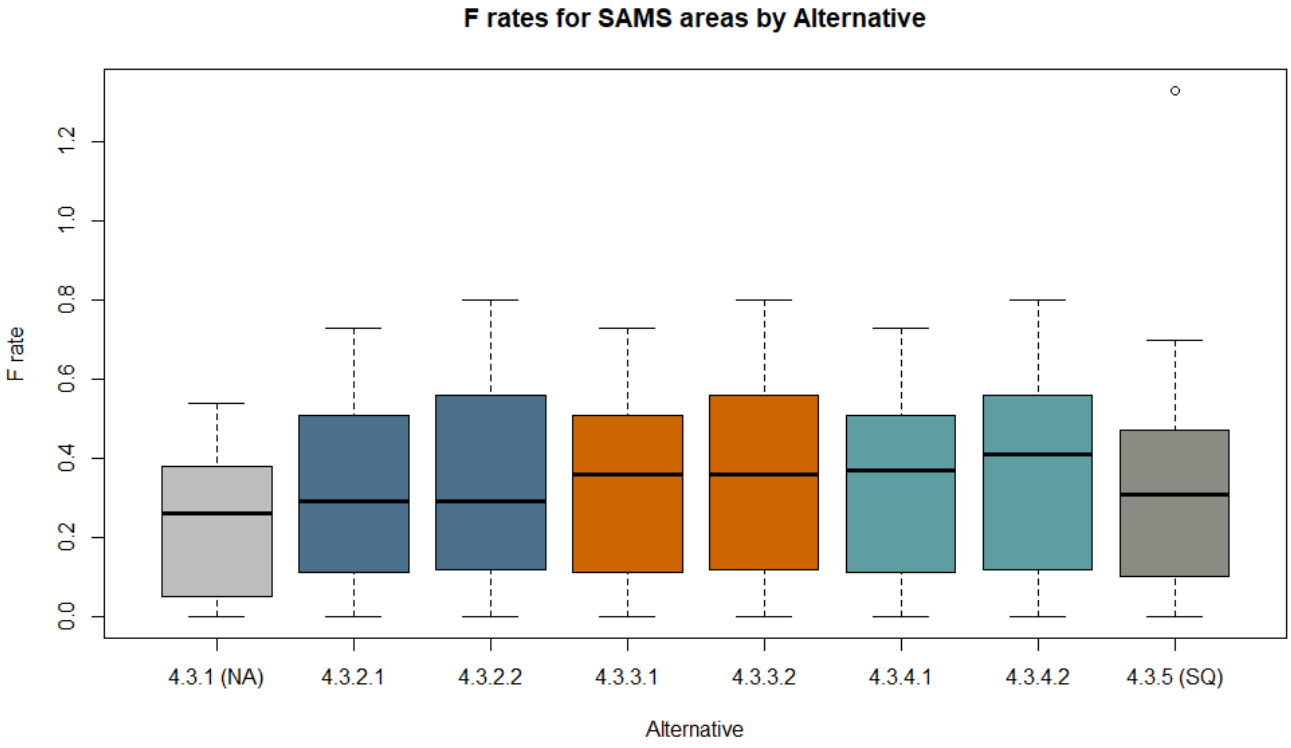


Figure 22 - Comparison of forecast F rates for all SAMS areas for alternatives in Action 3.



6.2.3.2 Open Area Fishing Mortality and Outlook

- Figure 23 provides a comparison of recent preferred F rates with options under consideration in FW36. Open area F rates are predicted to increase from the FW34, and reach their highest levels since FY2016. The declining trend in open area F between 2016 and 2019 came as most fishing was directed to rotational areas that became available through the partial approval of OHA2.
- The outlook for the resource has changed in recent years due to below average recruitment in the Mid-Atlantic since 2013, and average or below average recruitment on Georges Bank.
- The 2023 scallop surveys indicated that the majority of biomass in areas open for DAS fishing is on Georges Bank. Differences in biomass between the Mid-Atlantic and Georges Bank suggest that most of the open area fishing will occur on Georges Bank.
- Open area F rates are an average of area-specific F rates, and the model is forecasting above average F rates on Georges Bank, and below average F rates in the Mid-Atlantic (Figure 24). At 22 and 24 DAS allocated, the model predicts F rates to be above 0.5 in Georges Bank areas. In the last stock assessment for scallops, open area F rates for Georges Bank were estimated above F=0.5 in 2019 for scallops greater than 120mm (Figure 25) when the average open area F (Mid-Atlantic and Georges Bank) was predicted to be F=0.23 (Figure 21). While the SAMS model appears to be accurately predicting that most open bottom fishing activity will be on Georges Bank, there is considerable uncertainty around predicting realized F rates by area and region, and recent experience has shown the model to underestimate F.

Figure 23 - Comparison of average open area fishing mortality (F) estimates in FW36 Alternatives with the preferred alternatives from recent Frameworks.

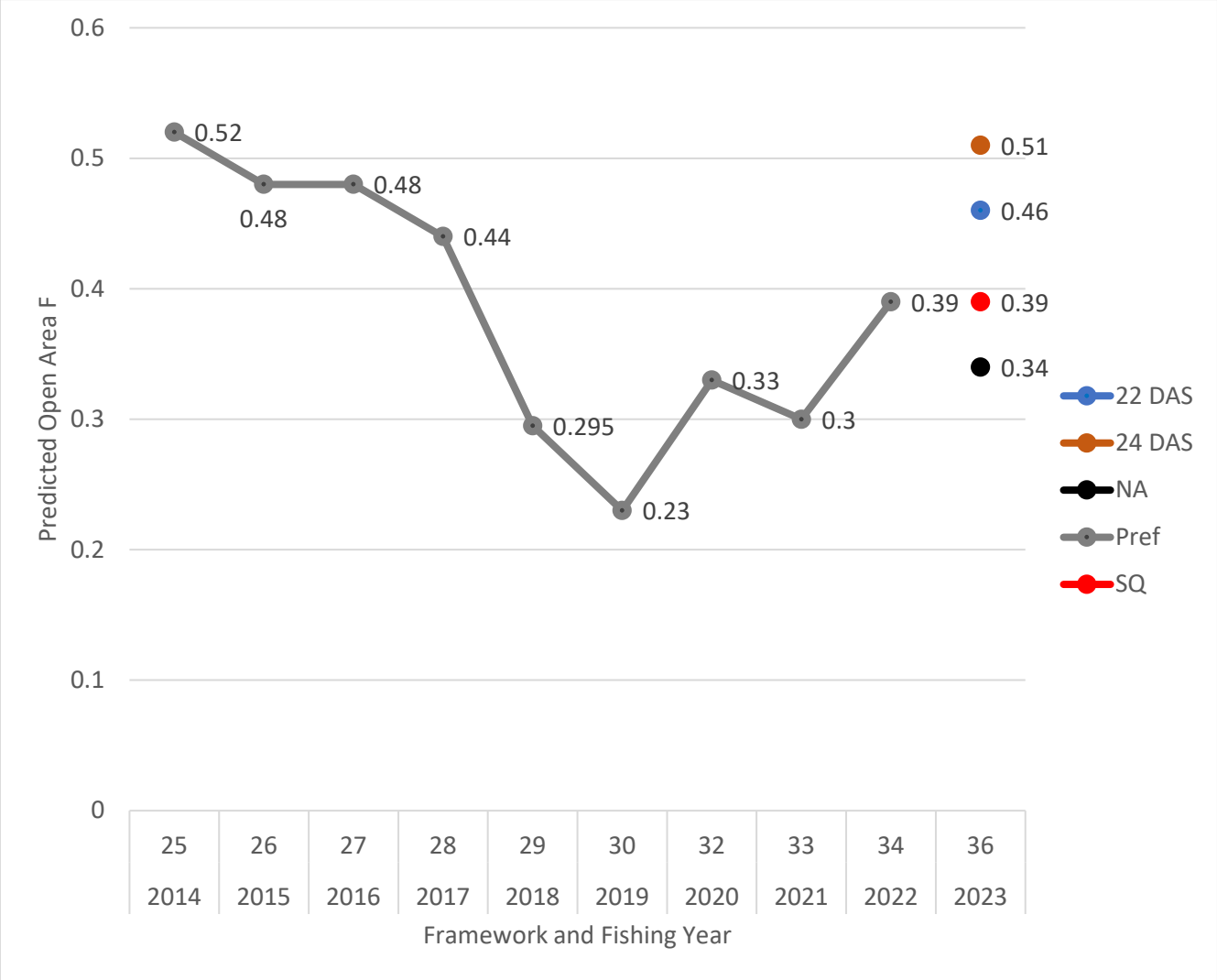


Figure 24 - Comparison of Open Bottom F rates by Region and DAS Options

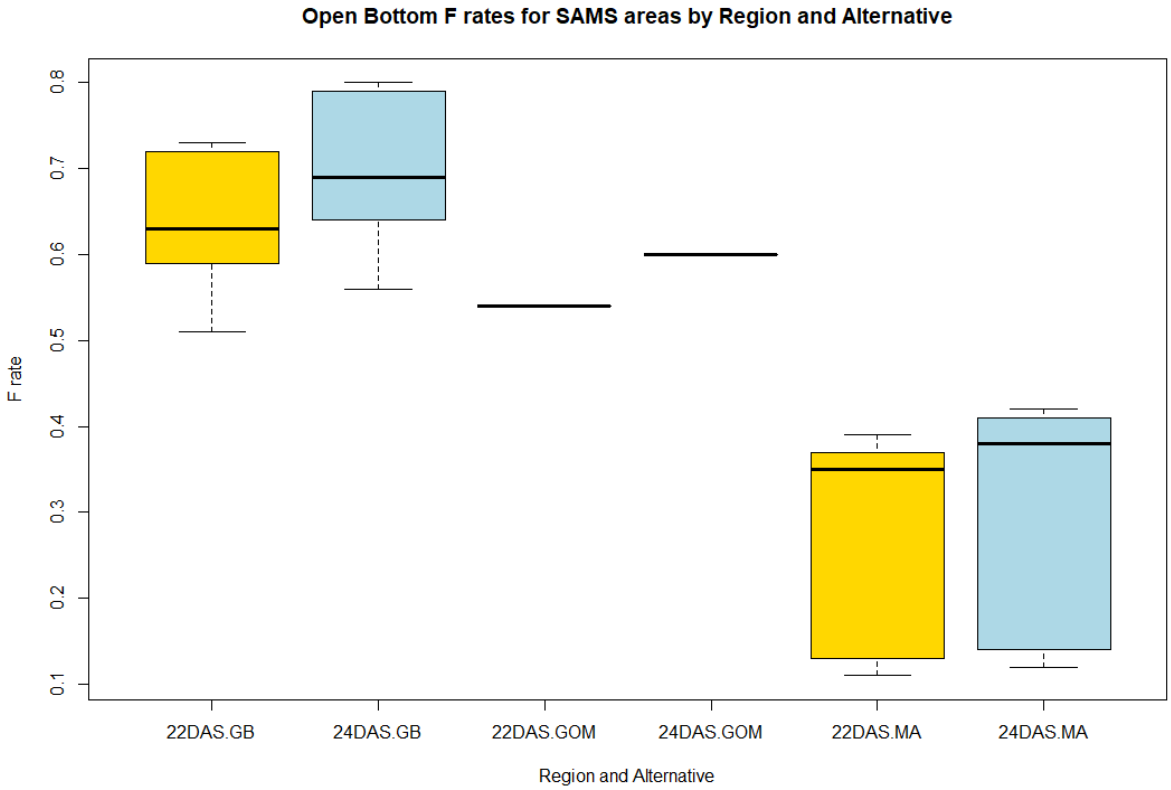
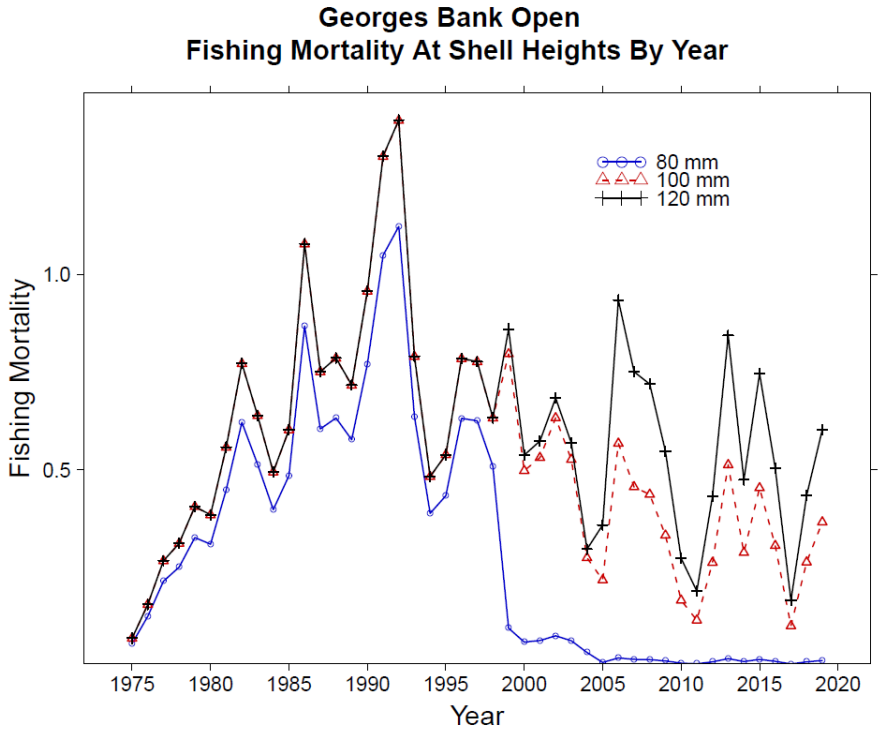


Figure 25 – 2020 Management Track Assessment estimates realized F for open bottom areas of Georges Bank for 80mm, 100mm, and 120mm shell-heights.



6.2.3.3 Projected Landings

Overall, the projected landings for the alternative runs under consideration are very similar (Figure 26). All options Framework 36 decrease overall landings compared to recent years. Alternative 2 and Alternative 3 both allocate 3 access area trips for FY2022, meaning that differences in projected landings are driven by DAS allocations. Total projected landings are likely to be between 47% (22 DAS and two 10,000 pounds trips in Area II) and 55% (24 DAS and two 14,000 pound trips to Area II) 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. The Council plans to revisit scallop fishery specifications again in 2023 to make recommendations for 2024. The uncertainty in projected landings is lower for year 1 but increases for 2023 and beyond. However, projections have been overly optimistic for parts of the resource in recent years (Figure 27).

Figure 26 - Projected landings for FW36 alternatives compared to the Council's preferred alternatives in recent actions (2014-2022).

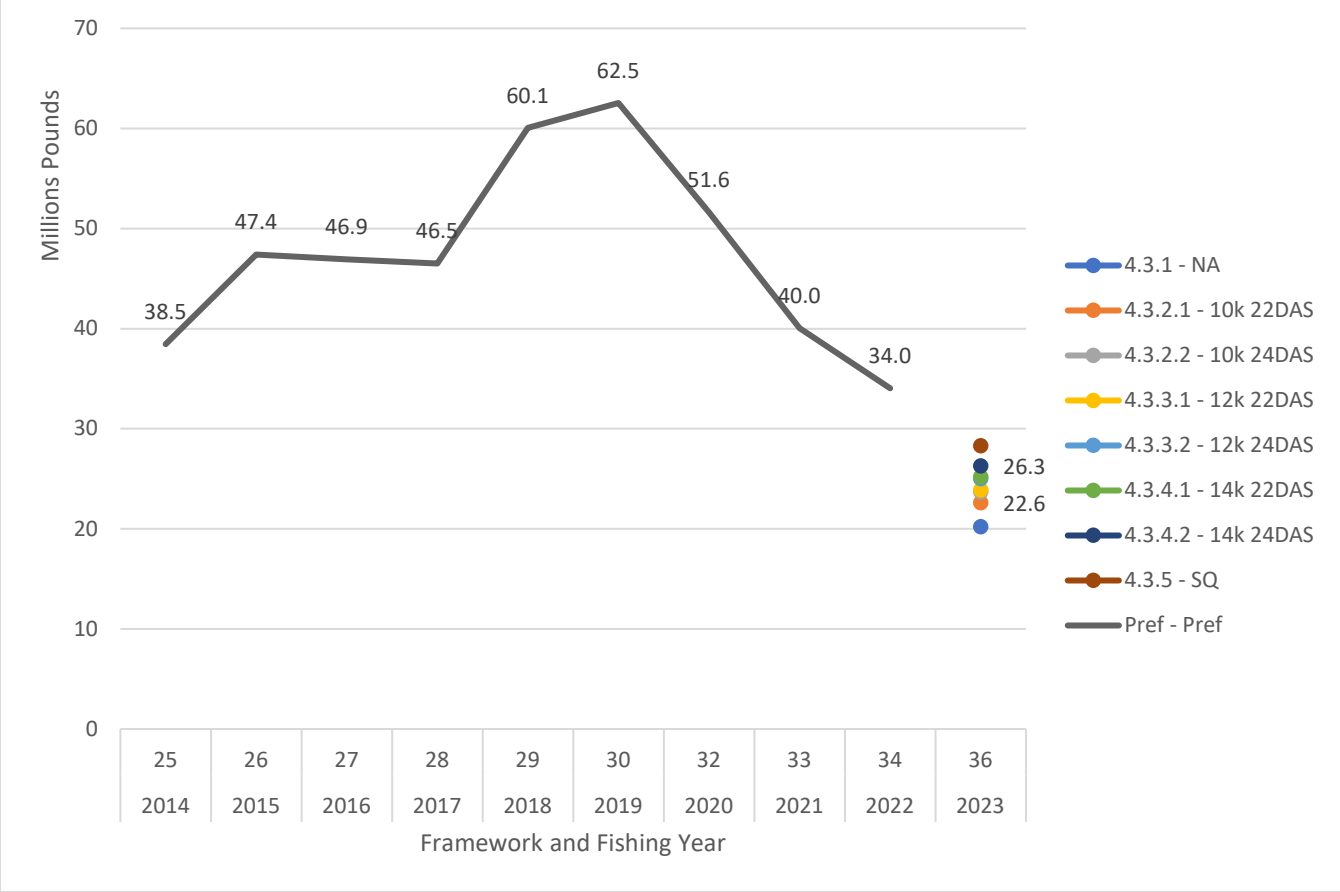
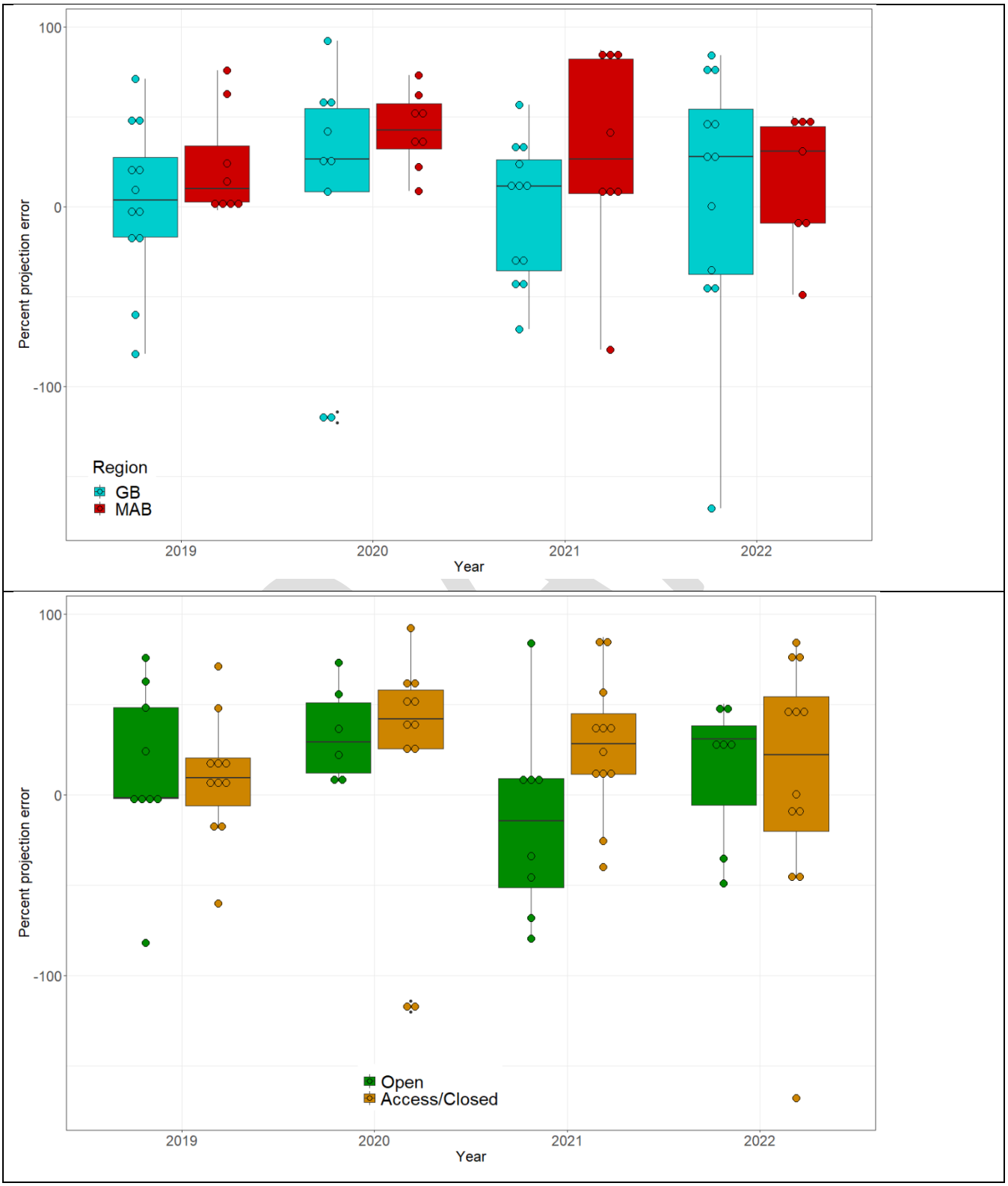


Figure 27 - Comparison of projection error for 2019 - 2022 by region (top) and access and open areas (bottom). The percent error is calculated as 100*(predicted-observed)/predicted.



6.2.4 Action 3 – Fishery Specifications and Rotational Management

The alternatives developed in this action set FY 2023 open area and access trip allocations for the LA and LAGC IFQ components of the fishery. Default specifications for FY 2024 are also established. The Council considered a total of four options. In addition to Alternative 1/No Action, three rotational management approaches (Alternatives 2-4) were developed, each with two options for open area F values that would result in either 22 or 24 DAS for full time limited access vessels.

For 2023, the Council is considering rotational fishing on eastern Georges Bank in a large rotational area (Area II) that combines the CAII-SW, SE, and EXT areas. This configuration would afford the fleet access to larger scallops in CAII-SE, which has been closed for two years, and will allow vessels to operate in a larger continuous area. The six year old cohort of scallops in Area II still have some growth potential. If the majority of harvest occurs in the SE portion of Area II, fishing mortality for that area will likely be underestimated.

6.2.4.1 Alternative 1 – No Action

No Action would set FT LA DAS at 18 and allocate one 15,000-pound trip to the Closed Area II Access Area for full-time limited access vessels. This alternative is likely to reduce landings and area swept compared to all other alternatives and Status Quo. A 15,000 pound trip to the Closed Area II Access Area is expected to result in an F=0.41 for both the CAII-SW and CAII-EXT, which is between the F rates assumed for Alternatives 3 and 4 (F=0.36 and F=0.44).

6.2.4.2 Alternative 2 – Two access area trips in Area II with 10,000-pound trip limit

Alternative 2 would result in a low overall F rate depending on the option selected (F=0.22 or F=0.23), which is similar to the overall F rates for Alternative 3, and slightly below the overall F rate for Alternative 4 (F=0.25 and F=0.26). All Alternatives and DAS options are expected to result in fishing mortality that is well below the OFL. With respect to open area F rates, F=0.46 (22 DAS) and F=0.51 (24 DAS) could result in slight negative biological impacts relative to No Action (F=0.34). Since open area F rates are the average of all SAMS areas, the 24 DAS option could be expected to result in the highest F rates for Georges Bank areas.

6.2.4.3 Alternative 3 – Two access area trips in Area II with 12,000-pound trip limit

Alternative 3 would result in a low overall F rate depending on the option selected (F=0.23 or F=0.24), which is similar to the overall F rates for Alternative 2, and slightly below the overall F rate for Alternative 4 (F=0.25 and F=0.26). All Alternatives and DAS options are expected to result in fishing mortality that is well below the OFL. With respect to open area F rates, F=0.46 (22 DAS) and F=0.51 (24 DAS) could result in slight negative biological impacts relative to No Action (F=0.34). Since open area F rates are the average of all SAMS areas, the 24 DAS option could be expected to result in the highest F rates for Georges Bank areas.

6.2.4.4 Alternative 4 – Two access area trips in Area II with 14,000-pound trip limit

Alternative 4 would result in a relatively low overall F rate depending on the option selected (F=0.25 or F=0.26). Both DAS options for Alternative 4 could be expected to result in an overall F rate that is slightly higher than F rates for both Alternatives 2 and 3. All Alternatives and DAS options are expected to result in fishing mortality that is well below the OFL. With respect to open area F rates, F=0.46 (22 DAS) and F=0.51 (24 DAS) could result in slight negative biological impacts relative to No Action (F=0.34). Since open area F rates are the average of all SAMS areas, the 24 DAS option could be expected to result in the highest F rates for Georges Bank areas.

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. Amendment 21 increased the LAGC IFQ access area trip limit from 600 pounds to 800 pounds per trip. 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 would afford vessels the opportunity to fishing the LAGC IFQ share of Area II allocations in the NLS-North area.

6.2.5.1 Alternative 1 – No Action (Default Measures from FW34)

Impacts of Alternative 1 are likely negligible at the stock level, but slight negative on the scallop resource in the Area I region of Georges Bank where strong recruitment was observed in the 2022 surveys. 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. However, fishing in areas with large numbers of pre-recruits could have a slight negative impact on the scallop resource through incidental mortality. Under default measures, the LAGC IFQ fleet would have a limited number of trips in Closed Area I (357 at 800 pounds per trip). Alternative 1 would likely have a slight negative biological impact relative to Alternative 2 LAGC could take place in an areas where large numbers of pre-recruits with substantial growth potential were observed.

6.2.5.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Area II Access Area Allocation to the Nantucket Lightship North and Area II

This option could have negligible to potentially slight positive impacts on the resource overall by reducing fishing pressure on inshore open areas and providing access to areas with higher biomass and catch rates (Area II) as well are areas that hold lower densities of large scallops but not been open to fishing in recent years. Alternative 2 would likely have a slight positive to negligible biological impact on the resource relative to Alternative 1. 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 Area II to the NLS-North for the LAGC component.

6.3 Impacts on Non-Target Species (Bycatch)

6.3.1 Action 1 – Overfishing Limit and Acceptable Biological Catch

The overfishing limit and acceptable biological catch are landings limits that the fishery is not allowed to exceed. As has been the case recent years, fishery allocations under consideration in this action (Section 4.3) are below the OFL and ABC values for both Alternative 1 (No Action, default OFL and ABC from FW34) and Alternative 2 (Updated OFL and ABC for FY2023 and FY2024). 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 FY2023 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. Given the above information, the impacts of Alternative 1 and Alternative 2 to non-target species are negligible overall and negligible in comparison to one another.

6.3.2 Action 2 – Northern Gulf of Maine Management and TAL 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. Bycatch projections for these two flatfish stocks under the NGOM TAL options are provided in Table 58. Bycatch projections are based on observed discard to kept (d/K) ratios from observed LAGC trips in the NGOM in FY2022 (i.e., the first year where observer coverage was required for the NGOM). Note that projections are provided for Option 1 and Option 2, but not Option 3 and Option 4, though bycatch for all options is expected to be similar (i.e., less than .5 mt).

For Alternative 1 and all options being considered under Alternative 2, bycatch of windowpane and yellowtail flounder is expected to be low relative to the overall catch limits for these stocks for both alternatives (i.e., less than ~1% of total projected bycatch for CC/GOM yellowtail and less than ~0.5% for northern windowpane). Alternative 1 or Alternative 2 are not expected to directly impact the overfishing/overfished status of these stocks or result in the overall ACLs to be exceeded. Therefore, considering the above, the impacts of Alternative 1 and Alternative 2 to non-target species are expected to be negligible overall and negligible in comparison to one another.

Table 58 – Comparison CC/GOM yellowtail and northern windowpane bycatch projections for the NGOM management area in FY2023, based on NGOM TAL Alternative 2 Options 1 and 2.

FW36 Alt	F rate	NGOM TAL	NWP bycatch (mt)	CC/GOM YT bycatch (mt)
Alternative 2 Op 1	F=0.15, biomass from Stellwagen only	357,149	0.18	0.40
Alternative 2 Op 2	F=0.18, biomass from Stellwagen only	421,083	0.21	0.47

6.3.3 Action 3 – Fishery Specifications and Rotational Management

The alternatives under this action set FY2023 open area and access trip allocations for the fishery. Default specifications for FY2024 are also established. The Council is considering a total of three new allocation options in addition to Alternative 1/No Action. The action alternatives (Alternatives 2 - 4) offer three access area allocation options, each with two options for open area F values. The access area options include two 10,000 pound trips to Area II (Alternative 2), two 12,000 pound trips to Area II (Alternative 3), and two 14,000 pound trips to Area II (Alternative 4). Alternatives 2 – 4 also consider options for 22 DAS (F=0.46) and 24 DAS (F=0.51). No Action includes default open area DAS set through FW34 (i.e., 18 DAS for FT LA vessels). A status quo scenario, which was not formally considered as an alternative, and is different from the No Action/default allocations, was evaluated for comparison to current management. The status quo alternative applies FY2022 specifications for FY2023 (i.e., considering changes in biomass that have occurred). The rotational access areas open under status quo differ from the action alternatives.

Table 59 shows the FY2023 scallop fishery bycatch projections for Georges Bank yellowtail, SNE/MA yellowtail, northern windowpane, and southern windowpane, relative to the anticipated scallop fishery sub-ACLs for each of these stocks. A description of the flatfish bycatch outlook for FY2023 and discussion around projections relative to anticipated catch limits for these stocks is included in the November 28, 2022 memo from the Scallop PDT to the Groundfish PDT.

Table 59 – Overview of FY2023 projected scallop fishery bycatch estimates for the range of alternatives being considered in FW36, including the anticipated FY2023 scallop sub-ACL for each stock.

Alternative	Scenario		GB YT	SNE/MA YT	GOM/GB WP	SNE/MA WP
Anticipated 2023 sub-ACL		GB Closure	*16.5 mt*	*2 mt*	*31 mt*	*129 mt*
Alt. 2	2 trips to Area II AA at 10,000 per trip (20K total) 22 or 24 DAS New York Bight, Elephant Trunk, Area I, NLS-West Closed	Area II seasonal closure (Aug 15-Nov 15)	32	3	106-112	38-41
Alt. 3	2 trips to Area II AA at 12,000 per trip (24K total) 22 or 24 DAS New York Bight, Elephant Trunk, Area I, NLS-West Closed	Area II seasonal closure (Aug 15-Nov 15)	38	3	112-119	38-41
Alt. 4	2 trips to Area II AA at 14,000 per trip (28K total) 22 or 24 DAS New York Bight, Elephant Trunk, Area I, NLS-West Closed	Area II seasonal closure (Aug 15-Nov 15)	45	3	119-126	38-41

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

The LAGC IFQ component is allocated 5.5% of the access area allocations and a fleet wide total number of access area trips. Therefore, bycatch of non-target species in the LAGC IFQ fishery are relatively small when compared to the amount of bycatch by the entire scallop fishery over the course of the year.

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.

Under Alternative 1 (No Action) the LAGC IFQ component would be allocated 357 trips to Area I, which is the default number of trips allocated through Framework 34. Note that all action alternatives in Action 3 (Section 4.3) close Area I to scallop fishing, meaning even if this alternative was selected and trips were allocated to Area I, LAGC IFQ vessels would not be able to fish them. Under Alternative 2, a range of access area trips could be allocated to the LAGC IFQ component depending on the specifications option selected in Action 3 (Section 4.3). Under Alternative 2, a total of 476, 571, or 666 access area trips could be allocated to the LAGC IFQ component in FY2023, corresponding to Alternative 4.3.2, Alternative 4.3.3, and Alternative 4.3.4, respectively (Table 9). Alternative 2 would allocate a total number of trips that could be fished in either the Nantucket Lightship North and(or) Area II. Once the total number of trips is taken, LAGC IFQ vessels will no longer be allowed to fish access area trips in either area. The LAGC IFQ component will continue to have access to the Nantucket

Lightship North as part of the open bottom after the total trip allocation has been taken. Alternative 2 also reverts the Nantucket Lightship North to open bottom for the LA component after the first 90 days of FY2023.

Under Alternative 2, should vessels choose to fish in Area II, vessels will likely be able to harvest the possession limit in less time compared to fishing in the NLS-North and(or) open bottom because there are high densities of scallops in Area II. Even in a scenario where vessels choose to fish in Area II, where GB yellowtail and northern windowpane bycatch tends to be higher than other parts of the resource, fishing in an area with high densities would mean lower area swept and therefore lower bycatch. Given the choice between fishing in Area II or the Nantucket Lightship North, it is more likely that LAGC IFQ vessels will fish in the Nantucket Lightship North due to the considerably longer steam time associated with trips to Area II, even if catch rates are not as high in the Nantucket Lightship North. Catch rates in the Nantucket Lightship North could be similar or slightly higher than what is anticipated for open trips, meaning allowing LAGC IFQ vessels to fish access area trips in the NLS-North could also have some slight benefits to non-target flatfish stocks in that area swept and time with gear in the water could be slightly reduced. Additionally, bycatch associated with trips in the NLS-North would be attributed to the SNE/MA yellowtail and southern windowpane stocks, which the fishery is projected to catch lower levels of and is not expected to exceed the respective sub-ACLs.

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. This is true for all Alternatives being considered in Action 4.

In any scenario, the Alternatives being considered under Action 4 are not expected to result in levels of bycatch of allocated flatfish stocks that would contribute to ACLs for those stocks to be exceeded. Therefore, the direct impacts of Alternative 1 and Alternative 2are expected to be negligible overall, as well as negligible in comparison to one another.

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 FY2023 and FY2024 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 19,828 mt for FY2023. This is 5,896 mt (23%) 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 2023 fishing year. Regardless of this influx of biomass to the fishery, the OFL, ABC, and ACL values set by the Council are often higher than the projected landings by the fishery (e.g., in this action, all alternatives in Section 4.3 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 of sea turtles and Atlantic sturgeon. 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), the level of negative impacts to ESA listed species of sea turtles and Atlantic sturgeon is expected to be slight. Support for this determination is provided below.

Under "No Action", the overall OFL and ABC would be at the default values for FY2023, which were adopted by the Council through FW34. The No Action ABC including discards is 27,606 mt or about 61 million pounds. The No Action OFL including discards is 34,941 mt or roughly 77 million pounds. The ABC and OFL under Alternative 1 (No Action) are the lowest values that were authorized for the fishery since 2014 (Table 60). As biomass of the scallop resource affect the OFL and ABC, and these resource conditions can vary from year to year, it is likely that fishing effort under the No Action OFL and ABC will be no greater than effort seen under the most recent values authorized in the fishery (i.e., 2017 through 2022). In addition, the OFL and ABC are not a direct measure of the Annual Projected Landings (APL) for the scallop fishery and therefore, the values in and of themselves are not a direct measure of expected fishing behavior or effort under such specifications. Instead these values represent the legal limits for the fishery based on biomass throughout the range of the resource and the overfishing level updated through the 2020 scallop stock assessment (F=0.61) (NEFSC 2020). Projected landings are anticipated to be much lower than the OFL/ABC values under No Action and Alternative 2, and impacts of the projected landings resulting from specification alternatives in Section 4.3 (i.e., day-at-sea and access area allocations) are described in Section 6.4.3.

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, No Action is not expected to introduce new or elevated interaction risks to ESA listed species of sea turtles and Atlantic sturgeon. 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 slight negative impacts on ESA listed species of sea turtles and Atlantic sturgeon. Relative to Alternative 2, the No Action alternative would result in negligible impacts to ESA-listed species because the OFL and ABC values in and of themselves under either alternative are not expected to change fishing behavior and effort in a manner that significantly differs from status quo conditions.

6.4.1.2 Alternative 2 – Updated OFL and ABC for FY2023 and FY2024 (default)

The OFL and ABC values approved by the SSC for FY2023 and FY2024 (default) under Alternative 2 are summarized in Table 4. The updated OFL including discards is 27,504 mt (approximately 61 million pounds) and the updated ABC including discards is 22,631 mt (approximately 50 million pounds). The updated OFL and ABC represent a reduction from No Action by 7,437 mt and 4,975 mt, respectively. Survey results from 2022 suggest a continued decline in scallop biomass, with overall biomass estimated to be at its lowest level since 1999. The trend is likely driven by larger year classes of scallops being fished down in tandem with several years of below average recruitment.

Under Alternative 2, the proposed OFL and ABC for FY2023 and FY2024 are lower than the range of ABC and OFL values that were authorized by the fishery over the past 12 years (Table 60). The trends in the ABC and OFL since 2017 (i.e., increases between FY2017 and FY2019; roughly similar values between FY2019 and FY2020; and a reduction between FY2020, FY2021, FY2022, and FY2023) reflect the higher estimates of scallop biomass observed in recent surveys of the scallop resource and the leveling off and steady decline of scallop biomass as the large year classes continued to be fished with a lack of subsequent recruitment. As biomass of the scallop resource affect the OFL and ABC, and these resource conditions can vary from year to year, it is likely that fishing effort under the Alternative 2 OFL and ABC will be no greater than effort seen under the most recent values authorized in the fishery (i.e., 2017 through 2022). In addition, the OFL and ABC are not a direct measure of the Annual Projected Landings (APL) for the scallop fishery and therefore, the values in and of themselves are not a direct measure of expected fishing behavior or effort under such specifications. Instead these values represent the legal limits for the fishery based on biomass throughout the range of the resource and the overfishing level updated through the 2020 scallop stock assessment (F=0.61) (NEFSC 2020). Projected landings

are anticipated to be much lower than the OFL/ABC values under both No Action and Alternative 2; impacts of the projected landings resulting from specification alternatives in Section 4.3 (i.e., day-at-sea and access area allocations) are described in more detail in Section 6.3.3.

Fishery allocations are projected to result in significantly lower landings than the OFL and ABC limits under Alternative 2 and are lower than projected landings in recent history. Based on this, the OFL and ABC in and of themselves are not expected to change fishing behavior and effort in a manner that significantly differs from status quo conditions or under Alternative 1. As a result, impacts on ESA listed species of sea turtles and Atlantic sturgeon under Alternative 2 are expected to be like those assessed for Alternative 1, slight negative. Therefore, relative to Alternative 1, Alternative 2 is likely to result in negligible impacts on ESA listed species of sea turtles and Atlantic sturgeon

Table 60 – Overfishing limit (OFL) and acceptable biological catch (ABC) values (mt) from fishing year 2011 to 2022, with 2023 and 2024 values.

Fishing Year	OFL	ABC
2011	32,387	27,269
2012	34,382	28,961
2013	31,555	21,004
2014	30,419	20,782
2015	38,061	25,352
2016	68,418	37,852
2017	75,485	46,737
2018	72,055	45,950
2019	73,421	57,003
2020	56,186	45,414
2021	47,503	36,435
2022	38,271	30,305
2023	27,504	22,631
2024	29,151	23,289

6.4.2 Action 2 - Northern Gulf of Maine Management and TAL Setting

6.4.2.1 Alternative 1 – No Action

Under No Action, the NGOM Set-Aside would be set at 465,980 pounds for FY2023. There would be no NGOM Set-Aside specified for FY2024, and the area would close to directed scallop fishing.

Alternative 1 (No Action) represents a reduction in the overall NGOM Set-Aside relative to FY2022 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 abbreviated relative to FY2022, which concluded in late May 2022. In other words, under Alterative 1 (No Action), the NGOM Set-Aside would likely be harvested by early to mid-May, assuming that activity in terms of active vessels and catch rates are similar to what was observed in FY2022. If the number of active vessels and(or) catch rates in the NGOM were to be reduced in FY2023 compared to FY2022, there is potential that scallop fishing activity at some level could persist within the NGOM

management area beyond the month of May. Given this, both of these scenarios will be considered in the following assessment of impacts to those protected species that have the potential to be impacted by the operation of the scallop fishery (i.e., ESA-listed species of sea turtles and Atlantic sturgeon).

As discussed in Section 5.4.2, sea turtles (hard-shelled and leatherback) are at risk of interacting with scallop dredge and trawl gear. In general, from late April/early May to November each year, sea turtles occur throughout the range of the scallop fishery. In the portion of the scallop fishery operating in the NGOM, hard-shelled sea turtles are most likely to be present, and overlap with the scallop fishery, from June through September; however, their presence, albeit lower, is still possible from October through December (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; NMFS 2021; Shoop & Kenney 1992). Leatherback sea turtles also occur in the Gulf of Maine over a similar time frame as hard-shelled sea turtles, with most leaving the Northwest Atlantic shelves by mid-November (Dodge et al. 2014; James et al. 2005; James et al. 2006; NMFS & USFWS 1992). Although sea turtles can be found seasonally throughout the range of the scallop fishery, relative to Mid-Atlantic, encounter rates of hard-shelled species of sea turtles are lower in the Gulf of Maine (Murray 2018, 2020). In addition, review of NMFS observer data (NEFSC FMRD database; unpublished data) show that there have been no observed or documented interactions between scallop fishing gear and any hard-shelled species of sea turtle in the GOM (NEFSC FMRD database; unpublished data; Murray 2011; 2013; 2015a; c; Murray & Orphanides 2013a; NMFS 2012; Warden 2011a; c). Although there is the possibility for leatherback sea turtles to interact with scallop fishing gear, based on NMFS observer data (NEFSC FMRD database; unpublished data), as well as data provided by the Greater Atlantic Region Sea Turtle Disentanglement Network (GAR STDN, unpublished data), leatherback sea turtle interactions with scallop fishing gear have never been observed or documented, and therefore, while the risk of interaction exists, it is likely very low.

Taking into consideration the information above, since the NGOM fishery is expected to end by early to mid-May, fishing activity is not expected to have a substantial overlap with the seasonal distribution of sea turtles in the Gulf of Maine (GOM). Based on this, if the fishery closes in May, interactions with sea turtles are not expected.

As described above, should the number of active vessels and(or) catch rates be lower than what is expected, 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. Generally, the rate in which the NGOM Set-Aside is harvested is an indication of the total number of vessels fishing in the area and catch rates (i.e., LPUE). When high densities of exploitable scallops are present in the NGOM, more vessels tend to participate in this part of the fishery because high catch rates and low operating costs make trips viable. Under this scenario, derby-style fishing can occur and the NGOM Set-Aside tends to be harvested quickly (i.e., fishery closes in May). Examples of this scenario were seen in 2016 through 2022, when an increase in LAGC vessel participation was seen, catch rates were high due to high densities of exploitable scallops, and the area catch limit was harvested in under two months. On the other hand, when exploitable biomass is low, the overall NGOM TAC tends to be lower, and vessel participation may decrease because fishermen defer to other fishing opportunities that are more economically viable. Examples of this scenario were seen in 2009 through 2015, when the NGOM catch limit, vessel participation, and overall effort were lower compared to more recent years, and the area remained open the entire year because the NGOM TAC was not harvested. Under either scenario, vessels that receive NGOM RSA compensation pounds are able to operate independently of the NGOM Set-Aside; in other words, eligible vessels can choose to fish in the NGOM at any time during the fishing year, regardless of whether the NGOM Set-Aside has been harvested. Therefore, considering each of the above scenarios, if the NGOM management area were open to the LAGC component for the entire year, it would indicate that fishing effort by the LAGC component is low, likely as a result of low exploitable biomass and low catch rates. In this situation, considering vessels can choose to fish NGOM RSA either inside or outside the NGOM, it is highly likely that vessels would choose to fish NGOM RSA pounds in other parts of the resource where catch rates are higher. Taking into consideration expected effort under this scenario, 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. 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 are known to occur in the Gulf of Maine year-round and are vulnerable to interactions with scallop fishing gear; however, based on the best available information, the risk is expected to be low (NMFS 2021). Specifically, review of NMFS observer data from 1989 through 2019 show no observed or documented Atlantic sturgeon interactions with scallop bottom trawl gear where the haul target or trip target is scallop (NEFSC FMRD database; unpublished data). However, NEFOP observer data has recorded one (1) Atlantic sturgeon interaction with scallop dredge gear targeting Atlantic sea scallops; this sturgeon was released alive (NEFSC FMRD database; unpublished data). Based on this information, as well as the information provided in the sea turtle assessment above regarding fishing effort, 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 negligible to slight negative. The NGOM Set-Aside under Alternative 1 is higher than all of the NGOM Set-Aside Options of Alternative 2. Given the lower catch limits being considered under Alternative 2, it is anticipated that the NGOM season will likely conclude in a similar time frame as what was experienced in FY2016-FY2022 (i.e., NGOM closure by the end of April to late-May).

In either scenario, impacts to protected species would be less under Alternative 2 relative to Alternative 1, meaning the impacts of Alternative 1 could be slightly negative relative to the options of Alternative 2.

6.4.2.2 Alternative 2 - Set NGOM TAL, with set-asides to support research, monitoring, and a directed LAGC fishery

Alternative 2 would specify a Northern Gulf of Maine Total Allowable Landings (NGOM TAL) limit for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed LAGC fishery. Option 1 (F=0.15) and Option 2 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank only. Option 3 (F=0.15) and Option 4 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. The resulting TALs from these options are 357,149 pounds (Option 1), 421,083 pounds (Option 2, preferred), 434,311 pounds (Option 3), and 511,472 pounds, respectively. All four options fall under the 800,000-pound NGOM Set-Aside trigger, meaning the remainder of the NGOM TAL after set-asides are removed will be allocated as NGOM Set-Aside, available to directed LAGC fishing only.

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), impacts of Alternative 2 on ESA-listed species of sea turtles and Atlantic sturgeon are expected to be slight negative for all Options. Support for this determination is provided below.

The options of Alternative 2 represent lower catch limits than those authorized in FY2022 and similar limits compared to FY2018-FY2021. The NGOM fishery is not expected to extend longer than what has typically been observed (i.e., NGOM fishery concluding between late April and mid-May) as a result of the NGOM TAL options being considered under Alternative 2. The main variable driving the duration of the fishing season is the level of participation (i.e., number of active vessels). Participation could vary under either Alternative 1 or Alternative 2 because any vessels with an LAGC A (IFQ) or LAGC B/C permit could choose to fish in the NGOM. For the purposes of understanding the relationship between the level of participation in the NGOM and potential impacts to protected species, several scenarios are presented below.

In a scenario where participation remains the same as last year, with approximately 100 LAGC vessels actively fishing in the NGOM, scallop fishing activity in the NGOM would likely conclude by early to mid-May under any of the options of Alternative 2. In another scenario with a moderate decrease in active vessels in the NGOM, fishing activity in the NGOM could extend slightly compared to FY2022, it is difficult to say to what degree. Another scenario could be that there is a significant increase in the number of active vessels fishing the NGOM Set-Aside; under this scenario, there would be an increase of gear in the water, but the duration of the NGOM fishery would be abbreviated to a short window in the early spring (i.e., likely mid- to late-April). There are roughly 427 LAGC IFQ, LAGC NGOM, and LAGC Incidental permits in the fishery; while it is highly unlikely that this number of vessels would activate in the NGOM, this represents the upper bound of possible participation in the above scenarios associated with Alternative 2.

Under an unlikely scenario where the season is extended into the summer months, it is possible that the risk of interaction with sea turtle species increases given their seasonal migration patterns into the GOM. In a scenario where there is a moderate decrease in participation, the NGOM fishery would still be expected to conclude in mid to late-May, prior to when sea turtles migrate into the GOM region. While there would be a notable increase of gear in the water in the third scenario, this scenario would likely have the lowest interaction risk with sea turtle species given that the fishing season would be abbreviated, likely concluding before sea turtle species migrate into the GOM region. While it is difficult to state which of these scenarios would occur, a similar level of participation as observed in FY2022 is probably the most realistic scenario to occur under Alternative 2.

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 2 could increase, meaning there could be some increased risk of interaction with protected species compared to current conditions. However, while the risk of interaction may be somewhat elevated, it is important to note 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 (NEFSC FMRD database; unpublished data; Murray 2011; 2013; 2015a; c; Murray & Orphanides 2013a; NMFS 2012; Warden 2011a; c) 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 (NEFSC FMRD database; unpublished data), as well as data provided by the Greater Atlantic Region Sea Turtle Disentanglement Network (GAR STDN, unpublished data), leatherback sea turtle interactions with scallop fishing gear have never been observed; therefore, while the risk of interaction exists, it is likely very low, even at the levels of effort expected under Alternative 2. Taking all of these factors into consideration and acknowledging that impacts will scale based on the range of participation scenarios that could occur under Alternative 2, the impacts to sea turtles could range from slightly to moderately negative overall.

The impact of Alternative 2 to Atlantic sturgeon would likely be driven by the overall effort, amount of gear, and tow time in the NGOM, meaning the impact would likely be similar under the participation scenarios outlined above (i.e., similar participation as recent years, moderate increase to participation, and high increase in participation). As provided above, Atlantic sturgeon are known to occur in the Gulf of Maine year-round and are vulnerable to interactions with scallop fishing gear; however, the risk of interactions with scallop dredges is expected to be low. Specifically, review of NMFS observer data from 1989 through 2019 show no observed or documented Atlantic sturgeon interactions with scallop bottom trawl gear where the haul target or trip target is scallop (NEFSC FMRD database; unpublished data) (NEFSC FMRD database; unpublished data). However, NEFOP observer data has 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 the different scenarios that could occur under Alternative 2 related to the timing and amount of fishing effort in the NGOM, the impacts to Atlantic sturgeon could be slightly negative overall.

In any scenario, impacts to protected species would be less under Alternative 2 relative to Alternative 1 because overall effort would be less, meaning the impacts of Alternative 2 could be slightly to positive to negligible relative to Alternative 1.

6.4.3 Action 3 – Fishery Specifications and Rotational Management

Alternatives under this action set FY2023 open area and access trip allocations for the fishery. Default specifications for FY2024 are also established. The Council is considering a total of six allocation options in addition to Alternative 1/No Action. The action alternatives (Alternatives 2 - 4) offer three access area allocation options, each with two options for open area F values (Table 61). The access area options include two 10,000 pound trips to Area II (Alternative 2), two 12,000 pound trips to Area II (Alternative 3), and two 14,000 pound trips to Area II (Alternative 4). A status quo scenario, which was not formally considered as an alternative, and is different from the No Action/default allocations, was evaluated for comparison to current management. The status quo alternative applies FY2022 specifications for 2023(i.e., considering changes in biomass that have occurred). The rotational access areas open under status quo differ from the action alternatives.

Table 61 shows landings, LPUE, and area swept by alternative, Table 62 provides a matrix of comparisons for the area swept values only, and Table 63 provides a matrix of the relative differences in area swept values between alternatives in terms of percent difference.

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 Table 62). 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 available exploitable biomass accounted for in the current OFL and ABC estimates is Area II. Area II is the only candidate access area being considered for FY2023. The projection model also suggests that the majority of open area fishing will occur on Georges Bank, which is consistent with observed trends in the past few years as well as survey estimates that show open areas of Georges Bank to hold greater biomass than in the Mid-Atlantic Bight region. The scallop fishery is expected to operate mostly on eastern Georges Bank in FY2023.

All action alternatives expand the boundary of Area II to include the Southwest/Extension (i.e., the FY2022 configuration), and East (i.e., closed in 2021-2022) portions of the area. All action alternatives continue closures of the New York Bight and Nantucket Lightship West, and also establish new closures of the Elephant Trunk and Area I to protect incoming recruitment that was observed in these areas during the 2022 surveys. Each alternative has options to allocate either 22 DAS (open area ranging from F=0.46) or 24 DAS (F=0.51). Given the similarities between alternatives in terms of spatial patterns of effort and area swept, the impacts to protected species are therefore expected to be broadly similar between the different alternatives, with effects scaling according to the magnitude of effort in each area.

Table 61 – Summary of projected landings, overall landings per unit of effort (LPUE), bottom area swept (nm^2), and relative habitat efficiency (landings/area swept) for alternatives under consideration in Framework 36.

Alternative	Description	Projected Landings (lbs)	LPUE Estimate	Area Swept (nm^2)	Landings (mt)/Area Swept (nm^2)
4.3.1	No Action	20,214,185	2,248	2,440	3.8
4.3.2.1	Two trips at 10k each, 22 DAS	22,619,428	2,138	3,268	3.1
4.3.2.2	Two trips at 10k each, 24 DAS	23,719,535	2,100	3,612	3.0
4.3.3.1	Two trips at 12k each, 22 DAS	23,909,132	2,172	3,323	3.3
4.3.3.2	Two trips at 12k each, 24 DAS	25,007,034	2,134	3,665	3.1
4.3.4.1	Two trips at 14k each, 22 DAS	25,207,655	2,200	3,388	3.4
4.3.4.2	Two trips at 14k each, 24 DAS	26,305,557	2,161	3,729	3.2
4.3.5	Status Quo	28,300,741	2,164	3,720	3.5

Table 62 – Comparison of area swept (nm2) between each specification alternative in Framework 36. Shading is used to emphasize comparisons between the action Alternatives 2.1 – 4.2.

Alt			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
	Description	**Area swept (nm^2)**	**2,440**	**3,268**	**3,612**	**3,323**	**3,665**	**3,388**	**3,729**	**3,720**
4.3.1	No Action	**2,440**	0	-828	-1,172	-883	-1,225	-948	-1,289	-1,280
4.3.2.1	10k 22DAS	**3,268**	828	0	-344	-55	-397	-120	-461	-452
4.3.2.2	10k 24DAS	**3,612**	1,172	344	0	289	-53	224	-117	-108
4.3.3.1	12k 22DAS	**3,323**	883	55	-289	0	-342	-65	-406	-397
4.3.3.2	12k 24DAS	**3,665**	1,225	397	53	342	0	277	-64	-55
4.3.4.1	14k 22DAS	**3,388**	948	120	-224	65	-277	0	-341	-332
4.3.4.2	14k 24DAS	**3,729**	1,289	461	117	406	64	341	0	9
4.3.5	Status Quo	**3,720**	1,280	452	108	397	55	332	-9	0

Table 63 – Comparison of the relative difference in area swept (nm^2) between each specification alternative in Framework 36. Shading is used to emphasize comparisons between the action Alternatives 2.1 – 4.2.

Alt			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
	Description	**Area swept (nm^2)**	**2,440**	**3,268**	**3,612**	**3,323**	**3,665**	**3,388**	**3,729**	**3,720**
4.3.1	No Action	**2,440**	0%	-25%	-32%	-27%	-33%	-28%	-35%	-34%
4.3.2.1	10k 22DAS	**3,268**	34%	0%	-10%	-2%	-11%	-4%	-12%	-12%
4.3.2.2	10k 24DAS	**3,612**	48%	11%	0%	9%	-1%	7%	-3%	-3%
4.3.3.1	12k 22DAS	**3,323**	36%	2%	-8%	0%	-9%	-2%	-11%	-11%
4.3.3.2	12k 24DAS	**3,665**	50%	12%	1%	10%	0%	8%	-2%	-1%
4.3.4.1	14k 22DAS	**3,388**	39%	4%	-6%	2%	-8%	0%	-9%	-9%
4.3.4.2	14k 24DAS	**3,729**	53%	14%	3%	12%	2%	10%	0%	0%
4.3.5	Status Quo	**3,720**	52%	14%	3%	12%	2%	10%	0%	0%

6.4.4 Access Area Allocations to the LAGC IFQ Component

The LAGC IFQ fishery is allocated a fleet wide total number of access area trips that is based on the access area allocation that the limited access component receives through specification setting (Action 3). LAGC IFQ vessels can elect to fish their quota in available access areas, but are not required to take trips in access areas. 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 how LAGC IFQ access area trips will be distributed. Under Alternative 1 (No Action) the LAGC IFQ component would be allocated 357 trips to Area I, which is the default number of trips allocated through Framework 34. Note that all action alternatives in Action 3 (Section 4.3) close Area I to scallop fishing, meaning even if this alternative was selected and trips were allocated to Area I, LAGC IFQ vessels would not be able to fish them. Under Alternative 2, a range of access area trips could be allocated to the LAGC IFQ component depending on the specifications option selected in Action 3 (Section 4.3). Under Alternative 2, a total of 476, 571, or 666 access area trips could be allocated to the LAGC IFQ component in FY2023, corresponding to Alternative 4.3.2, Alternative 4.3.3, and Alternative 4.3.4, respectively (Table 9). Alternative 2 would allocate a total number of trips that could be fished in either the Nantucket Lightship North and(or) Area II. Once the total number of trips is taken, LAGC IFQ vessels will no longer be allowed to fish access area trips in either area. The LAGC IFQ component will continue to have access to the Nantucket Lightship North as part of the open bottom after the total trip allocation has been taken. Alternative 2 also reverts the Nantucket Lightship North to open bottom for the LA component after the first 90 days of FY2023.

Allocating LAGC trips to access areas is not expected to change the overall amount of effort expected from this component of the fishery because the LAGC IFQ component is a quota-based fishery. Neither Alternative 1 or Alternative 2 allocate LAGC IFQ access area trips to the Mid-Atlantic region, meaning both options 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 ESA-listed species of sea turtles and Atlantic sturgeon would exist, meaning the overall impact of Alternative 1 and Alternative 2 on protected resources (i.e., with ESA-listed species of sea turtles and Atlantic sturgeon) could be slightly negative.

Even in a scenario where Alternative 1 is selected, it is highly unlikely that vessels would be able to fish Area I trips given that this area is closed to scallop fishing under all the action alternatives in Section 4.3. Therefore, under Alternative 1, LAGC IFQ vessels would only be able to fish quota on open trips, whereas under Alternative 2, vessels would have the option to fish quota in the Nantucket Lightship North and Area II. Should vessels choose to fish in Area II, vessels will likely be able to harvest the possession limit in less time compared to fishing in the NLS-North and(or) open bottom because there are high densities of scallops in Area II. This could reduce bottom time, which could have a positive effect on protected species in that the risk of interaction correlates to area swept and time with gear in the water. Given the choice between fishing in Area II or the Nantucket Lightship North, it is more likely that LAGC IFQ vessels will fish in the Nantucket Lightship North due to the considerably longer steam time associated with trips to Area II, even if catch rates are not as high in the Nantucket Lightship North. Catch rates in the Nantucket Lightship North could be similar or slightly higher than what is anticipated for open trips, meaning allowing LAGC IFQ vessels to fish access area trips in the NLS-North could also have some slight benefits to protected species in that area swept and time with gear in the water could be slightly reduced.

Given the above analyses and acknowledging the difficulty in predicting the timing and amount of LAGC IFQ access area effort, the impacts of Alternative 1 and Alternative 2 to protected species could range from slightly negative to slightly positive in comparison to one another.

6.5 IMPACTS ON PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

As in previous scallop frameworks, impacts to EFH for this action are evaluated considering the amount of fishing proposed, the general location of that fishing with respect to habitat type, and the swept area expected to result from that fishing, based on estimates produced by the Scallop Area Management Simulator (SAMS) model. Since the inception of this FMP, a broad suite of measures has been employed to reduce fishing mortality and address habitat impacts. Through OHA2 (NEFMC 2016) and prior actions including Amendment 10 (NEFMC 2004), the Council has identified areas to prohibit scallop fishing in order reduce impacts on EFH. After a period of very high fishing mortality during the mid-1980's and early-1990's, rotational area management (formalized in Amendment 10) has improved meat yields and LPUE, while DAS reductions have curbed overall fishing mortality. Overall, the successful management of the scallop resource has generally mitigated impacts on EFH.

6.5.1 Action 1 – Overfishing and Acceptable Biological Catch

The alternatives under this action pertain to setting the Annual Biological Catch (ABC) and overfishing limit (OFL) for fishing years 2023 and 2024 (default). These values are recommended by the Council's Scientific and Statistical Committee. The Alternative 2 FY 2023 and FY 2024 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 22,631 mt for FY2023 and 23,289 mt for FY2024. The OFL values are correspondingly higher. The Alternative 2 2023 ABC is about 5,000 mt lower than the default/No Action 2023 ABC (Alternative 1).

Fishery impacts to EFH are only indirectly related to the OFL and ABC, and more closely reflect the specifications alternative selected. Neither the No Action ABC (Alternative 1) nor the alternative ABC (Alternative 2) are anticipated to have direct impacts on EFH. 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. 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 Management and TAL Setting

The alternatives in this action pertain to setting the TAL for the NGOM Management Area.

Under Alternative 1/No Action, the NGOM set-aside would be set at the default value for FY2023. There would be no NGOM set-aside specified for FY 2024, and the area would close to directed scallop fishing. Alternative 2 would specify catch limits for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed LAGC fishery, and accounting for 2021 overages.

Alternatives and options are summarized below (also see Table 6):

- Alternative 1 (No Action): NGOM set-aside 465,890 lbs
- Alternative 2
    - Option 1 (F=0.15), based on exploitable biomass from Stellwagen Bank only. NGOM set-aside 303,693 lb
    - Option 2 (F=0.18), based on exploitable biomass from Stellwagen Bank only. NGOM set-aside 367,627 lb
    - Option 3 (F=0.15), based on exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. NGOM set-aside 380,855 lb

- Option 4 (F=0.18), based on exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. NGOM set-aside 458,016 lb

In recent years the NGOM set-aside has been fully harvested early in the fishing year, and it is expected that it will be fully harvested in 2023 as well. The amount of fishing effort and impacts to EFH associated with the NGOM fishery are expected to scale up or down relative to the size of the set-aside. Alternative 2 Option 1 has the lowest set-aside and therefore will have fewer impacts to EFH as compared to Alternative 2 Options 2 and 3, which have larger but similar set-asides. Alternative 1 and Alternative 2 Option 4 have the largest set-asides and will therefore have the greatest impacts to EFH.

As was the case during the 2022 fishing year, scallop densities are highly heterogeneous within the various fishing grounds in the Gulf of Maine (Table 64). Due to much higher densities on Stellwagen Bank, most effort in the NGOM fishery is expected to occur in this area, under any of the allocations.

Table 64 – Scallop density per meter squared from the 2022 SMAST Drop camera survey for the Northern Gulf of Maine.

NGOM Region	Scallop density per m^2	Number of stations
Platts Bank	0.07	90
Ipswich Bay	0.10	93
Jeffreys Ledge	0.04	215
Stellwagen Bank NGOM	0.38	171

6.5.3 Action 3 – Fishery Specifications and Rotational Management

Action 3 considers fishery specifications including rotational closures and openings for the fishery outside the NGOM. The differences between alternatives are in the number of DAS allocated and the possession limit for Closed Area II access area trips. The default specifications allocate fewer DAS and a single CAII access trip. Specifications for full time vessels are summarized below:

- Alternative 1/No Action – 18 DAS, Area II trip limit 15,000 lb., one trip
- Alternative 2 – Area II trip limit 10,000 lb., two trips
  - Option 1 – 22 DAS
  - Option 2 – 24 DAS
- Alternative 3 – Area II trip limit 12,000 lb., two trips
  - Option 1 – 22 DAS
  - Option 2 – 24 DAS
- Alternative 4 – Area II trip limit 14,000 lb., two trips
  - Option 1 – 22 DAS
  - Option 2 – 24 DAS

Given the similarities between alternatives, 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 overall magnitude of effort. Fishing effort and allocations this year will influence availability of scallops during fishing year 2024, so taking a multiyear view, differences in impacts to habitat between the various approaches laid out here for 2023 will likely be smoothed out over time as these animals are eventually harvested.

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 61 shows projections of landings, LPUE, and area swept by alternative, based on the SAMS model, while Table 62 provides a matrix of comparisons for the area swept values only. Figure 28 compares area swept for each FW34 alternative during the 2022 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 29 depicts estimates of intrinsic habitat vulnerability to scallop dredges from the Council's Fishing Effects Model, by SAMS area. This figure shows estimated vulnerability based on evenly distributed fishing effort, with the magnitude of effort at a median level relative to historical activity. Figure 30 and Figure 31 present the results spatially for Georges Bank and the Mid-Atlantic Bight, which summarize 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 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 rotational management employed in the FMP. To attempt to quantify this tradeoff between habitat impact and yield, Figure 32 shows area swept and landings/area swept ratio, respectively, for each FW34 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), 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 for this set of specifications. The substrate throughout much of southeastern Georges Bank and in the Nantucket Lightship region is predominately sandy and therefore is estimated to be less vulnerable to fishing (i.e., light blue area in Figure 30). Other locations on Georges Bank are relatively more vulnerable to median levels of dredging with scallop dredges (light red coloring in Figure 30). 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. Areas in the Mid-Atlantic are generally lower vulnerability. CAII-Ext and the southeastern section of CAII-SE fall within the low energy portion of the model domain (light red coloring in Figure 30), which likely accounts in large part for the higher estimate of intrinsic seabed vulnerability in these locations as compared to adjacent areas of Georges Bank. The scallop resource in CAII-SW and CAII-Ext, which will be open to fishing in FY2022, is largely concentrated in the shallower and less vulnerable CAII-SW access area.

To summarize across all alternatives including No Action and status quo, the action alternatives with 22 DAS have lower swept area than those with 24 DAS, with status quo scenario having similar values to the 24 DAS alternatives (Table 61, Table 62). No Action lower swept area estimates combined with lower projected catch since this alternative allocates fewer DAS and between 54-75% of the CAII possession limit, depending on the action alternative to which No Action is being compared. Impacts of all action alternatives are therefore higher than Alternative 1/No Action, but similar to or reduced as compared to status quo.

Figure 28 - Comparison of Bottom Area Swept estimates (nm2) for FW36 alternatives and recent preferred alternatives.

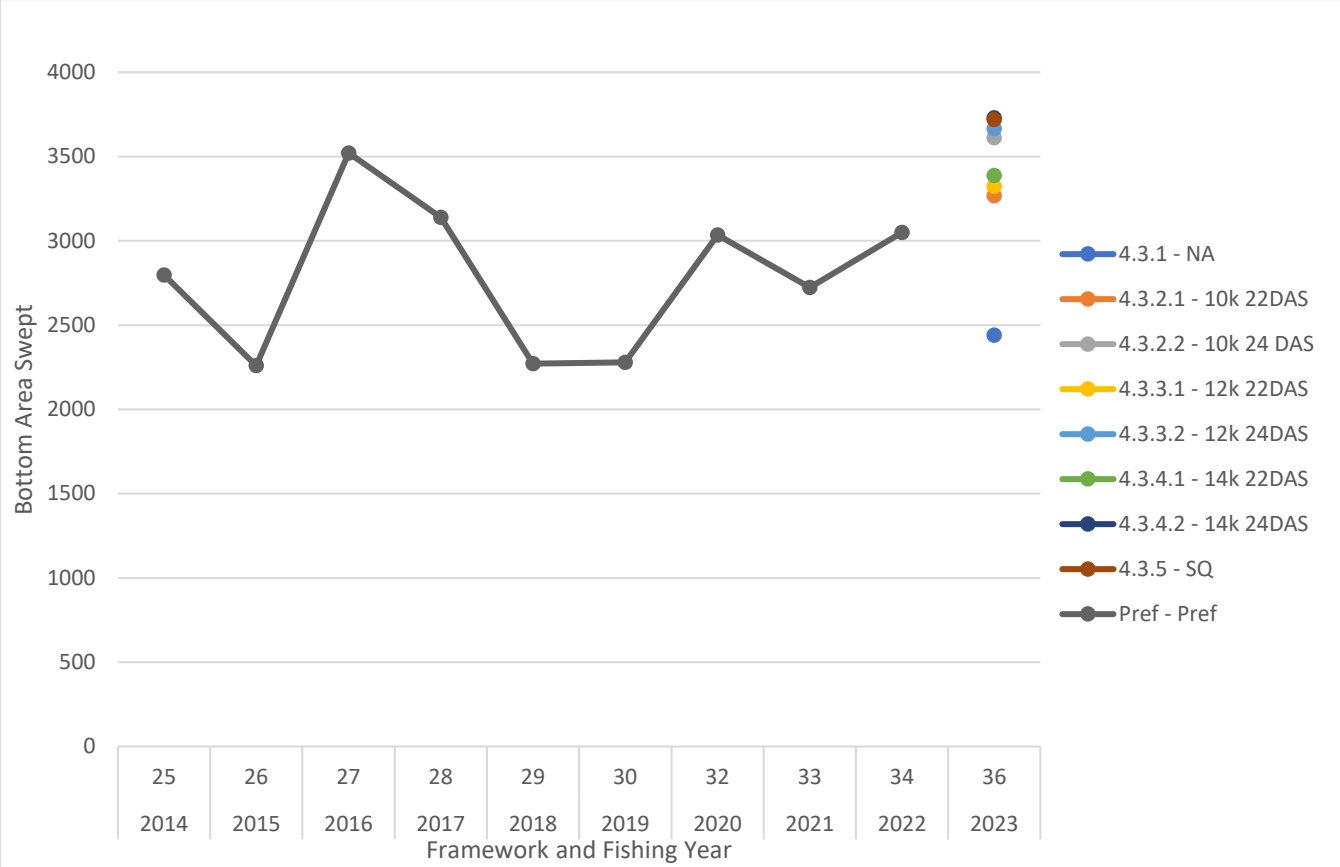


Figure 29 – Comparison of Intrinsic Habitat Vulnerability among SAMS areas

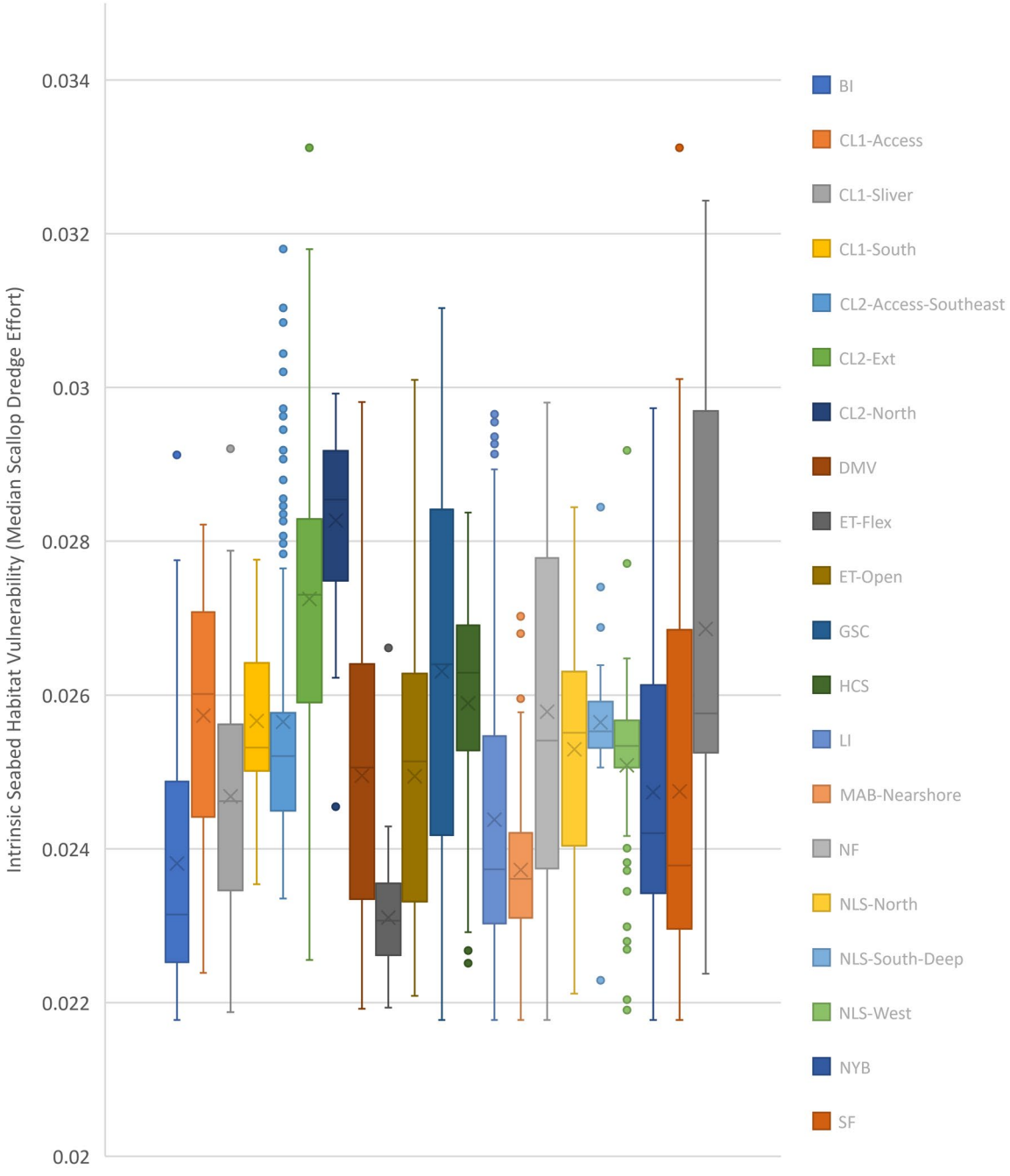


Figure 30 – Spatial distribution of intrinsic seabed habitat vulnerability on Georges Bank, based on a uniform distribution of scallop dredging at median levels. Source: Fishing Effects Model.

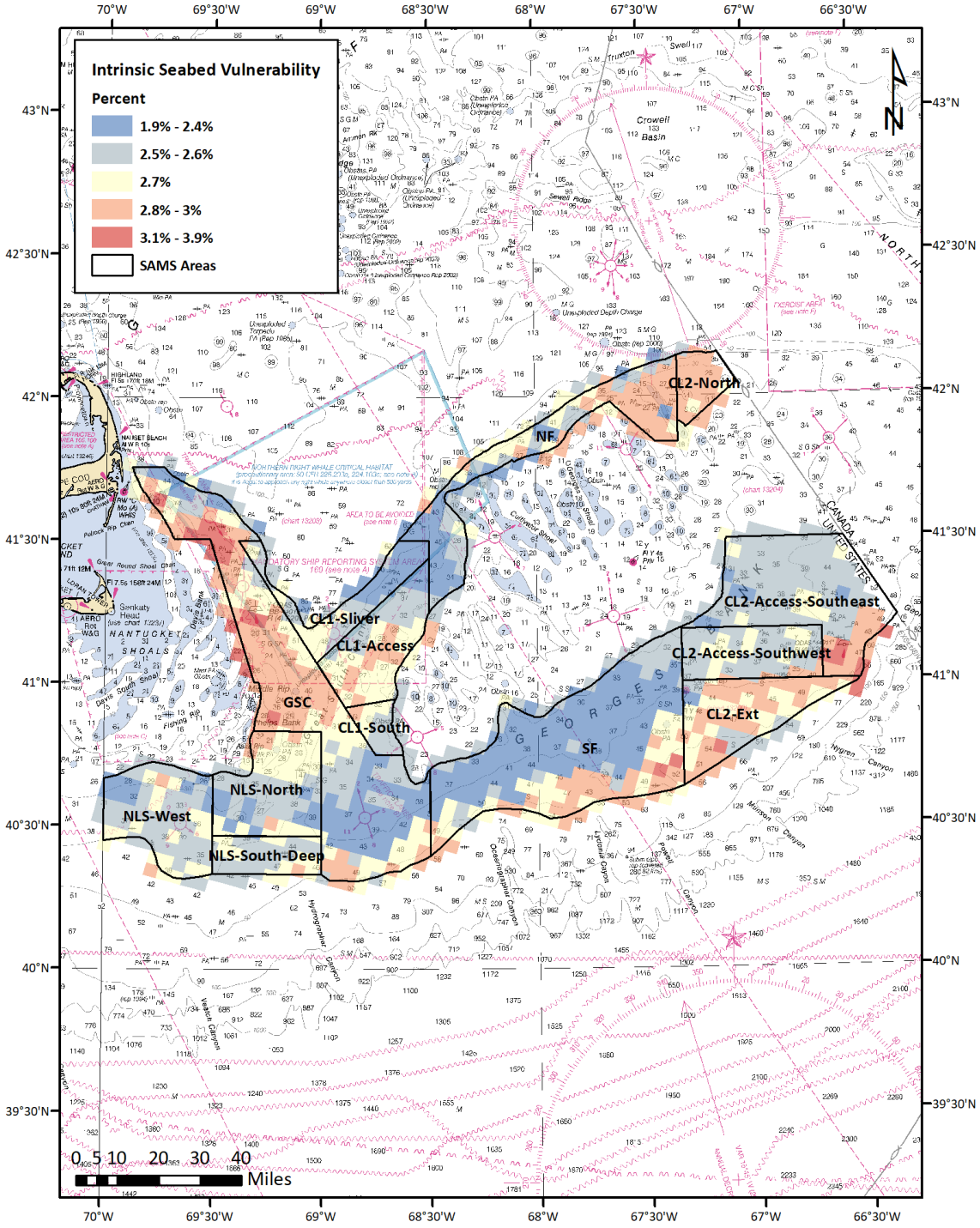


Figure 31 – Spatial distribution of intrinsic seabed habitat vulnerability in the Mid-Atlantic Bight, based on a uniform distribution of scallop dredging at median levels. Source: Fishing Effects Model.

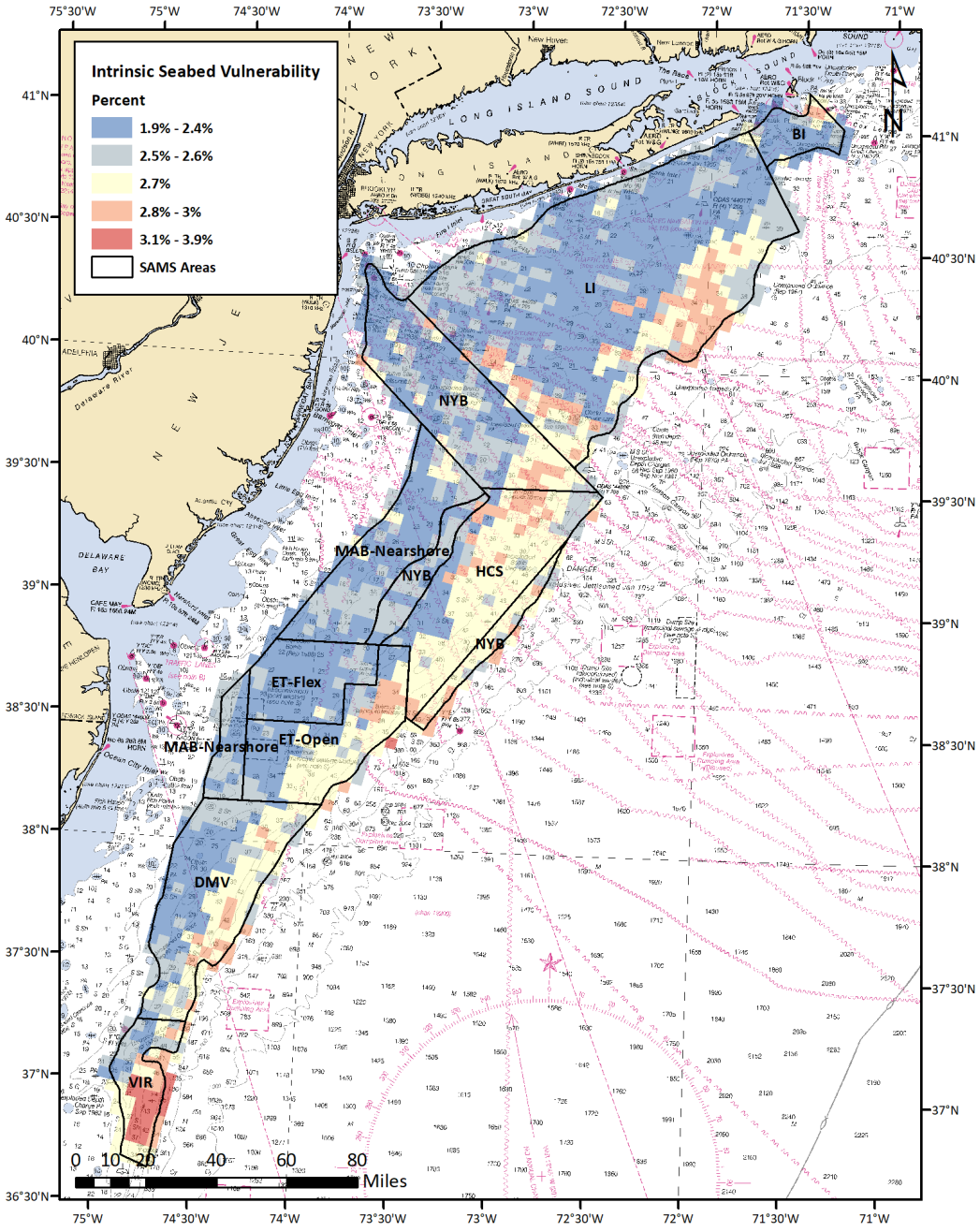
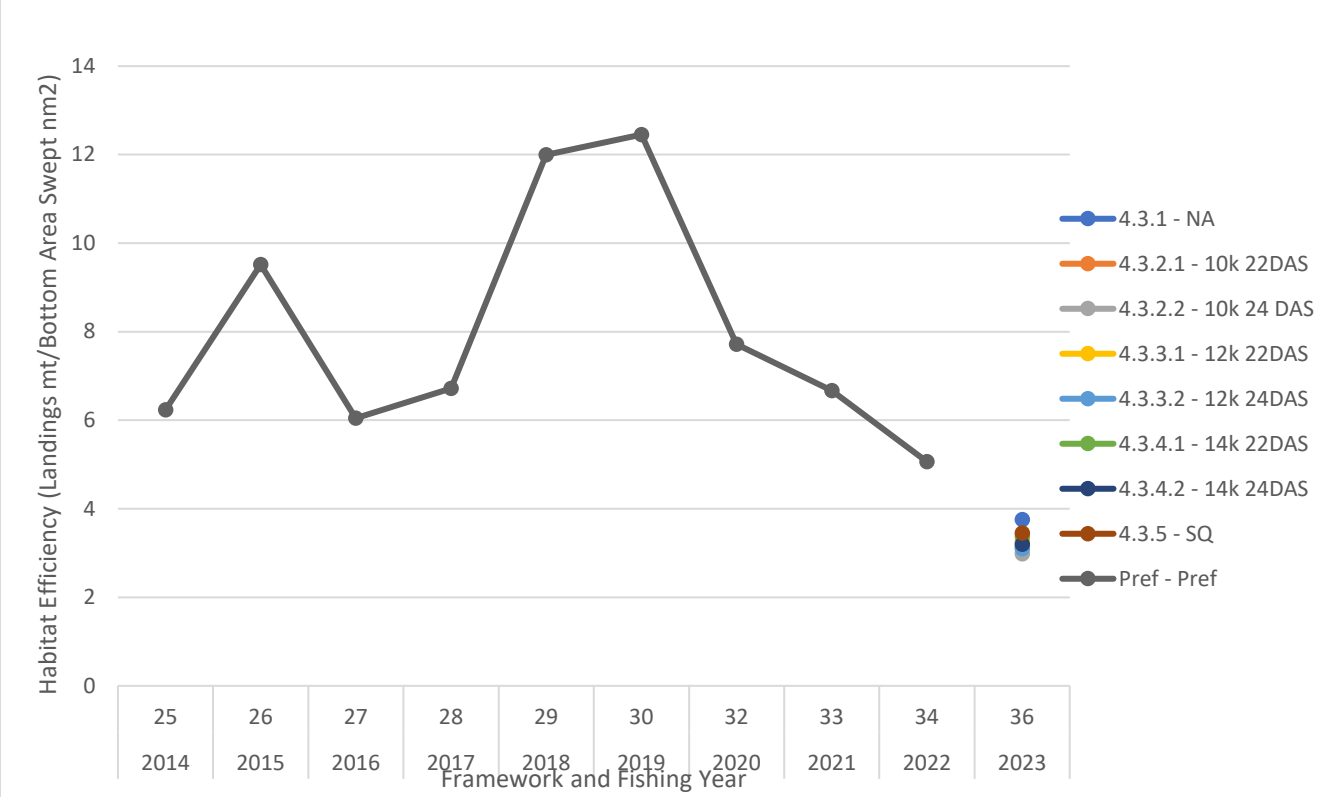


Figure 32 - Comparison of relative habitat efficiency of fishing (landings in mt divided by area swept in nm2) for FW34 specification alternatives and recent preferred alternatives. The higher the ratio, the more habitat efficient an alternative is.



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

The LAGC IFQ fishery is allocated 5.5% of the access area allocations as a fleet wide total number of access area trips. Access area allocations to CAII increase from Alternative 2 to Alternative 4, and the fleetwide LAGC trips also increases, as shown in Table 9. Under Alternative 1/No Action, no CAII trips are allocated.

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, 3, and 4 would likely have lower impacts to EFH as compared to Alternative 1. The difference in impacts of Alternative 2 versus Alternative 3 versus Alternative 4 on EFH is likely to be negligible.

6.6 Impacts on Communities (Economic and Social Impacts)

The analysis of impacts on human communities characterizes the magnitude and extent of the economic and social impacts likely to result from the alternatives considered, individually and in relation to each other. Management regulations influence the direction and magnitude of economic and social change, but attribution is difficult, because communities are constantly evolving in response to many external factors (e.g., market

conditions, technology, alternate uses of waterfront) that contribute to community vulnerability and adaptability to changing regulations.

Economic impacts. The economic effects of regulations can be categorized by changes in costs (including transactions costs such as search, information, bargaining, and enforcement costs) or revenues (by changing market prices or by changing the quantities supplied). These economic effects may be felt by the directly regulated entities as well as related industries (e.g., dealers, processors).

Social impacts. The social effects of regulations relate to changes factors such as demographics, employment fishery dependence, safety, attitudes towards management, equity, cultural values, and the well-being of persons, families, and fishing communities (e.g., Burdge 1998; NMFS 2007).

It is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); dealers and processors; consumers; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short-term negative impact on some communities, this should be weighed against potential long-term benefits to all communities which can be derived from a sustainable fishery. Amendment 21 further describes approaches to the analysis of impacts on human communities.

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 considering 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) may have positive short-term impacts on fishing communities depending on how prices respond to changes in quantity supplied. Likewise, lowering allowable harvests (as contemplated in this action) 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 et al. 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 51). 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. Potential differential impacts across ports are noted in the analysis.

6.6.1 Economic Impacts

The following sections analyze the economic impacts of the management alternatives considered in Framework 36. The objective of the cost-benefit analysis is to evaluate the net economic benefits arising from changes in consumer and producer benefits that are expected to occur with implementation of a regulatory action. As the

NMFS Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) [12] state "the proper comparison is '*with the action' to 'without the action'* rather than to *'before and after the action,*' since certain changes may occur even without action and should not be attributed to the regulation." The guidelines also state that the "No Action alternative does not necessarily mean a continuation of the present situation, but instead is the most likely scenario for the future, in the absence of other alternative actions"[13]. Even without action, the scallop stock abundance in open and access areas will be different, and as a result, landings, scallop prices, fishing costs, revenues and benefits from the fishery would change compared to the present levels. For Action 3 (specifications), analyses consider two baselines, No Action and Status Quo.

While NMFS 2007 guidelines indicate "The No Action alternative should be the basis of comparison for other alternatives", it very often uses the terms "No Action" and "Status Quo" interchangeably[14]. The economic analyses presented in this section make a distinction in the definition of those terms. In this analysis "No Action" refers to a "regulatory" baseline and "Status Quo" refers to a state with no changes from the present allocations for open area DAS and access area trips. The definition of "No Action" refers to the default measures that are specified in Framework 33 until the next Framework action is implemented.

However, the default "No Action" measures are temporary in nature and allocations set under those measures are usually considerably lower than the allocations either in the current fishing year (in 2023) or the projected allocations in the next fishing year (2024). This is done to allow for limited levels of harvest to continue if there are delays in the implementation of the proposed measures in next Framework Action. As a result, the projections for landings, revenues and economic benefits under the No Action alternative are considerably lower than the current levels and the levels that are expected under the proposed measures. Because of this, if economic benefits of the proposed alternatives were estimated using No Action as the baseline, the impacts on the economy would be overstated in the short-term compared to the present circumstances.

For these reasons, the economic analyses in Framework 36 also includes a Status Quo scenario *(SQ)* to provide an assessment of how landings, revenues and total economic benefits from the scallop fishery would change if the current regulations were continued in 2023. From that perspective, status quo is a more realistic baseline to assess the impacts of the proposed measures on the economy.

As the Guidelines for Economic Analysis of Fishery Management Actions specify, "benefits and costs are measured from the perspective of the Nation, rather than from that of private firms or individuals. Benefits enjoyed by other nations are not included, although tax payments by foreign owners, and export revenues, are benefits to the Nation."

Because fishery management actions in general result in short-term costs for the industry in terms of foregone revenue, "choosing a period of analysis that is too short may bias the analysis toward costs, where costs are incurred in the short-term and benefits are realized later." Similarly, the Office of Management and Budget (OMB, 2003) indicated that the analyses should "present the annual time stream of benefits and costs expected to result from the rule," and state that "the beginning point for your stream of estimates should be the year in which the final rule will begin to have effects" and "the ending point should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule."[15] For these reasons, guidelines indicate that "a

[12] Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007,

http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf

[13] Ibid, p.12

[14]For example, see p. 15 of 2007 NMFS guidelines: "For economic analysis of regulatory actions, changes in net benefits are measured by the difference in the present value of the discounted stream of net benefits of regulatory action, as compared to the status quo. In this context, a positive result means that the net present value of the regulatory action exceeds that of the status quo."

[15] OMB Circular A-4 (September 17, 2003), http://www.whitehouse.gov/omb/circulars_a004_a-4/

reasonable attempt should be made to conduct the analysis over a sufficient period of time to allow a consideration of all expected effects."

Furthermore, the economic impacts of the proposed regulations over the long-term should be evaluated by the discounted cumulative present value of the stream of benefits since benefits or costs that occur sooner are generally more valuable (or have a positive time preference). Discount rate is the interest rate used in calculating the present value of expected yearly benefits and costs.

This section examines the economic impacts of the proposed regulations in Framework 36. Although Framework 36 is a one-year action, it will have impacts on the future yield from scallop resources, on scallop revenues and total economic benefits. The short- and the long-term economic impacts of the specification alternatives are analyzed in Section 6.6.1.3. The present value of long-term benefit and costs of the specification alternatives are estimated using a 7% discount rate. The higher discount rate (7%) provides a more conservative estimate and a lower bound for the economic benefits of alternatives compared with the benefits predicted using a lower discount rate (3%).

6.6.1.1 Action 1 – Overfishing 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 for OFL and ABC

Under "No Action", the overall OFL and ABC would be set at the default values for FY 2023, which were adopted by the Council through FW34 (Table 56).

The economic impacts of Alternative 1 are likely to be negligible. Since the ABC under No Action and Alternative 2 are not expected to constrain the fishery, the impacts of the No Action are likely to be negligible compared to Alternative 2. However, since Alternative 1 would not set a default OFL or ABC for FY 2023, the start of FY 2023 could be delayed (from April 1, 2023) if there is a delay in setting specifications next year. Therefore, the overall short-term impacts of Alternative 1 are likely to be negative compared to Alternative 2. In the long-term, Alternative 1 is likely to have slight negative stock benefits. 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 Updated OFL and ABC for FY 2023 and FY 2024

The FY 2023 and FY 2024 OFL and ABC values that are preferred by the Council are summarized in Table 56. After several years of below-average recruitment in the Mid-Atlantic, the fishery is shifting primarily to Georges Bank. The fleet is expected to continue to target the small slow growing scallops in the Nantucket Lightship South. Overall, the OFL and ABC values in Alternative 2 are based on the most updated survey information and model configurations.

The economic impacts of Alternative 2 are likely negligible to slightly positive. Since the ABC under No Action and Alternative 2 are not expected to constrain the fishery, the impacts of the Alternative 2 are likely to be negligible relative 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 2023. This means that the fishing year could start on time in FY2023 (from April 1, 2023). The fishing year could not begin on April 1, 2023 if no OFL or ABC is set and there is a delay in setting specifications next year. Overall, using updated OFL and ABC estimates should have positive economic impacts over the long-term because the ABC values were determined based on the recent surveys and projections. 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 and TAL Setting

6.6.1.2.1 Alternative 1 – No Action

Under Alternative 1 – No Action, the default specifications approved in Framework 34 for the NGOM Set-Aside would be in place for the 2023 fishing year. The NGOM Set-Aside would be set at 465,980 pounds, and there would be no value specified for the 2024 fishing year, and the area would close to directed scallop fishing (Table 67).

No Action (Alternative 1) will 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 with Options 1 to 4.

Estimated scallop revenue for the LAGC NGOM fleet would be about $7.23 million under this alternative using an estimated price of $15.52 per pound and assuming landings will be equivalent to 465,980 pounds. Fishing costs are estimated to be about $2.33 million and net revenue would be about $4.89 million for the LAGC NGOM fleet[16] (Table 65).

Table 65. NGOM TAC, Scallop revenue and costs under Alternative 1, No Action (Monetary values are in 2022 dollars)

Data and Values	Estimated values for FY2022
LAGC (NGOM) TAC	465,980 lbs
Economic Impacts on the LAGC (NGOM) share:	
• Estimated LAGC scallop revenue	$7,232,010
• DAS	2,330
• Trip costs ($1,000/DAS)	$2,329,900
• **Net revenue**	**$4,902,110**

6.6.1.2.2 Alternative 2 - Set NGOM TAL, with set-asides to support research, monitoring, and a directed LAGC fishery

Alternative 2 would specify a Northern Gulf of Maine Total Allowable Landings (NGOM TAL) limit for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed LAGC fishery. Option 1 (F=0.15) and Option 2 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank only. Options 3 (F=0.15) and Option 4 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge.

- The economic impacts of the FY2023 NGOM Set-Aside in Alternative 2 (Option 1 to 4) are shown in Table 66 and the economic impacts of the associated FY2024 default NGOM Set-Aside values are shown in Table 67. The economic impacts of the Alternative 2 for all options under consideration are negative.

[16] Scallop revenue and cost estimates are based on the following assumptions and data. The assumed price per pound of scallops, $15.52, is roughly equivalent to the average estimated price (in 2022 dollars) for all market categories of scallops under the FW36 specification scenarios. This price is used for both alternatives in this action.

Trip costs estimates are based on cost function estimated using observer data for 1991-2020 and corresponds to estimated fuel, oil, water, food, ice, supply costs per trip for the NGOM fishery. Trip costs that were initially estimated in 2021 dollars were later adjusted by cost inflation to estimate costs in terms of 2022 dollars. Note that the observed trip costs in FY2022 increased by about 35 percent compared to the trip cost estimates in FY2021. Hence estimated trip cost for a NGOM vessel is about $1000 per DAS. This cost inflation rate was taken into consideration while estimating the trip costs (in 2022 dollars) in FR36 economic analysis. Total DAS for the NGOM fleet was estimated by dividing TAC with the 200 lb. possession limit.

- NGOM Set-Aside for FY2023: The NGOM Set-Aside for FY2023 under the options of Alternative 2 ranges from 303,693 pounds (Option 1) to 458,016 pounds (Option 4) (Table 66).

Table 66. Economic Impacts of the FY2023 NGOM TAL under Alternative 2 Option 1 - 4 (monetary values are in 2022 dollars).

	Alternative 2			
	4.2.2.1	**4.2.2.2**	**4.2.2.3**	**4.2.2.4**
	Option 1	**Option 2**	**Option 3**	**Option 4**
	F=0.15	F=0.18	F=0.15	F=0.18
Area(s) Fished	Stellwagen	Stellwagen	Stellwagen, Ipswich, Jeffreys	Stellwagen, Ipswich, Jeffreys
2023 Total Allowable Landings	357,149	421,083	434,311	511,472
1% NGOM ABC for Observers	10,538	10,538	10,538	10,538
2023 RSA Contribution	25,000	25,000	25,000	25,000
2021 Overage Payback	17,918	17,918	17,918	17,918
2023 NGOM Set-Aside	**303,693**	**367,627**	**380,855**	**458,016**
Impacts of the NGOM Set-Aside:				
Estimated LAGC revenue	$4,713,315	$5,705,571	$5,910,870	$7,108,408
DAS	1,518	1,838	1,904	2,290
Trip costs ($1000 per DAS)	$1,518,465	$1,838,135	$1,904,275	$2,290,080
Net revenue	**$3,194,850**	**$3,867,436**	**$4,006,595**	**$4,818,328**
Net revenue net of No Action	**($1,707,259)**	**($1,034,674)**	**($895,515)**	**($83,781)**

Table 66 and Table 67 summarize the economic impacts of Alternative 2 in FY2023 and FY2024 (default), respectively. Revenues and net revenues under FY2023 options 1-4 under Alternative 2 are all lower than estimated for Alternative 1 (No Action).

- Alternative 2, Option 1 would result in a lower NGOM Set-Aside (303,693 pounds) for the LAGC component compared to the LAGC share of the NGOM TAC under Alternative 1 (465,980 pounds) for the 2023 fishing year and is expected to have an estimated revenue of $4.71 million. Net revenue for Alternative 2 Option 1 would be around $3.2 million, which is about $1.7 million lower than No Action.
- Alternative 2 Option 2 yields lower net revenue estimated at $3.86 million in FY2023. The net benefit (net of No Action) for this sub-option is estimated to be $1.03 million lower than Alternative 1. The net benefit in this option is higher than option 1, but lower than option 3 and option 4.

- Alternative 2 Option 3 yields lower net revenue estimated at $4 million in FY2023. The net benefit (net of No Action) for this option is estimated to be $0.89 million lower than the Alternative 1.

- Alternative 2 Option 4 yields lower net revenue estimated at $4.81 million in FY2023. The net benefit (net of No Action) for this option is estimated to be $0.83 million lower than the Alternative 1.

- Comparing the four options in Alternative 2 for FY2023, Option 4 has the highest net revenues relative to other options, but all options in Alternative 2 have lower revenues relative to the No Action.

All options in the Alternative 2 have lower economic benefits in the short term. In the longer term, sustaining higher NGOM Set-Asides and revenue will be directly related to the level of exploitable biomass in the NGOM in the future. The allocation sharing arrangement, requirement for observer coverage, and contributions to the research set-aside are expected to reduce uncertainty around removals from the area, allow for a directed LAGC fishery, and improve the understanding of the resource in the NGOM through improved fishery data and research. The measures in Option 1-4 are expected to result in short-term negative economic benefit but positive economic benefits in the long-term to the participants of the NGOM fishery.

6.6.1.2.3 2024 NGOM TAL Options

Default Set-Aside for FY2024: The FY2024 default NGOM Set-Aside is set at 75% of the FY2023 NGOM Set-Aside. The default NGOM Set-Aside for the Alternative 2 in FY2024 would be set at 241,208 pounds under Option 1, 289,159 pounds, 299,080 pounds in Option 2, 356,950 pounds in Option 3 and 356,950 pounds in Option 4.

The economic impacts of NGOM TAL options are given in Table 67. Economic impacts for the FY2024 default measures correspond to the options in Alternative 2. Revenues range from $3.74 million in Option 1 to $5.54 million in Option 4 (highest).

Table 67. Economic impacts of the FY2024 (default) NGOM Set-Aside under Alternative 2 Option 1 -4 (values in 2022 dollars).

	Alternative 2			
	Option 1	**Option 2**	**Option 3**	**Option 4**
2024 Default NGOM Set-Aside	241,208	289,159	299,080	356,950
Impacts of the 2024 NGOM Set-Aside (default):				
Estimated Revenue	$3,743,548	$4,487,748	$4,641,722	$5,539,864
DAS	1,206	1,446	1,495	1,785
Trip costs ($1000 per DAS)	$1,206,040	$1,445,795	$1,495,400	$1,784,750
Net revenue	**$2,537,508**	**$3,041,953**	**$3,146,322**	**$3,755,114**

6.6.1.3 Action 3 – Fishery Specifications and Rotational Management

The LA (94.5%) and LAGC IFQ (5.5%) allocations are based on Annual Projected Landings (APL). Table 68 provides a comparison of anticipated F rates, along with APL values for the LA and LAGC components of the scallop fishery.

Table 68 - Comparison of allocations and DAS associated with each specification alternative in FW36.

FW36 Specification Alternatives & Options	Section in Fishery Specification and Rotational Mgmt.	Description (Open DAS, and 2 CAII Trip limits.)	Overall F rate	Open area F	Annual Projected Landings (APL)	APL w/ set-asides removed	LA Share (94.5%)	LAGC IFQ Share (5.5%)
Alternative 1	4.3.1	No Action	0.18	0.34	20,214,161	18,064,942	17,071,370	993,572

Alternative 2 Option 1	4.3.2.1	22-DAS, 10,000 lbs.	0.22	0.46	22,619,401	20,470,185	19,344,325	1,125,860
Alternative 2 Option 2	4.3.2.2	24 DAS, 10,000 lbs.	0.23	0.51	23,719,507	21,570,292	20,383,926	1,186,366
Alternative 3 Option 1	4.3.3.1	22 DAS, 12,000 lbs.	0.23	0.46	23,909,104	21,759,889	20,563,095	1,196,794
Alternative 3 Option 2	4.3.3.2	24 DAS, 12,000 lbs.	0.24	0.51	25,007,005	22,857,791	21,600,612	1,257,179
Alternative 4 Option 1	4.3.4.1	22 DAS, 14,000 lbs.	0.25	0.46	25,207,625	23,058,412	21,790,199	1,268,213
Alternative 4 Option 2	4.3.4.2	24 DAS, 14,000 lbs.	0.26	0.51	26,305,526	24,156,314	22,827,717	1,328,597
Status Quo*	4.3.5	Status Quo	0.3	0.39	28,300,707	25,753,643	24,337,193	1,416,450

* Status Quo (SQ) refers to Framework 34 preferred measures and is provided in the alternatives section of Framework 36 to provide continuity and context for the reader but is not an option proposed for Council decision.

Alternatives considered in Framework 36 are described in Section 4.3 for a full-time limited access vessel. No Action corresponds to the default measures in Framework 34 and Status Quo refers to a state with no changes from the present allocations in Framework 34 for open area DAS and access area trips using updated biological data from the 2022 surveys.

Economic impacts in the Framework 36 fishery specifications are evaluated for both the short- and long-terms, i.e., the short-term impacts in FY2023 and the long-term impacts over the 15- year period from FY2023-FY2037. This analysis uses price and variable trip cost models that incorporate data through FY2021. Scallop prices and trip cost estimates are adjusted to 2022 dollars for the FY2023 (short-term) projections using economy wide inflation index, i.e., CPI. Scallop prices have experienced wide swings, with very high price increases for all market grades in FY2021 and FY2022.[17] In order to better account for the recent price increases, price models incorporated consumer demand component as well.

The long-term landings streams are based on assumptions of average recruitment and constant F over the long-term. Since the Council generally sets specifications for one or two years, the long-term estimates should be interpreted as relative comparisons between measures, and not absolute values of future landings and economic impacts. The long-term economic impacts are evaluated conservatively using scallop prices adjusted with the recent CPI. Economic values are then discounted to present values at 7 and 3 percent.

Short-term Economic Impacts of the FW36 Fishery Specification Action

Below is the summary of economic impact in the short-term (FY2023) for the FW36 Fishery Specification Action. Table 69 provides a summary of the short-term impacts in terms of landings, revenues, producer surplus,

[17] Right after Covid-19 pandemic, both scallop harvest and prices plummeted. Scallop prices remained at a lower level for most part of FY2020 but buoyed up significantly later in FY2020. Prices further increased and have remained high for all grades of scallops throughout FY2021. The price increase has surpassed well above the economy wide inflation index during FY2021. As of Economy wide CPI increased by about 6 percent between FY2020 and FY2021. However, U10 grade price increased by about 124 percent and 11to20 grade scallop price increased by about 43 percent for the same period. Overall, there was about 54% increase in the price of all grades of scallops during FY2021.

Prices of scallops have pulled back slightly in FY2022, but they are still high relative to earlier years. In the early part of FY2022, U10 grade price decreased by about 13 percent and 11to20 grade scallop price decreased by about 10 percent while economy wide CPI increased by about 9 percent between FY2021 and FY2022 (Apr-Jul).

In FY2021, fuel price increased by about 33 percent and overall trip cost increased by about 32 percent. In FY2022 (Apr-Oct), fuel price has increased by about 49 percent and overall trip cost increased by about 35 percent.

consumer surplus, and total economic benefits for all alternatives and options in consideration. Each alternative including the No Action alternative is compared with the status quo.

Table 69 – Economic Impacts for FY2023: Estimated landings (Mill.lb.), revenue and economic benefits (Mill. $, in 2022 dollars), and prices (in 2022$ per lb.).*

Alternatives/Options		Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Key Economic Variables	**RUN**	**4.3.1 NA**	**4.3.2.1 22d10k**	**4.3.2.2 24d10k**	**4.3.3.1 22d12k**	**4.3.3.2 24d12k**	**4.3.4.1 22d14k**	**4.3.4.2 24d14k**	**4.3.5 SQ**
	Units*								
Landings	Mil lbs.	20.214	22.619	23.720	23.909	25.007	25.208	26.306	28.301
Price _ALL	$/lb.	$16.31	$16.11	$16.01	$16.04	$15.94	$15.96	$15.87	$15.75
Revenue	Mil $	$329.77	$364.48	$379.83	$383.44	$398.63	$402.34	$417.38	$445.78
Revenue Difference from SQ	**Mil $**	**-$116.01**	**-$81.29**	**-$65.95**	**-$62.34**	**-$47.15**	**-$43.44**	**-$28.40**	**$0.00**
Producer Surplus**	Mil $	$245.34	$272.80	$284.87	$289.80	$301.73	$306.62	$318.39	$342.67
Consumer Surplus***	Mil $	$13.50	$16.84	$18.43	$18.75	$20.43	$20.78	$22.53	$25.73
Total Benefits (PS+CS)	Mil $	$258.84	$289.64	$303.30	$308.55	$322.15	$327.40	$340.93	$368.40
Total Benefits Difference from SQ	**Mil $**	**-$109.56**	**-$78.76**	**-$65.10**	**-$59.85**	**-$46.25**	**-$41.00**	**-$27.47**	**$0.00**
Rank of Total Benefits		**7**	**6**	**5**	**4**	**3**	2	1	

*CPI based priced adjustment to 2022 dollars for the price model estimates that are in 2021 dollars.

6.6.1.3.1 Alternative 1 – No Action

Alternative 1 or No Action alternative (Section 4.3.1) yields least economic benefits in terms of landings, revenues, and total economic benefits in the short-term compared to Alternative 2, Alternative 3 and Alternative 4 (Table 69). No Action has also lower economic benefits compared to the status quo.

The No Action alternative is expected to have total landings 20.21 million pounds, revenue $329.77 million, and producer surplus $245.34 million, consumer surplus $13.5 million and total economic benefits $258.84 million in FY2023.

6.6.1.3.2 Alternative 2 – Two access area trips in Area II with 10,000-pound trip limit

Alternative 2 has two access area trips in CAII with 10,000-pound trip limit with two options—Option 1 with 22 DAS (Section 4.3.2.1) and Option 2 with 24 DAS (Section 4.3.2.2). This alternative has higher landings, revenues, producer surplus, and consumer surplus relative to No Action but lower than Alternative 3, Alternative 4 and status quo.

Option 1 in this alternative (Section 4.3.2.1) is expected to have total landings 22.62 million pounds, revenue $364.48 million, producer surplus $272.8 million, consumer surplus $16.84 million and total economic benefits $289.64 million. It ranks sixth among the FW36 specification alternatives in consideration and has also lower benefits relative to the status quo.

Option 2 in this alternative (Section 4.3.2.2) is expected to have total landings 23.722 million pounds, revenue $379.83 million, producer surplus $284.87 million, consumer surplus $18.43 million and total economic benefits $303.3 million. It ranks fifth among the FW36 specification alternatives in consideration and has also lower benefits relative to the status quo.

6.6.1.3.3 Alternative 3 – Two access area trips in Area II with 12,000-pound trip limit

Alternative 3 has two access area trips in CAII with 12,000-pound trip limit with two options—Option 1 with 22 DAS (Section 4.3.3.1) and Option 2 with 24 DAS (Section 4.3.3.2). This alternative has higher landings, revenues, producer surplus, and consumer surplus relative to No Action and Alternative 2 but lower than Alternative 4, and status quo.

Option 1 in this alternative (Section 4.3.3.1) is expected to have total landings of about 23.91 million pounds, revenue $383.44 million, producer surplus $289.8 million, consumer surplus $18.75 million and total economic benefits $308.55 million. It ranks fourth among the FW36 specification alternatives in consideration and has also lower benefits relative to the status quo.

Option 2 in this alternative (Section 4.3.3.2) is expected to have total landings 25 million pounds, revenue $398.63 million, producer surplus $301.73 million, consumer surplus $20.43 million and total economic benefits $322.15 million. It ranks third among the FW36 specification alternatives in consideration and has also lower benefits relative to the status quo.

6.6.1.3.4 Alternative 4 – Two access area trips in Area II with 14,000-pound trip limit

Alternative 4 has two access area trips in CAII with 14,000-pound trip limit with two options—Option 1 with 22 DAS (Section 4.3.4.1) and Option 2 with 24 DAS (Section 4.3.4.2). This alternative has higher landings, revenues, producer surplus, and consumer surplus relative to No Action, Alternative 2 and Alternative 3 but lower than and status quo.

Option 1 in this alternative (Section 4.3.4.1) is expected to have total landings of about 25.21 million pounds, revenue $402.34 million, producer surplus $306.62 million, consumer surplus $20.78 million and total economic benefits $327.40 million. It ranks second among the FW36 specification alternatives in consideration and has also lower benefits relative to the status quo.

Option 2 in this alternative (Section 4.3.4.2) is expected to have total landings about 26.31 million pounds, revenue $417.38 million, producer surplus $318.39 million, consumer surplus $22.53 million and total economic benefits $340.93 million. It ranks highest among the FW36 specification alternatives in consideration but has lower economic benefits relative to the status quo.

Summary of the Short-term (FY2023) Economic Impacts (Table 69)[18]**:**
Short-term economic impacts in terms of landings, prices, revenues, producer surplus, consumer surplus, and total economic benefits for the FW36 specification alternatives are compared with the status quo (SQ).

- Landings, revenues, producer surplus, consumer surplus, and total economic benefits (a sum of producer and consumer surpluses) in No Action, Alternative 1 (Section 4.3.2.1 and Section 4.3.2.1), Alternative 2 (Section 4.3.3.1 and 4.3.3.2), and Alternative 3 (Section 4.3.4.1 and Section 4.3.4.2) with 10,000 lbs., 12,000 lbs., and 14,000 lbs. with 22- and 24-DAS options are all lower than status quo in the short-term.

- Higher economic benefits correspond to higher trip limit and higher DAS in the short-term.

- The No Action (Section 4.3.1) has the least landings, revenues, and total benefits in the short-term, but this alternative is only a transitory measure until the preferred alternative in the FW36 specification action is implemented.

- Revenue ranges from around $364.48 million for Alternative 2 Option 1 (Section 4.3.2.1) to $417.38 million for Alternative 4 Option 2 (Section 4.3.4.2).

[18] Note that range of estimates for different economic variables like revenues, producer surplus, consumer surplus and total economic benefits in the short-term economic impacts are based on CPI based price adjustment to 2022 dollars. All economic numbers are in 2022 dollars in the short-term economic impacts.

- Producer surplus ranges from around $272.80 million for Alternative 2 Option 1 (Section 4.3.2.1) to $318.39 million for Alternative 4 Option 2 (Section 4.3.4.2).

- Consumer surplus ranges from around $16.84 million for Alternative 2 Option 1 (Section 4.3.2.1) to $22.53 million for Alternative 4 Option 2 (Section 4.3.4.2).

- Total economic benefit (in 2022 dollars) for the highest ranked Alternative 4 Option 2 (Section 4.3.4.2) is about $340.93 million but $289.64 million for the lowest ranked Alternative 2 Option 1 (Section 4.3.2.1).

- Compared to the status quo, total economic benefits are lower by about $27.47 million for the highest ranked Alternative 4 Option 2 (Section 4.3.4.2) but is lower by $78.76 million for the lowest ranked Alternative 2 Option 1 (Section 4.3.2.1).

It is important to note that actual prices, revenues, producer surplus, consumer surplus and total economic benefits may differ from these estimates. Actual prices will depend on realized landings, the size composition of landings, and values of variables that effect prices including import prices, disposable income of consumers, consumer demand level in terms of per capital scallop consumption, 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. 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.

Long-term Economic Impacts (FY2023 to FY2037)

The long-term economic impacts are summarized in Table 70 and

Table 71. Economic values are discounted to present value terms at a market rate of 7 percent and at a lower discount rate of 3 percent. The economic estimates are in 2022 dollars.

- In the long-term, cumulative scallop landings ranged between 851.61 to 852.1 million pounds. They differ by less than 1 million pounds across alternatives in the long-term.

- The present value of the revenues for all alternatives including No Action are lower than status quo at both discount rates of 7 and 3 percent.

- At 7 percent discount rate, the present value of revenues expected to range from $7.285 billion in Alternative 2 Option 1 (Section 4.3.2.1) to $7.304 billion in Alternative 4 Option 2 (Section 4.3.4.2); producer surplus ranges from $5.951 in Alternative 2 Option 1 (Section 4.3.2.1) to $5.966 billion in Alternative 4 Option 2 (Section 4.3.4.2); and total economic benefits range from $6.835 in Alternative 2 Option 1 (Section 4.3.2.1) to $6.847 billion in Alternative 4 Option 2 (Section 4.3.4.2).

- At 3 percent discount rate, the present value of revenues expected to range from $9.434 billion in Alternative 2 Option 1 (Section 4.3.2.1) to $9.449 billion in Alternative 4 Option 2 (Section 4.3.4.2); producer surplus ranges from $5.951 billion in Alternative 2 Option 1 (Section 4.3.2.1) to $5.966 billion in Alternative 4 Option 2 (Section 4.3.4.2); and total economic benefits range from $8.891 billion in Alternative 2 Option 1 (Section 4.3.2.1) to $8.900 billion in Alternative 4 Option 2 (Section 4.3.4.2).

- The ranking of alternatives in the long-term matches with the short-term one for the Alternative 3 and Alternative 4 but Alternative 2. In the long-term, No Action alternative yields slightly higher economic benefits than the Alternative 2 with 10,000 pounds trip limits for both open area 22- and 24-DAS options.

- Higher revenues and economic benefits are expected from specifications alternatives with the higher open area DAS for the FT LA vessels. The increase in revenues and economic benefits can be attributed to higher DAS from 22 to 24 DAS in open areas. Similarly, higher trip limits also yield higher revenues and total economic benefits.

Table 70. FW36 - Long-term Economic Impacts (2023-2037) (CPI based price adj in 2022 dollars): Cumulative present value (PV) of revenues, producer surplus and total economic benefits net of Status quo values (million $ in 2022 dollars, 7% Discount rate)

Alternatives/ Options		Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
	RUN	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
Economic Variables	**Units**								
Landings	Mil lbs.	**851.918**	**851.614**	**851.614**	**851.867**	**851.874**	**852.105**	**852.105**	**852.264**
Price _ALL	$/lb.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
PV Revenue	Mil $	$7,282	$7,285	$7,289	$7,293	$7,296	$7,300	$7,304	$7,317
PV Revenue Difference from SQ	**Mil $**	**-$35**	**-$32**	**-$28**	**-$25**	**-$21**	**-$17**	**-$14**	**$0**
PV Producer Surplus	Mil $	$5,951	$5,951	$5,954	$5,958	$5,960	$5,964	$5,966	$5,977
PV Consumer Surplus	Mil $	$886	$883	$883	$883	$882	$882	$881	$879
PV Total Economic Benefits (PVPS+PVCS)	Mil $	$6,837	$6,835	$6,836	$6,841	$6,842	$6,846	$6,847	$6,856
PV Total Benefits Difference from SQ	**Mil $**	**-$19.16**	**-$21.43**	**-$20.21**	**-$15.49**	**-$14.35**	**-$10.04**	**-$8.82**	**$0.00**
Rank		5	7	6	4	3	2	1	

Table 71. FW36 - Long-term Economic Impacts (2023-2037) with Low Prices (CPI based price adj in 2022 dollars): Cumulative present value (PV) of revenues, producer surplus and total economic benefits net of Status quo values (million $ in 2022 dollars, 3% Discount rate)

Alternatives/Options		Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
	RUN	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
Economic Variables	**Units**								
Landings	Mil lbs.	**851.918**	**851.614**	**851.614**	**851.867**	**851.874**	**852.105**	**852.105**	**852.264**
Price _ALL	$/lb.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
PV Revenue	Mil $	$9,433	$9,434	$9,436	$9,440	$9,443	$9,446	$9,449	$9,459
PV Revenue Difference from SQ	**Mil $**	**-$27**	**-$26**	**-$23**	**-$19**	**-$17**	**-$13**	**-$11**	**$0**
PV Producer Surplus	Mil $	$7,724	$7,722	$7,723	$7,728	$7,729	$7,733	$7,734	$7,742
PV Consumer Surplus	Mil $	$1,172	$1,169	$1,168	$1,168	$1,167	$1,167	$1,166	$1,163
PV Total Economic Benefits (PVPS+PVCS)	Mil $	$8,895	$8,891	$8,891	$8,895	$8,895	$8,899	$8,900	$8,905
PV Total Economic Benefits Difference from SQ	**Mil $**	**-$9.58**	**-$13.84**	**-$13.71**	**-$9.29**	**-$9.25**	**-$5.29**	**-$5.14**	**$0.00**
Rank of Total Benefits		**5**	**7**	**6**	**4**	**3**	2	1	

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, which estimated the impact of landings and size composition on prices after taking into account the impact of exogenous variables. These variables include 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.

6.6.1.3.5 Landings and size composition

- Projected landings under all specification alternatives (except for No Action) range from roughly 22.62 million to 26.30 million pounds in FY 2023. While projections suggest that landings could reach close to 55 million pounds during FY 2025 to FY2027 (Table 72), the Council plans to revisit its rotational management strategy again next year using different assumptions. However, over the long-term (FY2028 to FY2037), the projected landings for each specification alternative (including No Action) are expected to stabilize around 63 million pounds.
- The short- and long-term projected landings of U10s are shown in Table 73 and Table 75. Under the specification alternatives being considered in this action (except for No Action), the proportion of overall landings that are U10s is estimated to be about 7.6 percent in FY2023 and is expected to stabilize around 4.85% to 5.8% in the long-term (FY 2025 to FY 2037).

Table 72. Estimated landings (Million lbs., Average per fishing year).

Average of Total landings	Scenarios							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	20.214	22.619	23.720	23.909	25.007	25.208	26.306	28.301
2024	33.440	31.541	31.107	31.182	30.748	30.810	30.375	30.834
2025-27	55.497	55.308	55.131	55.155	54.978	54.996	54.819	54.278
2028-37	63.177	63.153	63.139	63.131	63.118	63.110	63.097	63.029

Table 73. Projected landings of U10 scallops per year (million lbs.).

Average of L-U10	Scenarios							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	1.512	1.753	1.825	1.832	1.907	1.911	1.986	1.925
2024	3.468	3.217	3.179	3.155	3.117	3.091	3.053	3.177
2025-27	3.228	3.215	3.203	3.180	3.167	3.144	3.132	3.045
2028-37	3.070	3.070	3.069	3.064	3.062	3.056	3.056	3.041

Table 74. Historical landings of scallops by size category (in pounds).

Fishyear	'U10'_landing	'1120'_landing	'2130'_landing	31+ landing	'Unknown Category'_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	10,856,965	41,365,184	6,930,184	65,768	880,567	60,098,667
2019	11,944,335	38,171,190	8,154,785	1,061,243	1,053,266	60,384,819
2020	7,680,431	26,585,538	7,013,746	3,967,575	713,057	45,961,206
2021	6,056,458	21,654,887	9,824,152	4,641,362	760,029	42,936,888

Table 75. Biological projections - Percentage share of U10 scallops in total landings.

Average of U10PCTSH	Scenarios							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	7.48%	7.75%	7.70%	7.66%	7.63%	7.58%	7.55%	6.80%
2024	10.37%	10.20%	10.22%	10.12%	10.14%	10.03%	10.05%	10.30%
2025-27	5.82%	5.81%	5.81%	5.77%	5.76%	5.72%	5.71%	5.61%
2028-37	4.86%	4.86%	4.86%	4.85%	4.85%	4.84%	4.84%	4.82%

Table 76. Historical data: Percentage composition of scallop landings by size categories.

Fish year	'U10'_landing	'1120'_landing	'2130'_landing	31+ landing	'Unknown Category' 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	5.3	2.75
2017	19.00	54.84	23.61	0.72	1.83
2018	18.07	68.83	11.53	0.11	1.47
2019	19.78	63.21	13.50	1.75	1.74
2020	16.71	57.84	15.26	8.63	1.55
2021	14.11	50.43	22.88	10.81	1.77

Table 77. Scallop landings pounds per DAS (LPUE).

Average of LPUE-all	Scenarios							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	2,248	2,138	2,100	2,172	2,134	2,200	2,161	2,164
2024	2,294	2,262	2,258	2,250	2,246	2,238	2,234	2,253
2025-27	2,614	2,621	2,621	2,619	2,619	2,616	2,616	2,604
2028-37	2,719	2,719	2,719	2,719	2,719	2,719	2,719	2,718

6.6.1.3.6 Prices and Revenue

- Prices are estimated (Table 78) 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 on Price Model).

- The price estimates in Framework 36 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 FY2020 and FY2021 averaged to about $6.01 per pound); scallop exports will constitute about 13.7% of the domestic landings;

per capita disposable income of about $54.77 thousands in FY2021 and is adjusted for in price estimation; the ratio of Japanese and Canadian imports to total scallops imported will be constant at their current levels in 2021; 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 2021 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 which also receive a premium price.

- 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 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.

Table 78. Short-term Ex-Vessel Scallop Price Estimates* for FY2023 (in 2022 dollars) by FW36 Alternatives and Market Grades.

	Alternative/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Price US$/lb.	Fish Year	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
Price U10	2023	$29.46	$28.81	$28.61	$28.58	$28.37	$28.35	$28.14	$28.10
Price 11 plus	2023	$15.63	$15.49	$15.42	$15.41	$15.35	$15.33	$15.27	$15.15
Price_ALL	2023	$16.31	$16.11	$16.01	$16.04	$15.94	$15.96	$15.87	$15.75

*Price model estimates are in 2021 dollars. The price estimates are later adjusted to 2022 dollars based on CPI.

Table 79. Scallop revenue per fishing year (undiscounted, Million dollars, in 2022 dollars (Adj to CPI).

Average of REV-22	Scenarios							
Alternatives/Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	$329.768	$364.483	$379.831	$383.441	$398.630	$402.336	$329.768	$364.483
2024	$522.170	$495.437	$489.378	$490.284	$484.204	$484.954	$522.170	$495.437
2025-27	$775.349	$773.200	$771.224	$771.283	$769.292	$769.301	$775.349	$773.200
2028-37	$854.337	$854.098	$853.955	$853.839	$853.701	$853.573	$854.337	$854.098

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

- Total effort in terms of total DAS (Table 81, Table 82) are expected to be lower in the short-term in FY 2023 for all alternatives compared to the status quo. Changes in the employment level (Table 80) in the scallop fishery, as measured by CREW*DAS[19], is also expected to be lower compared to the status quo. Employment level is expected to decrease ranging from about 7% in Alternative 4 Option 2 (Section 4.3.4.2) to 19% in Alternative 2 Option 1 (Section 4.3.2.1). Expected employment for the FW36 alternatives in both short- and long-term are presented in Table 80.

- Fleet-wide trip costs (Table 83) in FY2023 for all alternatives including No Action are expected to be lower than SQ levels dollars as a result of lower Total DAS, but there are small differences in the magnitude of trip costs across specification alternatives. However, trip costs are expected to increase noticeably over the long-term. Trip cost per DAS in FY2023 is expected to increase by about 35% compared to last year which is primarily attributed to increasing fuel costs and general inflation recently.

Table 80. Total employment level (i.e., Crew*DAS) and percent changes relative to the Status Quo in the short- and long-term by FW36 Alternatives

Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	**4.3.1 NA**	**4.3.2.1 22d10k**	**4.3.2.2 24d10k**	**4.3.3.1 22d12k**	**4.3.3.2 24d12k**	**4.3.4.1 22d14k**	**4.3.4.2 24d14k**	**4.3.5 SQ**
2023	62,225	73,207	78,161	76,162	81,102	79,303	84,244	90,486
2024	100,852	96,499	95,351	95,890	94,735	95,254	94,098	94,714
2025-27	440,091	437,247	435,863	436,431	435,053	435,586	434,195	431,850
2028-37	1,607,820	1,607,032	1,606,713	1,606,658	1,606,347	1,606,298	1,605,980	1,604,907
Grand Total	**2,210,988**	**2,213,985**	**2,216,088**	**2,215,140**	**2,217,237**	**2,216,441**	**2,218,517**	**2,221,957**
Percent change in employment level (Crew*DAS) from SQ:								
Short Run (FY2023)	-31.23%	-19.10%	-13.62%	-15.83%	-10.37%	-12.36%	-6.90%	0.00%
Long Run (FY2023-2037)	-0.49%	-0.36%	-0.26%	-0.31%	-0.21%	-0.25%	-0.15%	0.00%

[19] Employment in scallop fishery is as measured by average crew in a FT vessel times total days at sea (DAS).

Table 81. Projected DAS per FT vessel per year (including open and access areas).

Average of DAS/LA vessel	FW36 Scenarios							
Alternatives / Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	25.21	29.66	31.66	30.85	32.85	32.12	34.13	36.65
2024	40.85	39.09	38.63	38.84	38.38	38.59	38.12	38.37
2025-27	59.43	59.04	58.85	58.93	58.75	58.82	58.63	58.31
2028-37	65.13	65.10	65.09	65.08	65.07	65.07	65.06	65.01

Table 82. Percentage change in total DAS from SQ levels (open and access areas).

Average of DAS/LA vessel	Percent change from SQ on Avg of DAS/LA vessel in t^{th} year or period.							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	-31.23%	-19.10%	-13.62%	-15.83%	-10.37%	-12.36%	-6.90%	0.00%
2024	6.48%	1.89%	0.67%	1.24%	0.02%	0.57%	-0.65%	0.00%
2025-27	1.91%	1.25%	0.93%	1.06%	0.74%	0.87%	0.54%	0.00%
2028-37	0.18%	0.13%	0.11%	0.11%	0.09%	0.09%	0.07%	0.00%

Table 83. Trip costs per year for the scallop fleet (Undiscounted, in million 2022 dollars).

Average Trip Cost	FW36 Scenarios							
Alternatives/ Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Fishing year groups	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
2023	$28.036	$32.984	$35.216	$34.315	$36.541	$35.730	$37.957	$40.769
2024	$45.439	$43.478	$42.961	$43.204	$42.683	$42.917	$42.396	$42.674
2025-27	$66.095	$65.668	$65.460	$65.545	$65.338	$65.418	$65.210	$64.857
2028-37	$72.441	$72.406	$72.391	$72.389	$72.375	$72.372	$72.358	$72.310

6.6.1.3.8 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 in Framework 36 have lower producer surplus relative to the status quo in the short-term. The decrease in producer surplus is largely attributed to decline in scallop landings together with the decline in share of U10 scallops and increase in trip costs. An increase in scallop prices could partially offset any decline in revenues due to reduced landing expectations.

- In FY2023, producer surplus (Table 69) is estimated to range between $272.8 million in Alternative 2 Option 1 (Section 4.3.2.1) to $318.39 million in Alternative 4 Option 2 (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 70.

- All alternatives in Framework 36 have lower consumer surplus relative to the status quo in the short-term.
- In FY2023, consumer surplus is predicted to range between approximately $16.84 million in Alternative 2 Option 1 (Section 4.3.2.1) to $22.53 million in Alternative 4 Option 2 (Section 4.3.4.2).

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 70.

- 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.
- Compared to status quo, total economic benefits in the short-term (FY2023) are lower in all alternatives for both with 22 and 24 DAS.

- Total economic benefits would be largest under Alternative 4 Option 2 (Section 4.3.4.2) which has 24 DAS and opens the CAII. Economic benefits are lowest under Alternative 2 Option 1 (Section 4.3.2.1), which allocated 22 DAS and keeps the CAII open.

Total economic benefits range between $289.64 million in Alternative 2 Option 1 (Section 4.3.2.1) to $340.93 million in Alternative 4 Option 2 (Section 4.3.4.2).

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

The 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 84 shows 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 1,416,450 pounds. The share for the specification alternatives ranges from 1,125,860 pounds in Alternative 2 Option 1 (Section 4.3.2.1) to a high of 1,328,597 pounds in Alternative 4 Option 2 (Section 4.3.4.2).

Section 4.3.5 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 using the regulations and spatial management from FW34, which would result in 1,416,450 pounds. Alternative 4 Option 2 (Section 4.3.4.2) has the highest LAGC IFQ allocation at 1,328,597 pounds with an expected revenue of $21.08 million (in 2022 dollars). The differences in revenue with status quo across alternatives range from about -$1.23 million to -$4.16 million. The highest-ranking alternative in terms of revenue is Alternative 4 Option 2 (Section 4.3.4.2) with about -5.52% less revenue than what is expected for the LAGC IFQ allocation under status quo.

Table 84 - Economic Impacts of the LAGC IFQ TAC for the 2023 fishing year.

Alternatives/Options	Alt. 1	Alt. 2 Opt. 1	Alt. 2 Opt. 2	Alt. 3 Opt. 1	Alt. 3 Opt. 2	Alt. 4 Opt. 1	Alt. 4 Opt. 2	Status Quo
Runs/Alts	4.3.1 NA	4.3.2.1 22d10k	4.3.2.2 24d10k	4.3.3.1 22d12k	4.3.3.2 24d12k	4.3.4.1 22d14k	4.3.4.2 24d14k	4.3.5 SQ
LAGC IFQ Share (lbs.)	993,572	1,125,860	1,186,366	1,196,794	1,257,179	1,268,213	1,328,597	1,416,450
LAGC IFQ Share (mt)	451	511	538	543	570	575	603	643
Price per lb (in 2022$)	$16.31	$16.11	$16.01	$16.04	$15.94	$15.96	$15.87	$15.75
Revenue (in 2022 $ mil)	$16.209	$18.142	$18.998	$19.194	$20.040	$20.242	$21.080	$22.311
Revenue Difference from SQ (in 2022$ mil)	-$6.102	-$4.169	-$3.313	-$3.118	-$2.271	-$2.069	-$1.231	$0
Percent Change in Revenue from SQ	-27.35%	-18.69%	-14.85%	-13.97%	-10.18%	-9.27%	-5.52%	0.00%

6.6.2 Social Impacts

6.6.2.1 Action 1 – Overfishing and Acceptable Biological Catch

6.6.2.1.1 Alternative 1 – No Action for OFL and ABC

Under No Action, the OFL and ABC would be set at the default values for FY 2023 OFL and ABC, which were adopted by the Council through FW34 (Table 2). The ABC excluding discards would be 23,200 mt and the ABC for FY 2024 would be 0 mt.

The social impacts of No Action would likely be moderate negative. With no change in the FY 2023 ABC from the default, there would be a degree of constancy and predictability for fishing industry operations. However, this ABC is 10% lower than that of FY 2022 (25,724 mt), which was a reduction from FY 2021. While fishery allocations are not linked to ABC (rather 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. 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 recommended that the ABC should be lower than the No Action level 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 2024 would be 0 mt (i.e., there would be no fishery), unless the Council takes another 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 Updated OFL and ABC for FY 2023 and FY 2024

Under Alternative 2, the OFL and ABC for FY 2023 would be set based on the results of the most recent stock assessment and at levels recommended by the SSC (Table 4). The ABC excluding discards would be 19,828 mt for FY 2023 and the default for FY 2024 would be 20,206 mt.

The social impacts of Alternative 2 would likely be moderate negative but more positive than No Action. The ABC in FY 2023 would be 23% lower than in FY 2022 (25,724 mt) and 15% lower than the FY 2023 default level. Like Alternative 1, Alternative 2 would continue the period of decreasing catch limits. While fishery allocations are not linked to ABC (rather 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, 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 2024, 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 and TAL Setting

6.6.2.2.1 Alternative 1 – No Action

Under No Action, the default measures for FY 2023 would be in place: the NGOM Set-Aside for FY 2023 would be 465,980 lb, 25% lower than the FY 2022 Set-Aside (621,307 lb). No default would be set for FY 2024, and the area would close to directed scallop fishing.

The social impacts of No Action would likely be slight negative. With a 25% reduction in the Set-Aside from the FY 2022 level, but no change from the FY 2023 default, the fishery would continue to benefit from fishing in the NGOM, but at reduced levels. This degree of change could further disrupt the constancy and predictability of fishing industry operations and make providing a steady supply to the market a challenge. The size of the fishery-related workforce operating in the NGOM would likely be reduced, as would the historical dependence on and participation in the fishery (structure of fishing practices, income distribution and rights). Scallop surveys indicate that the No Action NGOM TAL may be higher than is biologically sustainable in the long term. 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 2024 would be 0 mt (i.e., there would be no fishery), unless the Council takes another 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.

Alternative 1 would likely have differential impacts among ports. Gloucester is a key landing port for the vessels that would be fishing the NGOM TAC, particularly the LAGC NGOM vessels, as it is near the most productive fishing grounds in this area and has the necessary shoreside infrastructure to support the fishery. However, the LAGC vessels fishing out of Gloucester are from homeports throughout Maine, New Hampshire, and Massachusetts (Amendment 21, Section 5.6.8.4.3).

6.6.2.2.2 Alternative 2 - Set NGOM TAL, with set-asides to support research, monitoring, and a directed LAGC fishery

Alternative 2 would specify a Northern Gulf of Maine Total Allowable Landings (NGOM TAL) limit for FY 2023 and FY 2024 (default), including set-asides to support research, monitoring, and a directed LAGC fishery. Option 1 (F=0.15) and Option 2 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank only. Options 3 (F=0.15) and Option 4 (F=0.18) would set the NGOM TAL using estimates of exploitable biomass from Stellwagen Bank, Ipswich Bay, and Jeffreys Ledge. There are four options for setting the NGOM TAL and Set-Aside at varying F rates that result in FY 2023 Set-Asides ranging from a low of 303,693 lb under Option 1 to a high of 458,016 lb under Option 4.The social impacts of Alternative 2 would be uncertain but potentially moderate negative and more negative than No Action. The fishery would continue to benefit from fishing in the NGOM but at lower levels than under No Action. As growth assumptions for the Stellwagen Bank area of the NGOM are uncertain and could be overestimated, so there is uncertainty about the long-term sustainability of fishing under the options considered. While Options 1 and 2 are the most conservative, their impacts may be more positive in the longer-term. While Option 4 may lead to more positive short-term social impacts due to allowing the highest landings, in the long-term the most positive social impacts would more likely accrue under Option 1, which has the most conservative TAL. In the long term, ensuring continued, sustainable harvest of the resource benefits all fisheries.

Alternative 2 would likely have differential impacts among ports with the short-term positive impacts accruing more to the port of Gloucester for the same reasons as described under No Action. In the long term, if Alternative 2, and particularly Option 1, allows for the most growth in the scallop resource, biomass may increase substantially and become more distributed throughout the area. Thus, LAGC landings may increase in more northerly ports as well. Alternative 2 may more quickly lead to biomass being above the trigger that would allow for more directed harvest by the LA fishery component. These vessels are distributed throughout the range of the entire resource; many are based out of New Bedford but occur down to North Carolina.

6.6.2.3 Action 3 – Fishery Specifications and Rotational Management

Action 3 sets specifications for open area DAS and access area trip allocations. The alternatives are based on Alternative 2 for OFL and ABC (Section 4.1.2). The LA (94.5%) and LAGC IFQ (5.5%) allocations are based on the Annual Projected Landings (APL).

6.6.2.3.1 Alternative 1 – No Action

Under No Action, the FY 2023 specifications (default approved in Framework 34) would include 18 full-time LA open area DAS, 75% of the FY 2022 DAS. Part-time and occasional LA vessels would have 7.2 and 1.5 DAS, respectively. The total LAGC IFQ allocation would be 1,295,996 lb, 75% of the FY 2022 LAGC IFQ allocation. The target TAC for vessels with an LAGC incidental permit would be 50,000 lb. There would be no allocations specified for FY 2024.

The social impacts of No Action would be moderate negative. Fishing would be allowed, but at substantially reduced levels relative to FY 2022 (Section 4.3.5). Open area DAS would be set at 18 for FT LA vessels, with one 15,000 pound access area trip to CAII. Landings, revenue, and total economic benefits would likely be lower than Status Quo (FY 2022) and all other alternatives under consideration in Framework 36, providing fewer fishing opportunities. Employment (i.e., crew limit * DAS) is modeled to be lower in FY 2023 under No Action relative to Status Quo (Table 80). Thus, the size of the fishery-related workforce could decrease, though the model predicts similar employment across the alternatives in later years. Fishermen could perceive the selection of No Action as a fishery management failure (e.g., no default for FY 2024). 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. No Action 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 2024, unless the Council takes another action to set specifications. 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.

6.6.2.3.2 Alternative 2 – Two access area trips in Area II with 10,000-pound trip limit

Under Alternative 2, specifications for access to the open areas and rotational access areas would be set for FY 2023 and default measures for FY 2024. The full-time LA vessels would have two access area trips to Area II (boundary expanded), each with a possession limit of 10,000 lb. Options 1 and 2 would set open area fishing at F=0.46 (22 DAS) and F=0.51 (24 DAS), respectively. The APL (after set-asides removed) under these options would be 20.5M lb and 21.6M lb, respectively.

The social impacts of both Alternative 2 options are likely slight positive and more positive than No Action. Landings, revenue, and total economic benefits would likely be higher than No Action, providing more fishing opportunities and participation and more positive social impacts. Social impacts of the Alternative 2 options are likely negligible relative to each other and less positive than the Alternative 3 options and Status Quo (FY 2022). Employment in FY 2022 is modeled to be lower under Alternative 2 Option 1 and higher under Option 2 relative to Status Quo (Table 80). Thus, the size of the fishery-related workforce could change, though the model predicts

similar employment across the alternatives in later years. Setting default measures for FY 2024 leads to greater predictability and business planning, which have positive social outcomes. 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.

6.6.2.3.3 Alternative 3 – Two access area trips in Area II with 12,000-pound trip limit

Alternative 3 is like Alternative 2, except that the possession limit for the two trips would be 12,000 lb. The APL (after set-asides removed) under these options would be 21.8M lb and 22.9M lb, respectively.

The social impacts of both Alternative 3 options are likely slight positive and more positive than No Action. Landings, revenue, and total economic benefits would likely be higher than No Action, providing more fishing opportunities and participation and more positive social impacts. Social impacts of the Alternative 3 options are likely negligible relative to each other, more positive than Alternative 2 options and less positive than the Alternative 3 options and Status Quo (FY 2022). Employment in FY 2022 is modeled to be lower under Alternative 3 Option 1 and higher under Option 2 relative to Status Quo (Table 80). Thus, the size of the fishery-related workforce could change, though the model predicts similar employment across the alternatives in later years. Setting default measures for FY 2024 leads to greater predictability and business planning, which have positive social outcomes. 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.

6.6.2.3.4 Alternative 4 – Two access area trips in Area II with 14,000-pound trip limit

Alternative 4 is like Alternatives 2 and 3, except that the possession limit for the two trips would be 14,000 lb. The APL (after set-asides removed) under these options would be 23.1M lb and 24.2M lb, respectively.

The social impacts of both Alternative 4 options are likely slight positive and more positive than No Action. Landings, revenue, and total economic benefits would likely be higher than No Action, providing more fishing opportunities and participation and more positive social impacts. Social impacts of the Alternative 4 options are likely negligible relative to each other, more positive than the Alternative 2 and 3 options and less positive than Status Quo (FY 2022). Employment in FY 2022 is modeled to be lower under Alternative 3 Option 1 and higher under Option 2 relative to Status Quo (Table 80). Thus, the size of the fishery-related workforce could change, though the model predicts similar employment across the alternatives in later years. Setting default measures for FY 2024 leads to greater predictability and business planning, which have positive social outcomes. 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.

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 FW34)

Under Alternative 1, the FY 2023 LAGC IFQ access area trips, with a 800 lb trip limit, would be 357 trips to Area I, the default from Framework 34.

The social impacts of No Action are likely moderate negative. For FY 2022, there were 1,071 access area trips allocated for this fishery component to the Area I and Nantucket Lightship-South Deep, 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 2024, unless the Council takes another action to set the ABC.

6.6.2.4.2 Alternative 2 – Update LAGC IFQ Access Area Trip Allocations, Distribute Area II Access Area Allocation to the Nantucket Lightship North and Area II

Under Alternative 2, the FY 2023 LAGC IFQ access area trips would range from 476 to 666, depending on the alternative selected in Action 3, with an 800 lb trip limit, adopting the trip limit increase recommended by the Council through Amendment 21. Trips would be allowed in the NLS-S and Area 2 and vessels could choose which area to fish in.

The social impacts of Alternative 2 are likely slight negative but more positive than No Action. For FY 2022, there were 1,071 access area trips allocated for this fishery component, so Alternative 2 would result in a reduction from present conditions but an increase from No Action. 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 two access areas, so vessels based in a wider geographic range of ports could benefit from fishing in the access areas relative to No Action, and there would be flexibility in which area to fish. Given Area 2 is offshore of Nantucket Lightship North, there may be more safety risks from fishing there relative to NLS-N.

7.0 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[20].

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.

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[20] 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.

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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