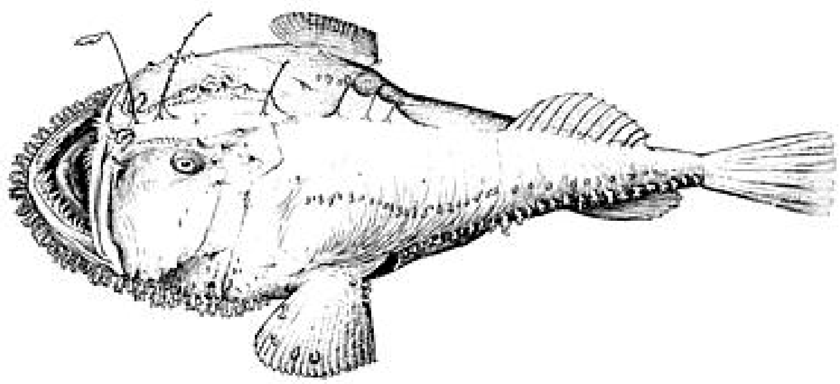
Monkfish Fishery Management Plan

Framework Adjustment 13



DRAFT Environmental Assessment

November 25, 2022

Prepared by the
New England Fishery Management Council and the
Mid-Atlantic Fishery Management Council
in consultation with the
National Marine Fisheries Service

Document history

Initial Specifications Meeting:	April 5, 2022 (MAFMC)
	April 12, 2022 (NEFMC)
Final Specifications Meeting:	Month ##, 2022 (NEFMC) [December expected]
	Month ##, 2022 (MAFMC) [December expected]
Preliminary Submission:	Month ##, 2021
Final Submission:	Month ##, 2021

Cover image

NOAA image.

MONKFISH FISHERY MANAGEMENT PLAN

FRAMEWORK ADJUSTMENT 13

Proposed Action:	Propose monkfish specifications for fishing years 2023 - 2025 and other measures.
Responsible Agencies:	New England Fishery Management Council 50 Water Street, Mill #2 Newburyport, MA 01950 National Marine Fisheries Service National Oceanic and Atmospheric Administration U.S. Department of Commerce Washington, D.C. 20235
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Abstract:

The New England Fishery Management Council and the Mid-Atlantic Fishery Management Council, in consultation with NOAA Fisheries has prepared Framework Adjustment 13 to the Monkfish Fishery Management Plan, which includes a draft environmental assessment that presents the range of alternatives to achieve the purpose and need of the action. The proposed action focuses on setting monkfish fishery specifications for fishing years 2023 - 2025 and effort controls. The document describes the affected environment and valued ecosystem components and analyzes the impacts of the alternatives on both. It addresses the requirements of the National Environmental Policy Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Regulatory Flexibility Act, and other applicable laws.

1.0 EXECUTIVE SUMMARY

The New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC) are charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (MSA). The Monkfish Fishery Management Plan (FMP) is jointly managed by these Councils, with the NEFMC having the administrative lead. The FMP has been updated through a series of amendments, framework adjustments, and fishery specification actions.

This action, Framework Adjustment 13 (FW13) includes alternatives that would set specifications for fishing years (FY) 2023-2025, measures that would revise fishery effort controls to help the fishery remain within specifications, and alternatives that would increase the minimum gillnet mesh size (Table 1). This action is needed to meet regulatory requirements and adjust management measures that are necessary to prevent overfishing and help achieve optimum yield in the fishery consistent with stock status of stocks, recommendations of the NEFMC's Scientific and Statistical Committee, and the requirements of the Magnuson-Stevens Act.

Under the provisions of the MSA, Councils submit proposed management actions to the Secretary of Commerce for review. The Secretary of Commerce can approve, disapprove, or partially approve the action proposed. In this action, alternatives identified as preferred alternatives constitute the proposed action.

[the Executive Summary will be finalized after the Councils take final action on this framework.]

Proposed Action

Impacts of the Proposed Action

Alternatives to the Proposed Action

Table 1. Summary of potential impacts of the alternatives under consideration in Framework 13 across the valued ecosystem components. (Preferred alternatives will be shaded once the Councils take final action)

Actions & Alternatives			Direct and Indirect Impacts				
			Target Species	**Non-target Species**	**Protected Resources**	**Physical Env. (EFH)**	**Human Communities**
Action 1: ABC, ACL, TAL	**Alt. 1: No Action**		Uncertain or moderate +	Positive	Slight + to moderate +	Slight +	Economic: High - Social: High -
	Alt. 2: Status Quo		Uncertain or slight -	Slight +	Slight – to slight +	Slight -	Economic: Moderate + Social: Moderate +
	Alt. 3: Update (SSC Rec.)		Uncertain or moderate +	Moderate +	Slight – to moderate +	Slight -	Economic: Negative Social: Moderate -
Action 2: Effort Controls	**Alt. 1: No Action**		Slight -	Negligible	Slight – to slight +	Slight -	Economic: Negligible Social: Slight -
	Alt. 2: Separate DAS Alloc. by area, Reduce DAS	Option 2A: 20 DAS	Slight +	Slight +	Slight -	Slight -	Economic: Negative Social: Slight -
		Option 2B: 10 DAS	Slight + to moderate +	Slight + to moderate +	Slight – to moderate +	Slight -	Economic: Negative Social: Slight -
		Option 2C: 0 DAS	Moderate +	Moderate +	Moderate +	Slight -	Economic: Negative Social: Slight -
	Alt. 3: Reduce NFMA Incidental Limits	Option 3A: 20% reduction	Negligible to slight +	Negligible to slight +	Slight – to slight +	Slight -	Economic: Negative Social: Slight -
		Option 3B: 40% reduction	Negligible to slight +	Negligible to slight +	Slight – to slight +	Slight -	Economic: Negative Social: Slight -
Action 3: Monkfish Gillnet Mesh Size	**Alt. 1: No Action**		Slight -	Slight -	Slight – to slight +	No impact	Economic: Negligible Social: Slight +
	Alt. 2: Increase Mesh Size	Option A: Increase to 11”	Slight +	Slight +	Slight – to slight +	No impact	Economic: Slight - Social: Slight +
		Option B: Increase to 12”	Slight +	Slight +	Slight – to slight +	No impact	Economic: Slight - Social: Slight +

2.0 TABLE OF CONTENTS

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2.4 Acronyms

ABC	Acceptable biological catch
ACL	Annual catch limit
ACT	Annual catch target
DAS	Days-at-Sea
FMP	Fishery Management Plan
GB	Georges Bank
GOM	Gulf of Maine
MAFMC	Mid-Atlantic Fishery Management Council
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NFMA	Northern Fishery Management Area
OFL	Overfishing limit
SFMA	Southern Fishery Management Area
SSC	Scientific and Statistical Committee
TAL	Total allowable landings

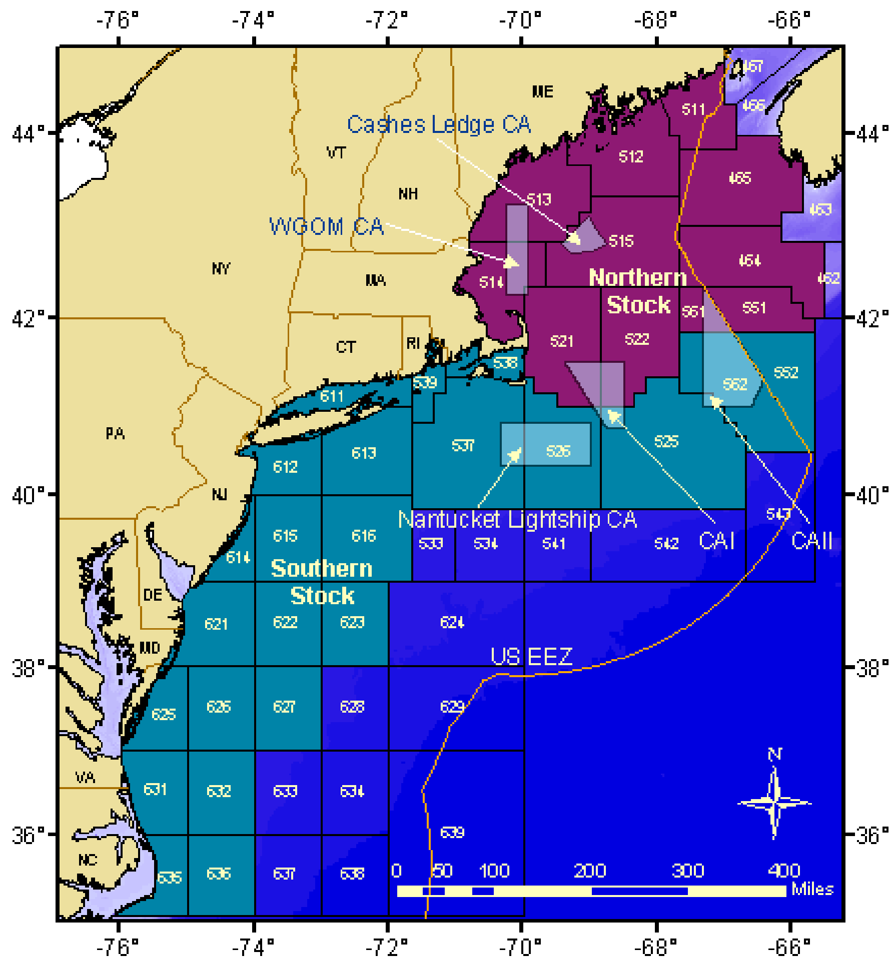
3.0 BACKGROUND AND PURPOSE

3.1 Background

The monkfish fishery in U.S. waters is jointly managed under the Monkfish Fishery Management Plan (FMP) by the New England Fishery Management Council (NEFMC) and the Mid-Atlantic Fishery Management Council (MAFMC), with the NEFMC having the administrative lead. The fishery extends from Maine to North Carolina out to the continental shelf margin. The fishery is assessed and managed in two areas, northern and southern (Map 1). The Northern Fishery Management Area (NFMA) covers the Gulf of Maine (GOM) and northern part of Georges Bank (GB), and the Southern Fishery Management Area (SFMA) extends from the southern flank of GB through the Mid-Atlantic Bight to North Carolina. The directed monkfish fishery is primarily managed with a yearly allocation of monkfish Days-at-Sea (DAS) and possession limits, though incidental landings are allowed in other fisheries.

Map 1. Fishery statistical areas used to define the Monkfish NFMA and SFMA.

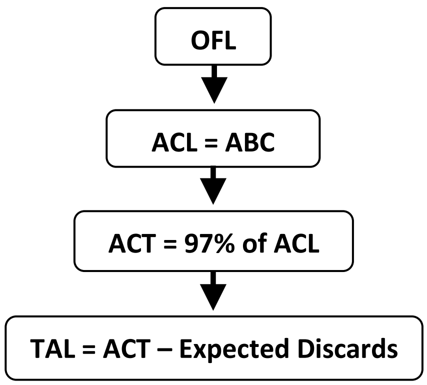
Source: NEFSC (2020b).



Stock status. The monkfish stock assessments in 2016, 2019, and 2022 determined that stock status is unknown. The 2016 assessment did not update the SCALE model that had been used since 2007 to assess monkfish after its use was invalidated by age validation research. For the 2016, 2019, and 2022 assessments, biological reference points could not be determined and catch advice has been provided using the "PlanBsmooth" method, now called "Ismooth" as of the 2022 assessment, which is based solely on the trawl survey index (Deroba 2022; NEFSC 2020b; Richards 2016).

Fishery specifications. Specifications for each management area follow a hierarchy (Figure 1) of an overfishing limit, (OFL), acceptable biological catch (ABC), an annual catch limit (ACL) set equal to the ABC, an annual catch target (ACT) set equal to 97% of the ACL, and total allowable landings (TAL) set equal to the difference between the ACT and expected discards.

Figure 1. Formulas for monkfish specification setting.



Overfishing Limit (OFL) and Acceptable Biological Catch (ABC). Amendment 5 (NEFMC 2010) identified the following control rules for OFLs and ABCs:

$$OFL = \text{exploitable biomass } (B_{current}) * \text{the fishing mortality threshold } (F_{max})$$

$$ABC = \text{exploitable biomass } (B_{current}) * \text{average exploitation rate}$$

Since 2010, the Scientific and Statistical Committee (SSC) has considered these control rules interim proxies until more precise aging methods can be incorporated into the assessment. OFLs and ABCs were last set for FY 2014-2016 following this approach. OFLs have not been updated since then. ABCs have been updated, though following unique methods each specifications cycle (NEFMC 2022).

Annual Catch Limit (ACL). The ACL for each area is set equal to the ABC. The ACL is a limit that will trigger accountability measures if catch exceeds this amount (a pound-for-pound reduction in ACL in the second year following the overage).

Annual Catch Target (ACT). The ACT for each area is 97% of the ACL, because the management uncertainty buffer between the ACL and ACT is currently set at 3%. This buffer was last changed through Framework 10 for FY 2017-2019, lowered from 13.5% for the NFMA and 6.5% for the SFMA (Final Rule). Amendment 5 identified that optimum yield is equivalent to the ACT, since this value represents the maximum yield from the fishery while preventing overfishing, after considering scientific uncertainty in the OFL in setting ABC, and management uncertainty in setting measures that will not exceed the ABC (NEFMC 2010, Sect 3.1.2.4.).

Total Allowable Landings (TAL). The TAL for each area is set by subtracting expected discards from the ACT. In prior specifications, the discard deduction has been set by applying a discard rate to the ACT. This rate is the latest 3-year moving average of calendar year discards divided by total catch, as calculated through the assessment. This action would adopt a new approach to setting the discard deduction.

Note: The monkfish regulations indicate that "The ACTs established for each management area shall be the basis for setting management measures (DAS and trip limits), after accounting for incidental catch in non-directed fisheries and discards in all fisheries." Landings by vessels with an open-access Category E federal monkfish permit or with other permits but that are not on a monkfish DAS are typically considered incidental. In practice, all monkfish landings by federally-permitted vessels are monitored in-season against the TALs (though there are no in-season closure measures) and there is no specific deduction for incidental catch.

3.2 Purpose and Need

Periodic framework adjustments are used to adjust strategies in response to updated assessments and fishery conditions. The need for this action is to meet regulatory requirements and adjust management measures that are necessary to prevent overfishing and help achieve optimum yield in the fishery consistent with stock status of stocks, SSC recommendations for OFL and ABC recommendations, and/or the requirements of the Magnuson-Stevens Act (Table 1). The primary purpose of this action is to adopt monkfish fishing specifications for FY 2023-2025 and adjust effort controls to help ensure the fishery remains within specifications.

Table 2. Purpose and need for Framework Adjustment 13.

Need for Framework 13	Corresponding Purpose for Framework 13
To prevent overfishing while promoting the full utilization of optimum yield and to ensure that monkfish is managed consistent with its stock status and the requirements of the MSA.	Specify OFL and ABC, set specifications for the 2023-2025 fishing years, and adjust effort controls to help ensure that the fishery remains within specifications.
Continue to address and minimize the catch and bycatch mortality of juvenile monkfish and other species caught in gillnet gear.	Consider measures that would increase the mesh size of gillnets used in the monkfish fishery.

This action is intended to help meet the objectives of the Monkfish FMP, as developed in the Original FMP (NEFMC & MAFMC 1998):

1. To end and prevent overfishing; rebuilding and maintaining a healthy spawning stock;
2. To optimize yield and maximize economic benefits to the various fishing sectors;
3. To prevent increased fishing on immature fish;
4. To allow the traditional incidental catch of monkfish to occur.

4.0 ALTERNATIVES UNDER CONSIDERATION

The Councils considered the alternatives in this section. No others were considered because these provide a reasonable range of alternatives to address the purpose and need for action described in Section 3.2.

4.1 Action 1 - FY 2023-2025 Specifications

Action 1 sets monkfish fishery specifications for fishing years 2023 - 2025.

4.1.1 Alternative 1 - No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either fishery management plan. The OFLs, ABCs, ACLs, and TALs would be set at 0 mt. The accountability measure would still be in place: a pound-for-pound deduction from the ACT in the second fishing year following the year of the overage for any catch (landings and discards) that exceeds the ACL.

4.1.2 Alternative 2 – Status Quo

Under Alternative 2, the FY 2020-2022 specifications (Table 2) would be in place for FY 2023-2025. The expected discards were identified by applying a discard rate to the ACT. This rate was the latest 3-year moving average (2016-2018) of calendar year discards divided by total monkfish catch, as calculated through the 2019 assessment (NEFSC 2020b, Figure D8, p. 119).

Table 3. Status quo specifications from FY 2020-2022, carried forward for FY 2023-2025 (Alternative 2).

	Northern FMA (mt)	Southern FMA (mt)
OFL	17,805	23,204
ABC = ACL	8,351	12,316
ACT (97% of ACL)	8,101	11,947
Expected Discards	(18.2%) 1,477	(50.8%) 6,065
Federal TAL (ACT – discards)	6,624	5,882
Note: Discard rate shown in parentheses.		

4.1.3 Alternative 3 – Update Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (Table 3) and would continue to be in place until a subsequent action replaces them.

Table 4. Updated specifications for FY 2023-2025 (Alternative 3).

	Northern FMA		Southern FMA	
	(mt)	% change	(mt)	% change
OFL	undetermined	n/a	undetermined	n/a
ABC = ACL	5,526.0	-34%	3,766.0	-69%
ACT (97% of ACL)	5,360.2	-34%	3,653.0	-69%
Expected Discards (10-year median)	728.5	-51%	2,204.5	-64%
Federal TAL (ACT – discards)	4,631.7	-30%	1,448.5	-75%

The SSC recommended that this catch advice be equivalent to the Annual Catch Target (ACT). The trawl survey multipliers were 0.829 in the NFMA and 0.646 in the SFMA. The latest three-year average catch is for the years 2019-2021: 6,465 mt in the North and 5,655 mt in the South, using calendar year assessment data. Thus, ACTs are set at:

*North ACT: 0.829 * 6,465 mt = 5,360 mt*

*South ACT: 0.646 * 5,655 mt = 3,653 mt*

The Index-based Methods Working Group and Legault et al. (in press) found that the Ismooth approach, in the face of multiple uncertainties, was likely to provide catch advice that prevents overfishing and promotes long-term stability of catch and biomass.

Rationale for Expected Discards: The method for identifying expected discards is being updated to:

Expected discards = latest 10-year median of discards

This update was prompted by NEFMC concerns during the setting of FY 2020-2022 specifications that use of the latest three-year mean of the discard:catch ratio was causing the discard deduction to be higher than expected (e.g., discards increased in 2017-2019 largely due to the 2015 year-class). Several alternate approaches have been analyzed, both during contracted work in 2020 and 2021 (O'Keefe 2020; 2021) and in 2022 (Monkfish PDT memo). The SSC reviewed the latest work and recommended the use of a 10-year median of discards. The analysis supporting this recommendation suggested that this approach may result in more accurate and stable estimates of discards overall relative to using the discard:catch ratio, a mean value, and a 3-year time series. This would help meet the NEFMC's goal for the discard deduction (agreed to in April 2022), to "*provide as much stability to the directed fishery as possible*" while also optimizing for the accuracy of the discard prediction. However, uncertainty still exists as to whether this or other methods considered would accurately predict realized discards in any given year.

Other Rationale: Current regulations (50 CFR 648.96(a)(3)(iv)) allow for continued fishing under a previous year's specifications only when a specifications action is not in effect by the time the fishing year starts. Thus, there is no provision to allow FY 2022 specifications to roll over into FY 2023. By allowing specifications to roll over until replaced under Alternative 3, the fishery could continue to operate in the absence of a Council action, and in future specification actions, there would not need to be both a No Action and Status Quo alternative (would be one and the same).

4.2 Action 2 - Effort Controls

The Councils may select Alternative 2 and 3. Within Alternative 2, the Councils would select an option for the NFMA and for the SFMA. Within Alternative 3, the Council would select one option.

4.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), annual DAS allocation would be unchanged. Each vessel issued a limited access monkfish permit is allocated 46 monkfish DAS per fishing year. There is a reduction from the annual allocation for RSA DAS, currently 0.8 DAS so 45.2 DAS are allocated to each vessel.[1] Of

[1] Per 50 CFR 648.92(b)(1)(v), the formula for the RSA deductions is the allocated DAS minus the quotient of 500 DAS divided by the total number of limited access permits issued in the previous fishing year. The number of limited access monkfish permits in FY 2022 was 518, so the deduction would be 0.965 (500/518). This same deduction would apply to all alternatives in Section 4.2.1.

these 45.2, 37 can be used in the SFMA. Each vessel may carry-over and use up to four unused monkfish DAS from the previous fishing year.

There are monkfish possession limits specific to each permit category in the NFMA and the SFMA (Table 22, Table 23) that would be unchanged. While fishing on a Northeast multispecies DAS, vessels fishing in the NFMA with either a monkfish Category C or D permit can possess up to 900 lb or 750 lb tail weight of monkfish, respectively, without fishing on a monkfish DAS (Table 25). To possess more than these amounts, these vessels must use a monkfish DAS. If so, their possession limit becomes unlimited; there is no possession limit for vessels fishing on a Northeast multispecies DAS and a monkfish DAS on the same trip (Table 22).

4.2.2 Alternative 2 – Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. The Research Set Aside (RSA) DAS deduction would be split evenly across both areas. The provision that allows for carry-over of four unused DAS across areas would still apply (carryover of four in each area would not be allowed). Alternative 2 would not change the formula for setting the annual Category F DAS allocation (50 CFR 648.95(g)).

NFMA DAS options

Option 2A – Set NFMA DAS at 20 DAS.

Option 2B – Set NFMA DAS at 10 DAS.

Option 2C – Set NFMA DAS at 0 DAS.

SFMA DAS options

Option 2A – Set SFMA DAS at 20 DAS.

Option 2B – Set SFMA DAS at 10 DAS.

Option 2C – Set SFMA DAS at 0 DAS.

Alternative 2 Rationale: A reduction in annual DAS allocation would reduce landings to help keep landings within the TAL, to a greater extent under Options B and C relative to Option A. The DAS values of these options were identified based on an analysis of fishery performance in FY 2019 and 2021 and what level of DAS reductions may keep landings within the FY 2023-2025 TALs identified in Action 1, Alternative 3 (Section 6.1.1.1). Reducing DAS allocation versus possession limits for monkfish limited access vessels would help allow any remaining trips to be profitable and would help prevent increasing discards, which would be counted against the ACL for quota accounting and accountability measure determination purposes. Different DAS for each area may be appropriate given the different ACTs and how DAS are used in each area.

4.2.3 Alternative 3 – Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, incidental possession limits would be reduced for vessels fishing in the NFMA with Category C and D limited access monkfish permits. Under the options considered, while fishing on a Northeast multispecies DAS, vessels fishing in the NFMA with either a monkfish Category C or D permit would have either 20% or 40% lower monkfish incidental possession limit, without fishing on a monkfish

DAS (Table 4). These possession limits are applied per Northeast multispecies DAS used. For example, if a vessel with a Category C monkfish permit uses two multispecies DAS on a trip, then the monkfish incidental limit is 5,238 lb, whole weight under No Action (2*2,619 lb). To possess more than these amounts, these vessels must use a monkfish DAS. If so, like No Action, their possession limit becomes unlimited; there would still be no possession limit for vessels fishing on a Northeast multispecies DAS and a monkfish DAS on the same trip. Table 5 is a matrix for how the DAS options and the incidental possession limit options work together in the NFMA.

Option 3A – Reduce NFMA incidental possession limits by 20%.

Option 3B – Reduce NFMA incidental possession limits by 40%.

Table 5. Potential NFMA Category C and D permit incidental possession limits under consideration.

Permit Category	No Action	Alternative 3	
		Option A (-20%)	Option B (-40%)
C	900 lb tail weight (2,619 lb whole weight)	720 lb tail weight (2,095 lb whole weight)	540 lb tail weight (1,571 lb whole weight)
D	750 lb tail weight (2,183 lb whole weight)	600 lb tail weight (1,746 lb whole weight)	450 lb tail weight (1,310 lb whole weight)

Rationale: Most NFMA landings occur under the incidental provisions, so reducing these trip limits should reduce landings. Reducing the incidental limit of vessels with either a monkfish Category C or D permit fishing in the NFMA would necessitate use of a monkfish DAS (if available) to land higher amounts of monkfish. Vessels would need to choose whether to use a monkfish DAS (if available) to land above the incidental limit or land a smaller amount of monkfish and discard any remaining monkfish catch. If the monkfish DAS allocation (Alternative 2 in Section 4.2.1) is also lowered and DAS are not available, vessels may choose to not fish rather than be limited to the incidental monkfish limit, which may reduce total effort and keep monkfish catch within the NFMA ACL. Under the specifications Alternative 3, FY 2023-2025 TAL in the North would decline by 30% relative to FY 2020-2022, thus, 20% and 40% reductions in incidental possession limits represent a 10% range around the TAL reduction.

Table 6. Matrix of DAS and incidental possession limit (lb, tail weight) options for the NFMA.

DAS options	Incidental PL		
	No Action	Option 3A	Option 3B
No Action = 46	46 DAS, 750/900 lb	46 DAS, 720/600 lb	46 DAS, 540/450 lb
Option 2A = 20	20 DAS, 750/900 lb	20 DAS, 720/600 lb	20 DAS, 540/450 lb
Option 2B = 10	10 DAS, 750/900 lb	10 DAS, 720/600 lb	10 DAS, 540/450 lb
Option 2C = 0	0 DAS, 750/900 lb	0 DAS, 720/600 lb	0 DAS, 540/450 lb

4.3 Action 3 - Monkfish Gillnet Mesh Size

Action 3 includes alternatives that would increase the minimum gillnet mesh size for the monkfish fishery.

4.3.1 Alternative 1 - No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10" if fishing only under a monkfish DAS (50 CFR 648.91(c)(1)(iii)). Also, the minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would remain at 10" (50 CFR 648.80(a)(13)).

To land monkfish from the NFMA or SFMA, a gillnet vessel must declare that its fishing trip will use both a Northeast multispecies DAS and monkfish DAS, and the vessel would be subject to the 6.5" gillnet mesh requirement for using a multispecies DAS. However, there are two areas where vessels can be exempt from using a Northeast multispecies DAS and only need to use monkfish DAS. In these two exemption areas, 10" gillnet mesh is required when fishing for monkfish (to avoid catching groundfish):

1. Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area (50 CFR 648.80(a)(13)).
2. Southern New England (SNE) Monkfish and Skate Gillnet Exemption Area (50 CFR 648.80(b)(6)).

4.3.2 Alternative 2 – Increase Gillnet Mesh Size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Exemptions in place for the 10" minimum mesh size while on a monkfish DAS would remain, per 50 CFR 648.91(c)(1)(iii). Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action).

Option A – Increase gillnet mesh size to 11"

Option B – Increase gillnet mesh size to 12"

Rationale: An increase in mesh size for monkfish gillnets under these two conditions would help reduce discards of small monkfish and skates and promote sustainability in the monkfish fishery, with 12" more so than 11". While 12" mesh is used in most of the monkfish gillnet trips (e.g., Option B would better align fishing regulations with fishing practices), some fishermen do use 11" mesh gear at certain times of the year. An implementation delay would help defray the costs of purchasing new gear, as gillnets are commonly replaced every few years. Alternative 2 would avoid affecting other fisheries participating in subsets of the exemption areas, especially the dogfish and skate fisheries.

Explanation: The regulations at 50 CFR 648.91(c)(1)(iii) state that gillnet vessels on a monkfish DAS must use a minimum of 10" inch mesh. Where the exemption areas are described, the regulations state that a monkfish-only DAS may only be used in the exemption areas. Alternative 2 indicates that the mesh size increase is applicable to the use of monkfish DAS. This would help clarify the intent and keep regulations consistent. The way the regulations are written, the alternative needs to specify a mesh size increase only in the GOM/GB dogfish and monkfish area (see below), though it effectively would apply to the SNE monkfish and skate area too.

1. For the GOM/GB Dogfish and Monkfish Gillnet Exemption Area, there is a separate regulation that vessels targeting dogfish may use a 6.5" gillnet (catch of other species must be under 10%). It would be straightforward to revise the 10" gillnet mesh requirement in this area given the

minimum mesh size of 10” is defined separately from dogfish (i.e., any changes to the minimum mesh size for vessels targeting monkfish would not affect the dogfish fishery).

2. For the SNE Monkfish and Skate Gillnet Exemption Area, the regulations state that all gillnets must have a minimum size of 10”. If the minimum mesh size is changed for this exemption area, it would apply to all the trips that are authorized under this exemption area. That includes monkfish-only DAS trips and trips with a Letter of Authorization to fish for skate bait. The intent of Alternative 2 is to only constrain the monkfish-only DAS trips, thus the minimum mesh size in this area would not change. Monkfish DAS gillnet vessels fishing in this area would need to conform to the minimum mesh size for monkfish DAS, so effectively, Alternative 2 would apply to this area.

4.4 Alternatives Considered but Rejected

4.4.1 Increase DAS Overage Adjustment

The NEFMC considered developing an alternative that would grant vessels more flexibility to land additional DAS’ worth of monkfish on a trip in either management area. The DAS overage adjustment would have been revised to allow an extra DAS to be used on each trip, regardless of the trip length. For example, for trips less than or equal to 24 hours long, vessels could land up to three possession limits’ worth of monkfish (3 DAS) and be charged up to 2.007 DAS. For trips over 24 hours but up to 48 hours long, vessels can land up to four possession limits worth of monkfish (4 DAS) and be charged up to 3.007 DAS (72 hours and 1 minute), etc. The NEFMC decided to not increase the DAS overage adjustment as part of FY 2023-2025 specifications given the expected decrease in ABCs for both management areas and the need for a reduction in fishing effort.

The NEFMC was interested in this measure to help the fishery be more flexible and reduce monkfish discards by turning more monkfish discards into landings while keeping the overage provision consistent in the NFMA and SFMA and between vessels regardless of whether they use VMS or IVR. Revising the DAS overage provision would have effectively allowed for a similar flexibility that vessels using IVR lost when the FY 2020 specifications were implemented. At that time, NOAA Fisheries clarified the trip declaration requirements such that vessels using IVR had to call in a trip no more than one hour ahead of leaving port (no timeframe was specified prior). This change made the call-in timeframe for vessels using IVR match that of vessels using the Vessel Monitoring System, so that declaration requirements were consistent across the monkfish fishery. Previously, a vessel using IVR could declare a trip and let the clock run for several days before sailing (i.e., “preloading DAS”) and land the corresponding trip limit, even though they were at sea for a shorter period. Starting in FY 2020, vessels using IVR could, for example, no longer land three DAS’ worth of monkfish on a trip that was over 24 hours.

4.4.2 Increase Possession Limits in the SFMA

The NEFMC considered developing alternatives that would increase possession limits in the SFMA by 25% for vessels fishing with limited access permits and by 25% for vessels fishing with incidental permits in the SFMA when not under a DAS program and in the exemption areas where a 50 lb/day, not to exceed 150 lb per trip limit is in place in the SFMA (including those that also hold permits in other fisheries/special cases). The incidental possession limits would have remained unchanged for vessels fishing on a Northeast multispecies DAS, a scallop DAS, and in the Sea Scallop Access Area Program and for vessels using a skate bait Letter of Authorization in the SFMA. The change in incidental possession limits would not have modified the 5% (converted to tail weight) of the total weight of fish on board provision. The NEFMC decided to not increase possession limits as part of FY 2023-2025 specifications given the expected decrease in ABCs for both management areas and the need for a reduction in fishing effort. The NEFMC had been interested in increasing possession limits to help the fishery be more flexible and reduce monkfish discards by turning more monkfish discards into landings.

4.4.3 Vessel Monitoring System Requirement

The NEFMC considered developing alternatives in this action for requiring use of the Vessel Monitoring System (VMS) in the federal monkfish fishery. The Council considered some of the costs and benefits of requiring VMS and decided to not develop a problem statement for identifying the issues that VMS would help address and to not develop alternatives. Use of VMS is required for most segments of the monkfish fishery because of the requirements related to other permits (e.g., limited access scallop and groundfish permits) that are associated with monkfish permits. It is likely that vessels with monkfish-only permits (limited access permit category A or B), and a subset of permit category C and D vessels would be most impacted by this measure. Most of the monkfish vessels without a VMS requirement are under 50 ft in length, fish in the SFMA, and use gillnets. The Council was concerned about the acquisition and transmission costs of VMS units and considered the electronic vessel tracking device that was recently approved by the Atlantic States Marine Fisheries Commission for federally permitted lobster and Jonah crab vessels. The Council was interested in having additional positional data for vessels but noted that the timeframe for developing alternatives would extend beyond what is appropriate for a specifications action. The Council may take up this topic in a future action.

4.4.4 Measures to Reduce Discards in SFMA

The NEFMC considered developing alternatives in this action for reducing discards in the SFMA. The Council considered the magnitude of monkfish discards in the SFMA, potential reasons for discards, current monkfish fishery discard requirements, and potential approaches to reduce discards in this area. The Committee had identified that the goals for such measures would be to reduce unnecessary waste and mortality of monkfish, and to turn discards into landings where possible for economic reasons, including for fisheries that do not target monkfish. The Council decided to not develop other alternatives for this action beyond those described in Section 4.0 which are designed to help reduce discards.

5.0 AFFECTED ENVIRONMENT

The Affected Environment is described in this action based on valued ecosystem components (VECs), including target species, nontarget 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.

5.1 TARGET SPECIES (MONKFISH)

Monkfish Distribution and Life History. Monkfish (*Lophius americanus*), also called goosefish, occur in the Northwest Atlantic Ocean from the Grand Banks and northern Gulf of St. Lawrence south to Cape Hatteras, North Carolina (Collette & Klein-MacPhee 2002). Data from resource surveys spanning the period 1948-2007 suggest that seasonal onshore-offshore migrations occur (from inshore areas in autumn to depths of at least 900 m in mid-spring) and appear to be related to spawning and possibly food availability (Richards *et al.* 2008). Stock structure is not well understood, but two assessment and management areas for monkfish, northern and southern, were defined in 1999 through the original Fishery Management Plan based on patterns of recruitment and growth and differences in how the fisheries are prosecuted (NEFSC 2020b).

Monkfish Stock Status. The status of monkfish is unknown, according to the conclusions of the 2022 monkfish management track assessment, which are consistent with the conclusions of the assessments in 2016 and 2019. Analytical assessments have not been used for monkfish since 2013, and index-based approaches have been used since to determine catch advice. A brief history of recent assessments is provided.

The monkfish stock assessment in 2010 (SARC 50) was an analytical assessment that used the SCALE model (had been in use since 2007), concluding that monkfish was not overfished and overfishing was not occurring but recognized significant uncertainty in this determination. The 2013 operational assessment also used the SCALE model and reached the same conclusion.

The 2016 operational assessment, that informed FY 2017-2019 specifications, did not update the SCALE model because its use was invalidated by age validation research (Richards 2016). This assessment concluded that many of the biological reference points were no longer relevant due to invalidation of the growth model (e.g., no estimation of absolute biomass, F_{max} could not be recalculated), and thus were not updated. Stock status was determined to be unknown. A strong 2015-year class was identified in both the survey and the discard data. The assessment review panel concluded that using a survey index-based method for developing catch advice was appropriate. A method now called the "Ismooth" approach was used that set catch advice based on the recent trend in NEFSC trawl survey indices. This method calculates the proportional rate of change in a smoothed average of the fall and spring NEFSC surveys over the most recent three years. This rate is the slope of the regression trend from the last three years, which is then multiplied by the most recent three years average of fishery catch to determine catch advice. The multipliers were 1.02 in the NFMA and 0.87 in the SFMA (Table 6):

*Equation 1: catch advice = Trawl survey multiplier * latest 3-year average catch = ABC*

The 2019 assessment continued use of the Ismooth method due to ongoing uncertainties. The assessment continued to see a strong recruitment event from 2015 that led to an increase in biomass in 2016-2018, though abundance declined in 2019 as recruitment returned to average levels (NEFSC 2020b). The Ismooth multipliers were 1.2 in the NFMA and 1.0 in the SFMA.

Table 7. NEFSC trawl survey multipliers for monkfish from the last two assessments.

Assessment year	NEFSC trawl survey multiplier	
	NFMA	SFMA
2016	1.02	0.87
2019	1.2	1.0
2022	0.829	0.646
Source: Richards (2016); NEFSC (2020b); Deroba (2022).		

The 2022 management track assessment again used the Ismooth method to develop catch advice. Like the 2016 and 2019 assessments, this assessment concluded that the status of monkfish remains unknown. The multipliers were 0.829 for NFMA and 0.646 for SFMA, tracking the decline in monkfish biomass in the NEFSC trawl surveys. The fishery catch time series was updated, including a new discard mortality rate for scallop dredges (reduced to 64% from 100%) and various data corrections (Deroba 2022).

The October 19, 2022 Monkfish PDT memo to the SSC on OFLs and ABCs details how these prior assessments were used in setting specifications.

5.2 Non-target Species

The monkfish fishery is closely associated with the catch of several species managed by other FMPs, specifically the groundfish, skate, spiny dogfish, and scallop fisheries. Particularly in the NFMA, monkfish can be targeted or caught as incidental bycatch during trips in which groundfish are also caught, depending on the focus of a trip. Monkfish are caught as bycatch in the scallop fishery, particularly in the SFMA. Further, skates and spiny dogfish are often caught when targeting monkfish in both areas, but particularly in the SFMA.

5.2.1 Northeast Multispecies

Life History and Population. The Northeast Multispecies FMP manages twenty groundfish stocks (Table 7) such as gadids and flounders, and stock status varies by stock (NEFMC 2022a).

In U.S. waters, cod are currently managed as two stocks: Gulf of Maine (GOM) and Georges Bank (GB). Based on the updated assessment, the GOM cod stock is overfished and overfishing is occurring for the M=0.2 model and overfished and overfishing is not occurring for the M-ramp model. Georges Bank cod, Gadus morhua, is currently the most southerly cod stock in the world; based on the 2021 assessment, overfishing status is considered unknown and stock status remains overfished based on a qualitative evaluation of poor stock condition (NEFSC 2021b, in prep). Recent work by the Atlantic Cod Stock Structure Working Group proposes a new stock structure with five biological stocks in U.S. waters: Georges Bank, Southern New England, Western Gulf of Maine and Cape Cod winter spawners, Western Gulf of Maine spring spawners, and Eastern Gulf of Maine (McBride and Smedbol). The Western Gulf of Maine spring spawners overlaps spatially with the Western Gulf of Maine and Cape Cod winter spawner stock. The Council is working on a transition plan for management of the current two stocks to up to five stocks and the research track working group is currently working to determine how these stocks will be assessed, tentatively scheduled for 2023.

Six distinct haddock stocks have been identified, and the two which occur in U.S. waters are associated with Georges Bank and the Gulf of Maine. As of the 2019 groundfish operational assessments, the GOM stock is not overfished and overfishing is not occurring, with 2018 SSB estimated to be at 82,763 mt, which is 1,035% of the biomass target (NEFSC 2020b). The GB haddock stock has produced several exceptionally strong year classes in the last 15 years, leading to record high SSB in recent years.

Off the U.S. coast, American plaice are managed as a single stock in the Gulf of Maine and Georges Bank regions. In the Gulf of Maine and Georges Bank, the American plaice is not overfished and overfishing is not occurring (NEFSC 2020b). The stock was in a rebuilding plan, but based on the 2019 assessment, the stock is now considered rebuilt (NEFMC 2020b).

Witch flounder is managed as a unit stock. Because a stock assessment model framework is lacking, no historical estimates of biomass, fishing mortality rate, or recruitment can be calculated. NMFS determined that the stock status for witch flounder will remain overfished, with overfishing unknown, consistent with the 2016 benchmark assessment for this stock.

Winter flounder is managed and assessed in U.S. waters as three stocks: Gulf of Maine, southern New England/Mid-Atlantic, and Georges Bank. Based on the recommendation of the 2020 Peer Review Panel, overfishing is not occurring for GOM winter flounder, but the overfished status is unknown; GB winter flounder is overfished and overfishing is not occurring; SNE/MA winter flounder is overfished, but overfishing is not occurring (NEFSC 2020).

NMFS manages three yellowtail stocks off the U.S. coast including the CC/GOM, GB, and SNE/MA stocks. Based on the 2019 operational assessment, the CC/GOM yellowtail flounder stock is not overfished and overfishing is not occurring. GB yellowtail flounder status determination relative to reference points is not possible because reference points cannot be defined; 2020 stock assessment results continue to indicate low stock biomass and poor productivity. Based on the 2019 operational assessment, the SNE/MA yellowtail flounder stock is overfished and overfishing is not occurring (NEFSC 2020b).

NMFS manages Acadian redfish inhabiting the U.S. waters of the Gulf of Maine and deeper portions of Georges Bank and the Great South Channel as a unit stock. Based on the recommendation of the 2020 Peer Review Panel, redfish is not overfished and overfishing is not occurring. Redfish is rebuilt.

Pollock are assessed as a single unit, though there is considerable movement of pollock between the Scotian Shelf, Georges Bank, and the Gulf of Maine. Based on the 2019 operational assessment, the pollock stock is not overfished and overfishing is not occurring.

White hake is common on muddy bottom throughout the Gulf of Maine. Based on the 2019 operational assessment, the white hake stock is overfished and overfishing is not occurring.

Windowpane flounders are assessed and managed as two stocks: Gulf of Maine-Georges Bank (GOM/GB or northern) and Southern New England-Mid-Atlantic Bight (SNE/MA or southern) due to differences in growth rates, size at maturity, and relative abundance trends. Based on the recommendations of the 2020 Peer Review Panel, northern windowpane flounder stock status is unknown; Southern windowpane flounder is not overfished and overfishing is not occurring (status has not changed from the 2018 assessment) (NEFSC 2020b).

In US waters, ocean pout are assessed and managed as a unit stock from the Gulf of Maine to Delaware. Based on the 2020 assessment, ocean pout is overfished but overfishing is not occurring. The stock is not rebuilding as expected, despite low catch. Discards comprise most of the catch since the no possession regulation was implemented in May 2010.

Atlantic halibut is the largest species of flatfish and is distributed from Labrador to southern New England. Halibut is assessed using a data-poor method (First Second Derivative model), and projections are not possible using this method. Biological reference points are unknown for halibut, but the stock is considered overfished. Halibut is currently in a rebuilding plan with an end date of 2056.

Atlantic wolffish is a benthic fish distributed off Greenland to Cape Cod and sometimes in southern New England and New Jersey waters. Based on the recommendations of the 2020 Peer Review Panel, wolffish is overfished but overfishing is not occurring. Wolffish is in a rebuilding plan, but the end date is not defined.

Table 8. Status of groundfish stocks, determined by NOAA Fisheries.

Stock	Status	
	Overfishing?	Overfished?
Georges Bank Cod	Yes	Yes
Gulf of Maine Cod	Yes	Yes
Georges Bank Haddock	No	No
Gulf of Maine Haddock	No	No
Georges Bank Yellowtail Flounder	Yes	Yes
Southern New England/Mid-Atlantic Yellowtail Flounder	No	Yes
Cape Cod/Gulf of Maine Yellowtail Flounder	No	No
American Plaice	No	No
Witch Flounder	Unknown	Yes
Georges Bank Winter Flounder	No	Yes
Gulf of Maine Winter Flounder	No	Unknown
Southern New England/Mid-Atlantic Winter Flounder	No	Yes
Acadian Redfish	No	No
White Hake	No	Yes
Pollock	No	No
Northern Windowpane Flounder	No	Yes
Southern Windowpane Flounder	No	No
Ocean Pout	No	Yes
Atlantic Halibut	No	Yes
Atlantic Wolffish	No	Yes

Management and Fishery. Northeast multispecies are managed under a dual management system which breaks the fishery into two components: sectors and the common pool. For stocks that permit fishing, each sector is allotted a share of each stock's ACL that consists of the sum of individual sector member's potential sector contribution based on their annual catch entitlements. Sector allocations are strictly controlled as hard total allowable catch limits and retention is required for all stocks managed under an ACL. Overages are subject to accountability measures including payback from the sector's allocation for the following year. Common pool vessels are allocated days at sea (DAS) and their effort further is controlled by a variety of measures including trip limits, closed areas, minimum fish size and gear restrictions varying between stocks. Only a very small portion of the ACL is allotted to the common pool. Framework Adjustment 63 to the NE Multispecies FMP has more detail on the stock status and control of fishing effort (NEFMC 2022a).

5.2.2 Skates

Life History and Population. The Northeast Skate Complex Fishery Management Plan (Skate FMP) specifies the management measures for seven skate species (barndoor, clearnose, little, rosette, smooth, thorny, and winter skate) off the New England and Mid-Atlantic coasts. Specifications are set for skates as a complex (e.g., one ACL) every two years, which include possession limits for the skate wing and bait fisheries. These fisheries have different seasonal management structures and are subject to effort controls and accountability measures. Overfishing is not occurring on any of these species, and only one species, thorny skate, is overfished.

Management and Fishery. A detailed description of the commercial skate fishery and fishing communities may be found in Framework Adjustment 8 (NEFMC 2020). The bait fishery is primarily whole little and small-winter skates, and the wing fishery is primarily large-winter and barndoor skates. There are three primary skate ports: Chatham and New Bedford, Massachusetts and Point Judith, Rhode

Island; and 11 secondary ports from Massachusetts to New Jersey. The number of vessels landing skate has declined since FY 2011 (567) to 322 in FY 2020. Skate revenue has fluctuated between $5.2-$9.4M annually from FY 2010 to 2020, largely due to changes in wing revenue. Within the directed monkfish gillnet fishery, there is also a seasonal gillnet incidental skate fishery, in which mostly winter skates are sold for lobster bait and as cut wings for processing.

5.2.3 Dogfish

Life History and Population. Spiny dogfish, *Squalus acanthias*, occurs in the northwest Atlantic from Labrador to Florida. Spiny dogfish is a unit stock in the northwest Atlantic. In summer, dogfish migrate northward to the Gulf of Maine-Georges Bank region and into Canadian waters. They return southward in autumn and winter. Recent research has suggested that migratory patterns may be more complex (Carlson *et al.* 2014). Spiny dogfish tend to school by size and, when mature, by sex. The species bears live young, with a long gestation period and produce 2 - 15 pups (average of 6). Size at maturity for females is ~31 in (80 cm) but can vary from 31 - 33 in (78 - 85 cm) depending on the abundance of females (NEFSC 2013).

Management and Fishery. The NEFMC and MAFMC jointly manage spiny dogfish FMP for federal waters and the Atlantic States Marine Fisheries Commission (ASMFC) has a state waters plan. Spawning stock biomass of spiny dogfish declined rapidly in response to a directed fishery during the 1990's. NFMS initially implemented management measures adopted by the Councils for spiny dogfish in 2000. These measures were effective in reducing landings and fishing mortality. As of the 2018 assessment update, the stock was not overfished, and overfishing was not occurring, but the population declined to 67% of the target (Sosebee & Rago 2018) so quotas were lowered from 2018 to 2019 but then increased somewhat in 2020 and 2021. The spiny dogfish fishery is managed with an ACL, commercial quota, and possession limits (currently 7,500 lb per trip). A research track assessment is being peer reviewed in December 2022.

5.2.4 Atlantic Sea Scallops

Life History and Population. Sea scallops, *Placopecten magellanicus*, are distributed in the northwest Atlantic Ocean from Newfoundland to North Carolina, mainly on sand and gravel sediments where bottom temperatures remain below 20º C (68º F). North of Cape Cod, concentrations generally occur in shallow water <40 m (22 fathoms) deep. South of Cape Cod and on Georges Bank, sea scallops typically occur at depths of 25 - 200 m (14 - 110 fathoms), with commercial concentrations generally 35 - 100 m (19 - 55 fathoms). Sea scallops are filter feeders, feeding primarily on phytoplankton, but also on microzooplankton and detritus (Hart & Chute 2004). Sea scallops grow rapidly during the first several years of life. Between ages 3 and 5, they commonly increase 50 - 80% in shell height and quadruple their meat weight. Sea scallops can live more than 20 years. They usually become sexually mature at age 2, but individuals younger than age 4 probably contribute little to total egg production. Sexes are separate and fertilization is external. Spawning usually occurs in late summer and early autumn; spring spawning may also occur, especially in the Mid-Atlantic Bight. Sea scallops are highly fecund; a single large female can release hundreds of millions of eggs annually. Larvae remain in the water column for four to seven weeks before settling to the bottom. Sea scallops attain commercial size at about four to five years old, though historically, three-year-olds were often exploited. Sea scallops have a somewhat uncommon combination of life-history attributes: low mobility, rapid growth, and low natural mortality (NEFSC 2011).

Management and Fishery. The commercial fishery for sea scallops is conducted year-round, primarily using New Bedford style and turtle deflector scallop dredges. A small percentage of the fishery employs otter trawls, mostly in the Mid-Atlantic. The principal U.S. commercial fisheries are in the Mid-Atlantic (from Virginia to Long Island, New York) and on Georges Bank and neighboring areas, such as the Great South Channel and Nantucket Shoals. There is also a small, primarily inshore fishery for sea scallops in the Gulf of Maine. The NEFMC established the Scallop FMP in 1982. The scallop resource was last assessed through a management track assessment in 2020, and it was not overfished, and overfishing was not occurring (NEFSC 2020a). Vessels targeting scallops catch monkfish and land them if the price is high enough.

5.3 Protected Resources

5.3.1 Protected Species Present in the Area

Numerous protected species occur in the affected environment of the Monkfish FMP (Table 8) and have the potential to be impacted by the proposed action (i.e., there have been observed/documented interactions in the fisheries or with gear types like those used in the fisheries (bottom trawl, gillnet gear)). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Cusk are a NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (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 and the following sections; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. More information on cusk is at: https://www.fisheries.noaa.gov/species/cusk.

Table 9. Species Protected Under the ESA and/or MMPA that may occur in the Affected Environment of the monkfish fishery.

Species	Status	Potentially impacted by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (*Megaptera novaeangliae)*	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter macrocephalus	***Endangered***	***Yes***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[2]	Protected (MMPA)	Yes
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[3]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes

Species	Status	Potentially impacted by this action?
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Giant manta ray (*Manta birostris)*	Threatened	Yes
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
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)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
Critical Habitat		
North Atlantic Right Whale	ESA Designated	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA Designated	No

Note: Marine mammal species italicized and in bold are considered MMPA strategic stocks, a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Sect. 3, MMPA of 1972).
[2] 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*.
[3] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins. See NMFS Marine Mammal Stock Assessment Reports (SARs) for the Atlantic Region for further details.

5.3.2 Species and Critical Habitat Not Likely to be Impacted by the Proposed Action

Based on available information, it has been determined that this action is not likely to impact multiple ESA listed and/or MMPA protected species or any designated critical habitat (Table 5). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or based on the most recent ten years of observer, stranding, and/or marine mammal serious injury and mortality reports, there have been no observed or documented interactions between the species and the primary gear type (i.e., bottom trawl and gillnet) used to prosecute the monkfish fishery (Greater Atlantic Region (GAR) Marine Animal Incident Database, unpublished data; NMFS Marine Mammal Stock Assessment Reports (SARs) for the Atlantic Region; NMFS NEFSC observer/sea sampling database, unpublished data; NMFS NEFSC marine mammal (small cetacean, pinniped, baleen whale) serious injury and mortality Reference Documents or Technical

Memoranda; MMPA List of Fisheries (LOF); NMFS 2021a).[2] In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of critical habitat identified in Table 5 and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2021a).

5.3.3 Species Potentially Impacted by the Proposed Action

Table lists protected species of sea turtle, marine mammal, and fish species present in the affected environment of the monkfish fishery, and that may also be impacted by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially impacted by the action, NMFS Marine Mammal SARs for the Atlantic Region, MMPA List of Fisheries (LOF), NMFS (2021b) , NMFS NEFSC observer/sea sampling database (unpublished data), and NMFS NEFSC marine mammal (small cetacean, pinniped, baleen whale) serious injury and mortality Reference Documents or Technical Memoranda were referenced.

To help identify ESA listed species potentially impacted by the action, we queried the NMFS NEFSC observer/sea sampling (2010-2019), Sea Turtle Disentanglement Network (2010-2019), and the GAR Marine Animal Incident (2010-2019) databases for interactions, and reviewed the May 27, 2021, Biological Opinion (Opinion)[3] issued by NMFS. The 2021 Opinion considered the effects of the NMFS' authorization of ten fishery management plans (FMP),[4] including the Monkfish FMP on ESA-listed species and designated critical habitat. The Opinion determined that the authorization of ten FMPs may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; GOM DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these 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) data and observed records of protected species interaction with particular fishing gear types, to understand the potential risk of an interaction. Information on species occurrence in the affected environment of the monkfish fishery and on protected species interactions with specific fishery gear is provided below.

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[2] For marine mammals protected under the MMPA, the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports are from 2010-2019. For ESA listed species, information on observer or documented interactions with fishing gear is from 2010-2019.

[3] NMFS' May 27, 2021, Biological Opinion on the 10 FMPs is at: https://www.fisheries.noaa.gov/resource/document/biological-opinion-10-fishery-management-plans

[4] The ten FMPs considered in the May 27, 2021, Biological Opinion include: American Lobster, Atlantic Bluefish, Atlantic Deep-Sea Red Crab, Mackerel/Squid/Butterfish, Monkfish, Northeast Multispecies, Northeast Skate Complex, Spiny Dogfish, Summer Flounder/Scup/Black Sea Bass, and Jonah Crab.

5.3.3.1 Sea Turtles

Below is a summary of the status and trends, and the occurrence and distribution of sea turtles in the affected environment of the monkfish fishery. More information on the range-wide status of affected sea turtles species, and their life history is in several published documents, including NMFS (2021a); sea turtle status reviews and biological reports (Conant *et al.* 2009; Hirth 1997; NMFS & USFWS 1995; 2007a; b; 2013; TEWG 1998; 2000; 2007; 2009), and recovery plans for the loggerhead (Northwest Atlantic DPS) sea turtle (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).

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 5). 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 2021a).

For Kemp's ridley sea turtles, from 1980-, the number of nests at three primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) increased 15% 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 (Caillouet *et al.* 2018; NMFS & USFWS 2015). 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 (NMFS 2021a). Given this and continued anthropogenic threats to the species, according to NMFS (2021a), 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 (2021a), 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 (Northwest 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 (2021a), the species' resilience to additional perturbation both within the Northwest Atlantic and worldwide is low.

Occurrence and Distribution.

Hard-shelled sea turtles. 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). 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 2002; Epperly *et al.* 1995a; Epperly *et al.* 1995b; Epperly *et al.* 1995c; Griffin *et al.*

2013; Morreale & Standora 2005; NMFS & USFWS 2020), 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 (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although it should be noted that hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly *et al.* 1995a; Griffin *et al.* 2013; Hawkes *et al.* 2011; Shoop & Kenney 1992).

Leatherback sea turtles. Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (Dodge *et al.* 2014; Eckert *et al.* 2006; James *et al.* 2005; Murphy *et al.* 2006; NMFS & USFWS 2013). Leatherback sea turtles 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). They are found in more northern waters (i.e., GOM) 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).

5.3.3.2 Large Whales

Status and Trends. Six large whale species have the potential to be impacted by the proposed action: humpback, North Atlantic right, fin, sei, sperm, and minke whales (Table 9). Large whale stock assessment reports covering the period of 2010-2019, indicate a decreasing trend for the North Atlantic right whale population; however, for fin, humpback, minke, sperm, and sei whales, it is unknown what the population trajectory is as a trend analysis has not been conducted. The NMFS Marine Mammal SARs for the Atlantic Region has more information on the status of humpback, North Atlantic right, fin, sei, sperm, and minke whales.

Occurrence and Distribution. As in Table 9, North Atlantic right, humpback, fin, sei, sperm, and minke whales occur in the Northwest Atlantic Ocean. As large whales may be present in these waters throughout the year, the monkfish fishery and large whales are likely to co-occur in the affected area. To further assist in understanding how the monkfish fishery overlaps in time and space with the occurrence of large whales, Table 11 has an overview of species occurrence and distribution in the affected environment of the fishery. More information on North Atlantic right, humpback, fin, sei, sperm, and minke whales is in: NMFS Marine Mammal SARs for the Atlantic Region.

Table 10. Large whale occurrence, distribution, and habitat use in the affected environment of the monkfish fishery.

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
North Atlantic Right Whale	● Predominantly occupy waters of the continental shelf, but based on passive acoustic and telemetry data, are also known to make lengthy excursions into deep waters off the shelf. ● Visual and acoustic data demonstrate broad scale, year-round presence along the U.S. eastern seaboard (e.g., GOM, New Jersey, and Virginia). ● Surveys have demonstrated the existence of several areas where North Atlantic right whales congregate seasonally, including Cape Cod Bay; Massachusetts Bay; and the continental shelf south of New England. Although whales can be found consistently in particular locations throughout their range, there is a high inter-annual variability in right whale use of some habitats. Since 2010, acoustic and visual surveys indicate a shift in habitat use patterns, including: > Fewer individuals are detected in the Great South Channel; > increase in the number of individuals using Cape Cod Bay (i.e., during the expected late winter and early spring foraging period and during the 'off season' period of summer and fall); > apparent abandonment of central GOM in the winter; and, > Large increase in the numbers of whales detected in a region south of Martha's Vineyard and Nantucket Islands (i.e., during the expected late winter and early spring foraging period and during the 'off season' period of summer and fall). > Passive acoustic monitoring suggests a shift to a year-round presence in the Mid-Atlantic, including year-round detections in the New York Bight with the highest presence between late February and mid-May in the shelf zone and nearshore habitat).
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB) = Foraging Grounds (~March- November); however, acoustic detections of humpbacks indicate year-round presence in New England waters, including the waters of Stellwagen Bank. • Mid-Atlantic waters: Increasing evidence that mid-Atlantic areas are becoming an important habitat for juvenile humpback whales. • Since 2011, increased sightings of humpback whales in the New York-New Jersey Harbor Estuary, in waters off Long Island, and along the shelf break east of New York and New Jersey. • Increasing visual and acoustic evidence of whales remaining in mid- and high-latitudes throughout the winter (e.g., Mid- Atlantic: waters near Chesapeake and Delaware Bays, peak presence about January through March; Massachusetts Bay: peak presence about March-May and September-December).
Fin	• Distributed throughout all continental shelf waters of the GOM to Mid-Atlantic; • Recent sighting data show evidence that, while densities vary seasonally, fin whales are present in every season throughout most of the EEZ north of 30°N. • New England waters (GOM and GB) = Major Foraging Ground
Sei	• Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks.; however incursions into shallower, shelf waters do occur (e.g., Stellwagen Bank, Great South Channel, waters south of Nantucket, Georges Bank). • Spring through summer, sightings concentrated along the northern, eastern (into Northeast Channel) and southwestern (in the area of Hydrographer Canyon) edge of Georges Bank, and south of Nantucket, MA. • Recent acoustic detections peaked in northern latitudes in the summer, indicating feeding grounds ranging from Southern New England through the Scotian Shelf.

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
	• Persistent year-round detections in Southern New England and the New York Bight indicate this area to be an important region for sei whales. • The wintering habitat remains largely unknown. Passive acoustic monitoring conducted in 2015-2016 off Georges Bank detected sei whales calls from late fall through the winter along the southern Georges Bank region (off Heezen and Oceanographer Canyons).
Sperm	• Distributed on the continental shelf edge, continental slope, and into mid-ocean regions. • Seasonal Occurrence in the U.S. EEZ: >**Winter**: concentrated east and northeast of Cape Hatteras; >**Spring**: center of distribution shifts northward to east of Delaware and Virginia, and is widespread throughout the central portion of the mid-Atlantic bight and the southern portion of Georges Bank; >**Summer**: similar distribution to spring, but also includes the area east and north of Georges Bank and into the Northeast Channel region, and the continental shelf (inshore of the 100-m isobath) south of New England; and, >**Fall**: occur in high levels south of New England, on the continental shelf. Also occur along continental shelf edge in the mid-Atlantic bight.
Minke	• Widely distributed within the U.S. EEZ. • Spring to Fall: widespread (acoustic) occurrence on the continental shelf; most abundant in New England waters during this period of time. • September to April: high (acoustic) occurrence in deep-ocean waters.
Note: SNE=Southern New England; GOM=Gulf of Maine; GB=Georges Bank *Sources:* Baumgartner et al. (2011; 2007); Baumgartner and Mate (2005); Bort et al. (2015); Brown et al. (Brown *et al.* 2018; 2002); CETAP (1982); Charif et al. (2020); Cholewiak et al. (2018); Clapham et al. (1993); Clark and Clapham (2004); Cole et al. (2013); Davis et al. (2017; 2020); Ganley et al. (2019); Good (2008); Hain et al. (1992); Hamilton and Mayo (1990); Hayes et al. (2017; 2018; 2019; 2020; 2021; 2022); Kenney et al. (1986; 1995); Khan et al. (2010; 2011; 2012; 2009); Kraus et al. (2016); Leiter et al. (2017); Mate et al. (1997); Mayo et al. (2018); McLellan et al. (2004); Moore et al. (2021); Morano et al. (2012); Muirhead et al. (2018); Murray et al. (2013); NMFS (1991; 2005; 2010; 2011; 2021a; b) 2012; 2015; NOAA (2008); Pace and Merrick (2008); Palka et al. (2017); Palka (2020)2020; Payne et al. (1984; 1990); Pendleton et al. (2009); Record et al. (2019); Risch et al. (2013); Robbins (2007); Roberts et al. (2016); Salisbury et al. (2016); Schevill et al. (1986); Stanistreet et al. (2018); Stone et al. (2017); Swingle et al. (1993); Vu et al. (2012); Watkins and Schevill (1982); Whitt et al. (2013); Winn et al. (1986); 81 FR 4837 (January 27, 2016); 86 FR 51970 (September 17, 2021).	

5.3.3.3 Small Cetaceans

Status and Trends. Risso's, white-sided, short beaked common, and bottlenose dolphins (Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal stocks); long and short –finned pilot whales; and harbor porpoise are identified as having the potential to be impacted by the proposed action (Table 10). The latest stock assessment (Hayes *et al.* 2021) indicates that as a trend analysis has not been conducted for Risso's, white-sided, short-beaked common dolphins; long-finned pilot whales; or harbor porpoise, the population trajectory for these species is unknown. For short-finned pilot whales a generalized linear model indicated no significant trend in the abundance estimates (Hayes *et al.* 2022). For the Western North Atlantic Offshore stock, review of the most recent information on the stock shows no statistically significant trend in population size for this species; however, the high level of uncertainty in the estimates limits the ability to detect a statistically significant trend. Regarding the Northern and Southern Migratory Coastal stocks (both considered a strategic stock under the MMPA), the most recent analysis of trends in abundance suggests a probable decline in stock size between 2010–2011 and 2016, concurrent with a large UME in the area; however, there is limited power to evaluate trends given uncertainty in stock distribution, lack of precision in abundance estimates, and a limited number of surveys (Hayes *et al.* 2021).

Occurrence and Distribution. Atlantic white sided dolphins, short and long finned pilot whales, Risso's dolphins, short beaked common dolphins, harbor porpoise, and several stocks of bottlenose dolphins are found throughout the year in the Northwest Atlantic Ocean (see NMFS Marine Mammal SARs for the Atlantic Region). Within this range, however, there are seasonal shifts in species distribution and abundance. To further assist in understanding how the monkfish fishery overlaps in time and space with the occurrence of small cetaceans, Table 10 gives an overview of species occurrence and distribution in the affected environment of the fishery. More information on small cetacean occurrence and distribution in the Northwest Atlantic is in the NMFS Marine Mammal SARs for the Atlantic Region.

Table 11. Small cetacean occurrence and distribution in the affected environment of the monkfish fishery.

Species	Occurrence ad Distribution in the Affected Environment
Atlantic White Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 m) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM; however, most common in continental shelf waters from Hudson Canyon (~39°N) to GB, and into the GOM. • **January-May**: low densities found from GB to Jeffreys Ledge. • **June-September**: Large densities found from GB, through the GOM. • **October-December**: intermediate densities found from southern GB to southern GOM. • South of GB (SNE and Mid-Atlantic), particularly around Hudson Canyon, low densities found year-round, • Virginia (VA) and North Carolina (NC) waters represent southern extent of species range during winter months.
Short Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 m isobaths) of the Mid-Atlantic, SNE, and GB (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia/South Carolina border. • **January-May**: occur from waters off Cape Hatteras, NC, to GB (35° to 42°N). • **Mid-summer-autumn**: Occur in the GOM and on GB; *Peak abundance* found on GB in the autumn.
Risso's Dolphin	• **Spring through fall**: Distributed along the continental shelf edge from Cape Hatteras, NC, to GB. • **Winter**: distributed in the Mid-Atlantic Bight, extending into oceanic waters. • Rarely seen in the GOM; primarily a Mid-Atlantic continental shelf edge species (can be found year-round).
Harbor Porpoise	• Distributed throughout the continental shelf of the Mid-Atlantic, SNE, GB, and GOM. • **July-September**: Concentrated in the northern GOM (waters <150 m); low numbers can be found on GB. • **October-December**: widely dispersed in waters from New Jersey (NJ) to Maine (ME); seen from the coastline to deep waters (>1,800 m). • **January-March**: intermediate densities in waters off NJ to NC; low densities found in waters off New York (NY) to GOM. • **April-June**: widely dispersed from NJ to ME; seen from the coastline to deep waters (>1,800 m). • Passive acoustic monitoring indicates regular presence from January through May offshore of Maryland.
Bottlenose Dolphin	**Western North Atlantic Offshore Stock**

Species	Occurrence ad Distribution in the Affected Environment
	• Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from GB to Florida (FL). • Depths of occurrence: ≥40 m **<u>Western North Atlantic Northern Migratory Coastal Stock</u>** • Most common in coastal waters <20 m deep. • Warm water months (e.g., July-August): distributed from the coastal waters from the shoreline to about 25-m isobaths between the mouth of the Chesapeake Bay and Long Island, NY. • Cold water months (e.g., January-March): stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border. **<u>Western North Atlantic Southern Migratory Coastal Stock</u>** • Most common in coastal waters <20 m deep. • **October-December**: appears stock occupies waters of southern NC (south of Cape Lookout) • **January-March**: appears stock moves as far south as northern FL. • **April-June**: stock moves north to waters of NC. • **July-August**: stock is presumed to occupy coastal waters north of Cape Lookout, NC, to the eastern shore of VA (as far north as Assateague).
Pilot Whales: *Short- and Long-Finned*	**<u>Short- Finned Pilot Whales</u>** • Except for area of overlap (see below), primarily occur south of 40°N (Mid-Atlantic and SNE waters); although low numbers have been found along the southern flank of GB, but no further than 41°N. • Distributed primarily near the continental shelf break of the Mid-Atlantic and SNE (i.e., off Nantucket Shoals). **<u>Long-Finned Pilot Whales</u>** • Except for area of overlap (see below), primarily occur north of 42°N. • Winter to early spring: distributed principally along the continental shelf edge off the northeastern U.S. coast. • Late spring through fall: movements and distribution shift onto GB and into the GOM and more northern waters. • Species tends to occupy areas of high relief or submerged banks. **<u>Area of Species Overlap:</u>** along the mid-Atlantic shelf break between Delaware and the southern flank of GB.
Notes: Information is representative of small cetacean occurrence in the Northwest Atlantic continental shelf waters out to 2,000 m depth. *Sources*: Hayes et al. (2017; 2018; 2019; 2020; 2022); Payne and Heinemann (1993); Payne et al. (1984); Jefferson et al. (2009).	

5.3.3.4 Pinnipeds

Status and Trends. Harbor, gray, harp and hooded seals are identified as having the potential to be impacted by the proposed action (Table 11). Based on Hayes et al. (2019; 2022), the status of the:

- Western North Atlantic harbor seal and hooded seal, relative to Optimum Sustainable Population (OSP), in the U.S. Atlantic EEZ is unknown;
- Gray seal population relative to OSP in U.S. Atlantic EEZ waters is unknown, but the stock's abundance appears to be increasing in Canadian and U.S. waters; and,

- Harp seal stock, relative to OSP, in the U.S. Atlantic EEZ is unknown, but the stock's abundance appears to have stabilized.

Occurrence and Distribution. Harbor, gray, harp, and hooded seals are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. Depending on species, they may be present year-round or seasonally in some portion of the affected environment of the monkfish fishery. Table 11 gives an overview of pinniped occurrence and distribution in the affected environment of the monkfish fishery. More information on pinniped occurrence and distribution in the Northwest Atlantic is in the NMFS Marine Mammal SARs for the Atlantic Region.

Table 12. Pinniped occurrence and distribution in the affected environment of the monkfish fishery.

Species	Occurrence and Distribution in the Affected Environment
Harbor Seal	• Year-round inhabitants of Maine; • September through late May: occur seasonally along the coasts from southern New England to Virginia.
Gray Seal	• Ranges from New Jersey to Labrador, Canada.
Harp Seal	• Winter-Spring (approx. January-May): Can occur in the U.S. Atlantic Exclusive Economic Zone. • Sightings and strandings have been increasing off the east coast of the United States from Maine to New Jersey.
Hooded Seal	• Highly migratory and can occur in waters from Maine to Florida. These appearances usually occur between January and May in New England waters, and in summer and autumn off the southeast U.S. coast and in the Caribbean.
Sources: Hayes et al. (2019, for hooded seals; 2022).	

5.3.3.5 Atlantic sturgeon

Status and Trends. As in Table 8, Atlantic sturgeon (all five DPSs) have the potential to be impacted by the proposed action. Population trends for Atlantic sturgeon are difficult to discern; however, the most recent stock assessment report concludes that Atlantic sturgeon, at both coastwide and DPS level, are depleted relative to historical levels (ASMFC 2017a; ASSRT 2007; NMFS 2021a).

Occurrence and Distribution. 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 (Altenritter *et al.* 2017; ASMFC 2017b; ASSRT 2007; Breece *et al.* 2016; Breece *et al.* 2017; Dadswell 2006; Dadswell *et al.* 1984; Dovel & Berggren 1983; Dunton *et al.* 2015; Dunton *et al.* 2010; Erickson *et al.* 2011; Hilton *et al.* 2016; Ingram *et al.* 2019; Kynard *et al.* 2000; Laney *et al.* 2007; Novak *et al.* 2017; O'Leary *et al.* 2014; Rothermel *et al.* 2020; Stein *et al.* 2004a; Waldman *et al.* 2013; Wippelhauser *et al.* 2017; Wirgin *et al.* 2015a; Wirgin *et al.* 2015b).

Based on fishery-independent and dependent surveys, and data collected from genetic, tracking, and/or tagging studies in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour; however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Altenritter *et al.* 2017; Breece *et al.* 2016; Breece *et al.* 2018; Collins & Smith 1997; Dunton *et al.* 2010; Erickson *et al.* 2011; Ingram *et al.* 2019; Novak *et al.* 2017; Rothermel *et al.* 2020; Stein *et al.* 2004a; b; Wippelhauser *et al.* 2017). Data from fishery-independent and dependent surveys, and data collected from genetic, tracking, and/or tagging studies also indicate that Atlantic sturgeon make seasonal coastal movements from marine waters to river estuaries in the spring and from river estuaries to marine waters in the fall; however, 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 (Altenritter *et al.* 2017; Dunton *et al.* 2010; Erickson *et al.* 2011;

Ingram *et al.* 2019; Novak *et al.* 2017; Rothermel *et al.* 2020; Wippelhauser 2012; Wippelhauser *et al.* 2017).

More information on the biology and range wide distribution of each DPS of Atlantic sturgeon is in 77 FR 5880 and 77 FR 5914, the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007); the ASMFC 2017 Atlantic Sturgeon Benchmark Stock Assessment and Peer Review Report (ASMFC 2017a), and NMFS (2021a).

5.3.3.6 Atlantic salmon

Status and Trends. As in Table 10, Atlantic salmon (GOM DPS) have the potential to be impacted by the proposed action. There is no population growth rate available for GOM DPS Atlantic salmon; however, the consensus is that the DPS exhibits a continuing declining trend (NMFS 2021a; NMFS & USFWS 2018; NOAA 2016).

Occurrence and Distribution. The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily the northern portion) to the coast of Greenland (Fay *et al.* 2006; NMFS & USFWS 2005; 2016). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al.* 2006; Hyvärinen *et al.* 2006; Lacroix & Knox 2005; Lacroix & McCurdy 1996; Lacroix *et al.* 2004; NMFS & USFWS 2005; 2016; Reddin 1985; Reddin & Friedland 1993; Reddin & Short 1991; Sheehan *et al.* 2012; USASAC 2004). More information on the on the biology and range wide distribution of the GOM DPS of Atlantic salmon is in NMFS and USFWS (2005; 2016); Fay et al. (2006); and NMFS (2021a).

5.3.3.7 Giant Manta Ray

Status and Trends. Giant manta rays have the potential to be impacted by the proposed action (Table 8). While there is considerable uncertainty regarding the giant manta ray's current abundance throughout its range, the best available information indicates that in areas where the species is not subject to fishing, populations may be stable (NMFS 2021a). However, in regions where giant manta rays are (or were) actively targeted or caught as bycatch populations appear to be decreasing (Miller & Klimovich 2017).

Occurrence and Distribution. Based on the giant manta ray's distribution, the species may occur in coastal, nearshore, and pelagic waters off the U.S. east coast, usually found in water temperatures between 19 and 22°C and have been observed as far north as New Jersey. Given that the species is rarely identified in the fisheries data in the Atlantic, it may be assumed that populations within the Atlantic are small and sparsely distributed (Miller & Klimovich 2017).

5.3.4 Gear Interactions and Protected Species

Protected species are at risk of interacting with various types of fishing gear, with interaction risks associated with gear type, quantity, soak or tow duration, and degree of overlap between gear and protected species. Information on observed or documented interactions between gear and protected species is available from as early as 1989 (NMFS Marine Mammal SARs for the Atlantic Region; NMFS NEFSC observer/sea sampling database, unpublished data). As the distribution and occurrence of protected species and the operation of fisheries (and, thus, risk to protected species) have changed over the last 30 years, we use the most recent 10 years of available information to best capture the current risk to protected species from fishing gear. For marine mammals protected under the MMPA, the most recent

10 years of observer, stranding, and/or marine mammal serious injury and mortality reports are from 2010-2019 (GAR Marine Animal Incident Database, unpublished data; Cole *et al.* 2013; Hayes *et al.* 2017; 2018; 2019; 2020; Hayes *et al.* 2021; Hayes *et al.* 2022; Henry *et al.* 2017; Henry *et al.* 2016; Henry *et al.* 2020; Henry *et al.* 2021; 2022; Henry *et al.* 2019; Waring *et al.* 2016). For ESA listed species, the most recent ten years of data on observed or documented interactions is available from 2010-2019 (ASMFC 2017a; Kocik *et al.* 2014; unpublished data: GAR Marine Animal Incident Database, NMFS NEFSC observer/sea sampling database, GAR Sea Turtle and Disentanglement Network, NMFS Sea Turtle Stranding and Salvage Network; NMFS 2021a) (NMFS Marine Mammal SARs for the Atlantic Region; NMFS NEFSC protected species serious injury and mortality Reference Documents or Technical Memoranda). Available information on gear interactions with a given species (or species group) is in the sections below. This is not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is on the main gear types used to prosecute the monkfish fishery (i.e., sink gillnet and bottom trawl gear).

5.3.4.1 Sea Turtles

Bottom Trawl Gear. Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso & 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 GOM, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the GOM (Murray 2008; 2015; 2020; NMFS 2021a; Warden 2011a; NMFS NEFSC observer/sea sampling database, unpublished data; 2011b). As few sea turtle interactions have been observed in the GOM, 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 (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic was 231 (CV=0.13, 95% CI=182-298); this equates to approximately 33 adult equivalents. Most recently, 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 over 50 m deep. The most estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters under 50 m deep. In each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads (Murray 2020).

Based on Murray (2020)[5], 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 2020).

[5] Murray (2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2008; 2015; Warden 2011a; b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be like 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 2013; Orphanides 2010).

Gillnet Gear. Interactions between sink gillnet gear and green, Kemp's ridley, loggerhead, and leatherback sea turtles have been observed in the GAR since 1989 (NMFS NEFSC observer/sea sampling database, unpublished data). Specifically, sea turtle interactions with gillnet gear have been observed in the GOM, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the GOM (Murray 2009a; b; 2013; 2018; NMFS 2021a; NMFS NEFSC observer/sea sampling database, unpublished data). As few sea turtle interactions have been observed in the GOM, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with sink gillnet gear in this region. As a result, the bycatch estimates and discussion below are for sink gillnet gear in the Mid-Atlantic and Georges Bank.

From 2012-2016 (the most recent five-year period that has been statistically analyzed for gillnets), Murray (2018) estimated that sink gillnet fisheries in the Mid-Atlantic and Georges Bank bycaught 705 loggerheads (CV=0.29, 95% CI over all years: 335-1116), 145 Kemp's ridleys (CV =0.43, 95% CI over all years: 44-292), 27 leatherbacks (CV =0.71, 95% CI over all years 0-68), and 112 unidentified hard-shelled turtles (CV=0.37, 95% CI over all years (64-321).[6] Of these, mortalities were estimated at 557 loggerheads, 115 Kemp's ridley, 21 leatherbacks, and 88 unidentified hard-shelled sea turtles. Total estimated loggerhead bycatch was equivalent to 19 adults. The highest bycatch rate of loggerheads occurred in the southern Mid-Atlantic stratum in large mesh gear during November to June. Though only one sea turtle was observed in this stratum, observed effort was low, leading to a high bycatch rate. Bycatch rates of all other species were lower relative to loggerheads. Highest estimated loggerhead bycatch occurred in the northern mid-Atlantic from July to October in large mesh gears due to the higher levels of commercial effort in the stratum. Mean loggerhead bycatch rates were ten times those of Kemp's ridley bycatch rates in large mesh gear in the northern Mid-Atlantic from July to October (Murray 2018). Although interactions between sink gillnet gear and green sea turtles have been observed (NEFSC observer/sea sampling database, unpublished data); green sea turtles were excluded from the bycatch rate calculations in Murray (2018) because the observed interaction occurred in waters of North Carolina, and therefore, outside the study region.

5.3.4.2 Atlantic Sturgeon

Sink gillnet and Bottom Trawl Gear. The ASMFC (2017a), Miller and Shepard (2011); NMFS (2021a), and the most recent ten years of NMFS observer data (i.e., 2010-2019; NMFS NEFSC observer/sea sampling database, unpublished data) show that there have been observed or documented interactions between Atlantic sturgeon and bottom trawl and gillnet gear in the GAR. For sink gillnets, higher levels of Atlantic sturgeon bycatch have been associated with depths under 40 m, mesh sizes over ten in., and the months of April and May ASMFC (2007). For otter trawl fisheries, the highest incidence of Atlantic sturgeon bycatch has been associated with depths under 30 m. More recently, over all gears and observer programs that have encountered Atlantic sturgeon, the distribution of haul depths on observed hauls that caught Atlantic sturgeon was significantly different from those that did not encounter Atlantic surgeon, with Atlantic sturgeon encountered primarily at depths under 20 m (ASMFC 2017a).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The assessment analyzed fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. The total bycatch of Atlantic sturgeon from bottom otter trawls

[6] Murray (2018) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches Murray (2009a); (2013), where rates were estimated using GAMs. Ratio estimator results may be like to those using GAM or GLM if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007; Murray & Orphanides 2013; Orphanides 2010).

was between 624-1,518 fish over 2000-2015, while the total bycatch of Atlantic sturgeon from gillnets ranged from 253-2,715 fish. Focusing on the most recent five-year period of data the stock assessment report,[7] the estimated average annual bycatch during 2011-2015 of Atlantic sturgeon in bottom otter trawl gear is 777.4 individuals and in gillnet gear is 627.6 individuals.

5.3.4.3 Atlantic Salmon

Sink Gillnet and Bottom Trawl Gear. Atlantic salmon are at risk of interacting with bottom trawl or gillnet gear (Kocik *et al*. 2014; NMFS 2021a; NEFSC observer/sea sampling database, unpublished data). Northeast Fisheries Observer Program (NEFOP) data from 1989-2019 show records of incidental bycatch of Atlantic salmon in seven of the 31 years, with a total of 15 individuals caught, nearly half of which (seven) occurred in 1992 (NMFS NEFSC observer/sea sampling database, unpublished data).[8] Of the observed incidentally caught Atlantic salmon, ten were listed as “discarded,” which is assumed to be a live discard (Kocik, pers comm.; February 11, 2013). Five of the 15 were documented as lethal interactions. The incidental takes of Atlantic salmon occurred in bottom otter trawls (4) and gillnets (11). Observed captures occurred in March (2), April (2), May (1), June (3), August (1), and November (6). Given the very low number of observed Atlantic salmon interactions in gillnet and bottom trawl gear, interactions with these gear types are believed to be rare in the GAR.

5.3.4.4 Giant Manta Ray

Sink Gillnet and Bottom Trawl Gear. Giant manta rays are potentially susceptible to capture by bottom trawl and gillnet gear based on records of their capture in fisheries using these gear types (NMFS 2021a; NMFS NEFSC observer/sea sampling database, unpublished data). The most recent 10 years of NEFOP data show that between 2010-2019, two (unidentified) giant manta rays were observed in bottom trawl gear and two were observed in gillnet gear (NMFS NEFSC observer/sea sampling database, unpublished data). Also, all the giant manta ray interactions in gillnet or trawl gear recorded in the NEFOP database (13 between 2001 and 2019) indicate the animals were encountered alive and released alive. However, details about specific conditions such as injuries, damage, time out of water, how the animal was moved or released, or behavior on release is not always recorded. While there is currently no information on post-release survival, NMFS Southeast Gillnet Observer Program observed a range of 0-16 giant manta rays captured per year between 1998 and 2015 and estimated that approximately 89% survived the interaction and release (see NMFS reports at: http://www.sefsc.noaa.gov/labs/panama/ob/gillnet.htm).

5.3.4.5 Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl and/or pot/trap gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2022 LOF (87 FR 23122, April 19, 2022) categorizes commercial sink gillnet fisheries (Northeast and Mid-Atlantic) as a Category I fishery; and bottom trawl fisheries (Northeast or Mid-Atlantic) as a Category II fishery.

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[7] The period of 2011-2015 was chosen as it is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

[8] There is no information available on the genetics of these bycaught Atlantic salmon, so it is not known how many of them were part of the GOM DPS. It is likely that some of these salmon, particularly those caught south of Cape Cod, may have originated from the stocking program in the Connecticut River. Those Atlantic salmon caught north of Cape Cod and/or in the Gulf of Maine are more likely to be from the GOM DPS.

5.3.4.5.1 Large Whales

Bottom Trawl Gear. The most recent 10 years of observer, stranding, and/or baleen whale serious injury and mortality determinations from 2010-2019, and the GAR Marine Animal Incident database (which contains data for 2019) shows that there have been no observed or confirmed documented interactions with large whales and bottom trawl gear (Cole & Henry 2013; Henry *et al.* 2017; Henry *et al.* 2016; Henry *et al.* 2020; Henry *et al.* 2019) (Henry et al. 2021; Henry et al. 2022).[9] Thus, large whale interactions with bottom trawl gear are not expected.

Sink Gillnet Gear. Large whale interactions (entanglements) with fishing gear have been observed and documented in the waters of the Northwest Atlantic.[10] Information available on all interactions (e.g., entanglement, vessel strike, unknown cause) with large whales comes from reports documented in the GARFO Marine Animal Incident Database (unpublished data). The level of information collected for each case varies, but may include details on the animal, gear, and any other information about the interaction (e.g., location, description, etc.). Each case is evaluated using defined criteria to assign the case to an injury/information category using all available information and scientific judgement. In this way, the injury severity and cause of injury/death for the event is evaluated, with serious injury and mortality determinations issued by the NEFSC.[11]

Based on the best available information, the greatest entanglement risk to large whales is posed by fixed gear used in trap/pot or sink gillnet fisheries (Angliss and Demaster 1998; Cassoff et al. 2011; Cole and Henry 2013; Kenney and Hartley 2001; Knowlton and Kraus 2001; Hartley et al. 2003; Johnson et al. 2005;Whittingham et al. 2005a,b; Knowlton et al. 2012; NMFS 2021a,b; Hamilton and Kraus 2019; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Henry et al. 2022; Sharp et al. 2019; Pace et al. 2021; NMFS *Marine Mammal SARs for the Atlantic Region*). Specifically, while foraging or transiting, large whales are at risk of becoming entangled in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, and the net panels of gillnet gear that rise into the water column (Baumgartner et al. 2017; Cassoff et al. 2011; Cole and Henry 2013; Hamilton and Kraus 2019; Hartley et al. 2003; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Henry et al. 2022; Johnson et al. 2005; Kenney and Hartley 2001; Knowlton and Kraus 2001;Knowlton et al. 2012; NMFS 2021a,b; Whittingham et al. 2005a,b; see NMFS *Marine Mammal SARs for the Atlantic Region*).[12] Large whale interactions (entanglements) with these features of trap/pot and/or sink gillnet gear often result in the serious injury or mortality to the whale (Angliss and Demaster 1998; Cassoff et al. 2011; Cole and Henry 2013; Henry et al. 2014, Henry et al. 2015, Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Henry et al. 2022; Knowlton and Kraus 2001, Knowlton et al. 2012; Moore and Van der Hoop 2012; NMFS 2014; NMFS 2021a,b; Pettis et al. 2021; Sharp et al. 2019; van der Hoop et al. 2016; van der Hoop et al. 2017). In fact, review of Atlantic coast-wide causes of large whale human interaction incidents between 2010 and 2019 shows that entanglement

[9] GAR Marine Animal Incident Database (unpublished data); NMFS Marine Mammal Stock Assessment Reports for the Atlantic Region; NMFS NEFSC observer/sea sampling database, unpublished data ; MMPA List of Fisheries (LOF).

[10] NMFS Atlantic Large Whale Entanglement Reports: For years prior to 2014, contact David Morin, Large Whale Disentanglement Coordinator, David.Morin@NOAA.gov; GAR Marine Animal Incident Database (unpublished data); NMFS Marine Mammal Stock Assessment Reports for the Atlantic Region; NMFS NEFSC Baleen Whale Serious Injury and Morality Determinations Reference Documents or Technical Memoranda; MMPA List of Fisheries; NMFS 2021a,b.

[11] NMFS NEFSC Baleen Whale Serious Injury and Morality Determinations Reference Documents or Technical Memoranda

[12] Through the ALWTRP, regulations have been implemented to reduce the risk of entanglement in in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, and the net panels of gillnet gear. ALWTRP regulations currently in effect are summarized online.

is the highest cause of mortality and serious injury for North Atlantic right, humpback, fin, and minke whales in those instances when cause of death could be determined (NMFS 2021b). As many entanglements, and therefore, serious injury or mortality events, go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, the rate of large whale entanglement, and thus, rate of serious injury and mortality due to entanglement, are likely underestimated (Hamilton et al. 2018; Hamilton et al. 2019; Knowlton et al. 2012; NMFS 2021a,b; Pace et al. 2017; Robbins 2009).

As noted above, pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injurious and mortalities of marine mammals in each fishery. Large whales, in particular humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the Northwest Atlantic Ocean. As fin, and North Atlantic right whales are listed as endangered under the ESA, these species are considered strategic stocks under the MMPA. Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP)) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear.[13] In 1997, the ALWTRP was implemented; however, since 1997, it has been modified as NMFS and the ALWTRT learn more about why whales become entangled and how fishing practices might be modified to reduce the risk of entanglement. In 2021, adjustments to Plan were implemented and are summarized online.

The ALWTRP consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area-and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries. The ALWTRP recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the Plan.[14]. Further details on the Plan are at: the ALWTRP.

5.3.4.5.2 Small Cetaceans and Pinnipeds

Sink Gillnet and Bottom Trawl Gear. Small cetaceans and pinnipeds are vulnerable to interactions with sink gillnet and bottom trawl gear.[15] Reviewing marine mammal stock assessment and serious injury reports that cover the most recent 10 years data (i.e., 2010-2019), and the MMPA LOF's covering this time frame (i.e., issued between 2017 and 2021), Table 12 has a list of species that have been observed (incidentally) seriously injured and/or killed by MMPA LOF Category I (frequent interactions) gillnet and/or Category II (occasional interactions) bottom trawl fisheries that operate in the affected environment of the monkfish fishery. Of the species in Table 12, gray seals, followed by harbor seals, harbor porpoises, short beaked common dolphins, and harps seals are the most frequently bycaught small

[13] The measures identified in the ALWTRP are also beneficial to the survival of the minke whale, which are also known to be incidentally taken in commercial fishing gear.
[14] The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet .
[15] For additional information on small cetacean and pinniped interactions, see: NMFS NEFSC marine mammal serious injury and mortality Reference Documents or Technical Memoranda; NMFS Marine Mammal SARs for the Atlantic Region; MMPA LOF.

cetacean and pinnipeds in sink gillnet gear in the GAR (Hatch & Orphanides 2014; 2015; 2016; Orphanides 2019; 2020; Orphanides & Hatch 2017). In terms of bottom trawl gear, short-beaked common dolphins, Risso's dolphins, and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in the GAR, followed by gray seals, long-finned pilot whales, bottlenose dolphin (offshore), harbor porpoise, harbor seals, and harp seals (Chavez-Rosales *et al.* 2017; Lyssikatos 2015; Lyssikatos *et al.* 2020; 2021).

Table 13. Small cetacean and pinniped species observed seriously injured and/or killed by Category I and II sink gillnet or bottom trawl fisheries in the affected environment of the monkfish fishery.

Fishery	Category	Species Observed or Reported Injured/Killed
Northeast Sink Gillnet	I	Bottlenose dolphin (offshore)
		Harbor porpoise
		Atlantic white sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Long-finned pilot whales
		Harbor seal
		Hooded seal
		Gray seal
		Harp seal
Mid-Atlantic Gillnet	I	Bottlenose dolphin (Northern Migratory coastal)
		Bottlenose dolphin (Southern Migratory coastal)
		Bottlenose dolphin (offshore)
		Harbor porpoise
		Short-beaked common dolphin
		Harbor seal
		Harp seal
		Gray seal
Northeast Bottom Trawl	II	Harp seal
		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		Atlantic white-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal

Source: MMPA 2017-2021 LOFs at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries

To address the high levels of incidental take of harbor porpoise and bottlenose dolphins in sink gillnet fisheries, pursuant to section MMPA Section 118(f)(1), the Harbor Porpoise Take Reduction Plan (HPTRP) and the Bottlenose Dolphin Take Reduction Plan (BDTRP) were developed and implemented for these species.[16] Also, due to the incidental mortality and serious injury of small cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid- Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy was implemented. More information on each take reduction plan or strategy is at: NMFS HPTRP, NMFS BDTRP, or NMFS Atlantic Trawl Gear Take Reduction Strategy.

5.4 Physical Environment and Essential Fish Habitat

The Northeast U.S. Shelf Ecosystem has been described as including the area from the GOM 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 (Sherman *et al.* 1996). The continental slope includes the area east of the shelf, out to a depth of 2,000 m. Four distinct sub-regions comprise the NOAA Fisheries Greater Atlantic Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. Occasionally another sub-region, Southern New England, is described; however, we incorporated discussions of any distinctive features of this area into the sections describing Georges Bank and the Mid-Atlantic Bight.

The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical and biological characteristics of each of these sub-regions are described in the Physical and Biological Environment section of Amendment 5 (Section 4.2), along with a short description of the physical features of coastal environments. Monkfish habitats are described in Section 4.4.1 of Amendment 5 and summarized below. Information on the affected physical and biological environments included in Amendment 5 was extracted from Stevenson et al. (2004).

5.4.1 Fishing Effects on EFH

A detailed discussion of monkfish fishing on EFH is contained in the Affected Environment Section of Amendment 5. Since monkfish EFH has been determined to not be vulnerable to any fishing gear (Stevenson, et al. 2004), the discussion focuses on gears used in the directed monkfish fishery (trawls and gillnets) that potentially could impact EFH of other fisheries. The discussion in Amendment 5 cites several important peer-reviewed studies in describing the potential biological and physical effects of

[16] Although the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal SARs (Hayes *et al.* 2022) no longer designates harbor porpoise as a strategic stock, HPTRP regulations are still in place per the mandates provided in Section 118(f)(1).

fishing on various substrates (mud, sand, gravel and rocky substrates). Regarding the gears used in the monkfish fishery, the discussion focuses on trawling, since gillnets are stationary or static, and have been determined to not have an adverse effect on EFH. Since vessels are prohibited from using a dredge while on a monkfish DAS, discussion of the effects of dredges is not pertinent. Generally, trawling reduces habitat complexity and productivity by removing or altering physical (boulders, sand waves or cobble piles) and biological (structure forming invertebrates) habitat components and mixing sediments (ICES 2000). These impacts are more discernable with repeated trawl use and in low energy environments (NRC 2002).

5.4.2 Essential Fish Habitat

Section 4.4 of Amendment 5 contains a detailed description of monkfish EFH, EFH of other species vulnerable to bottom trawl gear, the effect of the monkfish fishery on EFH (monkfish and other species, all life stages), and measures to minimize adverse effects of the monkfish fishery on EFH. The document describes habitat protection measures taken in the monkfish FMP, and the Atlantic Sea Scallop and NE Multispecies FMPs (namely habitat closed areas).

In summary, monkfish EFH has been determined to only be minimally vulnerable to bottom-tending mobile gear (bottom trawls and dredges) and bottom gillnets. Therefore, the effects of the monkfish fishery and other fisheries on monkfish EFH do not require any management action. However, the monkfish trawl fishery does have more than a minimal and temporary impact on EFH for several other demersal species in the region. Amendment 5 to the Monkfish FMP took a proactive approach to minimize the adverse impacts of the trawl fishery for monkfish on EFH for other managed species by closing portions of the Lydonia and Oceanographer canyons to vessels using a monkfish DAS. Adverse impacts that were more than minimal and not temporary in nature were identified for the following species and life stages, based on an evaluation of species life history and habitat requirements and the spatial distributions and impacts of bottom otter trawls in the region (Stevenson et al., 2004):

Species and life stages with EFH more than minimally vulnerable to otter trawl gear:

> American plaice (Juvenile (J), Adult (A)), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), pollock (A), ocean pout (Egg (E), J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (A), witch flounder (J, A), yellowtail flounder (J, A), black sea bass (J, A), scup (J), tilefish (J, A), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A).

There are no species or life stages for which EFH is more than minimally vulnerable to bottom gillnets (Stevenson et al., 2004). Table 13 identifies the species, life stages and geographic area of their EFH, for those species whose EFH is vulnerable to bottom trawling.

Table 14. EFH descriptions for all benthic life stages of federally-managed species in the U.S. Northeast Shelf Ecosystem with EFH vulnerable to bottom tending gear.

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
American plaice	juvenile	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45 - 150	Bottom habitats with fine grained sediments or a substrate of sand or gravel
American plaice	adult	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45 - 175	Bottom habitats with fine grained sediments or a substrate of sand or gravel

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Atlantic cod	juvenile	GOM, GB, eastern portion of continental shelf off SNE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	25 - 75	Bottom habitats with a substrate of cobble or gravel
Atlantic cod	adult	GOM, GB, eastern portion of continental shelf off SNE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	10 - 150	Bottom habitats with a substrate of rocks, pebbles, or gravel
Atlantic halibut	juvenile	GOM, GB	20 - 60	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic halibut	adult	GOM, GB	100 - 700	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic herring	eggs	GOM, GB and following estuaries: Englishman/Machias Bay, Casco Bay, and Cape Cod Bay	20 – 80	Bottom habitats attached to gravel, sand, cobble or shell fragments, also on macrophytes
Atlantic sea scallop	juvenile	GOM, GB, SNE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18 - 110	Bottom habitats with a substrate of cobble, shells, and silt
Atlantic sea scallop	adult	GOM, GB, SNE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18 - 110	Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand
Haddock	juvenile	GB, GOM, middle Atlantic south to Delaware Bay	35 - 100	Bottom habitats with a substrate of pebble and gravel
Haddock	adult	GB and eastern side of Nantucket Shoals, throughout GOME, *additional area of Nantucket Shoals, and Great South Channel	40 - 150	Bottom habitats with a substrate of broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Monkfish	juvenile	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, all areas of GOME	25 - 200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Monkfish	adult	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, outer perimeter of GB, all areas of GOME	25 - 200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Ocean pout	eggs	GOM, GB, SNE, and middle Atlantic south to Delaware Bay, and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts and Cape Cod Bay	<50	Bottom habitats, generally in hard bottom sheltered nests, holes, or crevices
Ocean pout	juvenile	GOM, GB, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, and Cape Cod Bay	< 50	Bottom habitats near hard bottom nesting areas
Ocean pout	adult	GOM, GB, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, and Cape Cod Bay	< 80	Bottom habitats, often smooth bottom near rocks or algae
Offshore hake	juvenile	Outer continental shelf of GB and SNE south to Cape Hatteras, NC	170 - 350	Bottom habitats
Offshore hake	adult	Outer continental shelf of GB and SNE south to Cape Hatteras, NC	150 - 380	Bottom habitats
Pollock	juvenile	GOM, GB, and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay to Waquoit Bay; Long Island Sound, Great South Bay	0 – 250	Bottom habitats with aquatic vegetation or a substrate of sand, mud, or rocks
Pollock	adult	GOM, GB, SNE, and middle Atlantic south to New Jersey and the following estuaries: Passamaquoddy Bay, Damariscotta R., Mass Bay, Cape Cod Bay, Long Island Sound	15 – 365	Hard bottom habitats including artificial reefs

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Red hake	juvenile	GOM, GB, continental shelf off SNE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, and Chesapeake Bay	< 100	Bottom habitats with substrate of shell fragments, including areas with an abundance of live scallops
Red hake	adult	GOM, GB, continental shelf off SNE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, Delaware Bay, and Chesapeake Bay	10 - 130	Bottom habitats in depressions with a substrate of sand and mud
Redfish	juvenile	GOM, southern edge of GB	25 - 400	Bottom habitats with a substrate of silt, mud, or hard bottom
Redfish	adult	GOM, southern edge of GB	50 - 350	Bottom habitats with a substrate of silt, mud, or hard bottom
Silver hake	juvenile	GOM, GB, continental shelf off SNE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, Mass. Bay to Cape Cod Bay	20 – 270	Bottom habitats of all substrate types
Winter flounder	adult	GB, inshore areas of GOME, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	1 - 100	Bottom habitats including estuaries with substrates of mud, sand and gravel
Witch flounder	juvenile	GOM, outer continental shelf from GB south to Cape Hatteras	50 - 450 to 1500	Bottom habitats with fine grained substrate
Witch flounder	adult	GOM, outer continental shelf from GB south to Chesapeake Bay	25 - 300	Bottom habitats with fine grained substrate
Yellowtail flounder	adult	GB, GOM, SNE continental shelf south to Delaware Bay and the following estuaries: Sheepscot R., Casco Bay, Mass. Bay to Cape Cod Bay	20 - 50	Bottom habitats with substrate of sand or sand and mud

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Black sea bass	juvenile	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries from Buzzards Bay to Long Island Sound; Gardiners Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	1 - 38	Rough bottom, shellfish and eelgrass beds, manmade structures in sandy-shelly areas, offshore clam beds, and shell patches may be used during wintering
Black sea bass	adult	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries: Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Scup	juvenile	Continental shelf from GOM to Cape Hatteras, NC includes the following estuaries: Mass. Bay, Cape Cod Bay to Long Island Sound; Gardiners Bay to Delaware Inland Bays; and Chesapeake Bay	0 - 38	Demersal waters north of Cape Hatteras and inshore on various sands, mud, mussel, and eelgrass bed type substrates
Tilefish	juvenile	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76 - 365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
Tilefish	adult	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76 - 365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
Barndoor skate	juvenile	Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon	0 - 750, mostly < 150	Bottom habitats with mud, gravel, and sand substrates
Barndoor skate	adult	Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon	0 - 750, mostly < 150	Bottom habitats with mud, gravel, and sand substrates
Clearnose skate	juvenile	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0 – 500, mostly < 111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Clearnose skate	adult	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0 – 500, mostly < 111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom
Little skate	juvenile	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 137, mostly 73 - 91	Bottom habitats with sandy or gravelly substrate or mud
Little skate	adult	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 137, mostly 73 - 91	Bottom habitats with sandy or gravelly substrate or mud
Rosette skate	juvenile	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33 - 530, mostly 74 - 274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Rosette skate	adult	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33 - 530, mostly 74 - 274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Smooth skate	juvenile	Offshore banks of GOM	31 – 874, mostly 110 - 457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles
Smooth skate	adult	Offshore banks of GOM	31 – 874, mostly 110 - 457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles
Thorny skate	juvenile	GOM and GB	18 - 2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud
Thorny skate	adult	GOM and GB	18 - 2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Winter skate	juvenile	Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud
Winter skate	adult	Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud
White hake	juvenile	GOM, southern edge of GB, SNE to middle Atlantic and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Cape Cod Bay	5 - 225	Pelagic stage - pelagic waters; demersal stage - bottom habitat with seagrass beds or substrate of mud or fine-grained sand
Source: Stevenson et al (2004). GOM = Gulf of Maine, GB = Georges Bank, SNE = Southern New England				

5.5 Human Communities

5.5.1 Permits and Vessels

The Monkfish FMP has seven types of federal permits: six categories of limited access permits (A-D, F, H) and one open access permit (E, Table). The number of fishing vessels with limited access monkfish permits has decreased over the past decade, from 670 to 562 (Table). Of those vessels, about 35-48% landed over 1 lb of monkfish each year and about 9-20% landed ≥ 10,000 lb of monkfish. Permit category C and D vessels consistently accounted for the greatest portion of vessels with monkfish permits and landing monkfish (Table 15, Table 16).

Table 15. Monkfish permit categories.

Permit Category		Description
Limited Access	A	DAS permit that *does not* also have a groundfish or scallop limited access permit (possession limits vary with permit type).
	B	
	C	DAS permit that *also* has a groundfish or scallop limited access permit (possession limits vary with permit type).
	D	
	F	Seasonal permit for the offshore monkfish fishery.
	H	DAS permit for use in the Southern Fishery Management Area *only*.
Open Access	E	Open access incidental permit.

Table 16. Fishing vessels with federal monkfish permits, with number of vessels landing over 1 lb and 10,000 lb, FY 2012-2021.

Permit Category	2012			2015			2018			2021		
	All	>1lb	>10K lb	All	>1lb	>10K lb	All	>1lb	>10K lb	All	>1lb	>10K lb
A	22	6	4	22	4	*	20	*	*	18	8	6
B	44	9	5	42	4	*	38	6	4	38	19	15
C	295	148	60	267	128	30	268	110	30	255	114	42
D	292	94	28	242	59	10	226	77	18	229	115	50
F	9	6	4	17	9	*	17	14	4	14	13	0
H	8	5	4	8	6	5	7	6	3	8	*	0
Total LA	**670**	**268**	**105**	**598**	**210**	**51**	**576**	**214**	**60**	**562**	**270**	**113**
E	1,743	338	19	1,578	247	8	1,525	247	20	1,485	176	7
Source: GARFO Permit database and DMIS as of April 2022.												

Table 17. Proportion of monkfish landings by permit category to total monkfish landings in the year, FY 2012-2021.

Permit Category	2012	2015	2018	2021
A and B	15%	13%	16%	12%
C and D	75%	80%	77%	83%
F	2%	2%	1%	>1%
H	1%	1%	1%	0%
E	7%	5%	5%	4%
All	**100%**	**100%**	**100%**	**100%**
Source: GARFO Permit database and DMIS as of April 2022.				

5.5.2 Catch, Landings, and Revenues

Methods for Calculating Catch

Total Discards. Historically, monkfish discards have been calculated two ways: i) by GARFO following the close of the fishing year for end of year ACL accounting and ii) by NEFSC by calendar year during the assessment process. Methods for calculating discards are evolving towards a unified estimate from GARFO and the NEFSC using the Catch Accounting and Monitoring System (CAMS), but the discard data presented in this report were calculated as follows:

- During an assessment, the NEFSC estimates discards by gear, half year and management area using observer data. For otter trawls and gillnets, the observed monkfish discard-per-kept-monkfish ratio is expanded to total monkfish discards. For scallop dredges and shrimp trawls, the observed monkfish discard-per-all-kept-catch ratio is expanded to total monkfish discards. Monkfish discard mortality has been assumed to be 100% across all gear types, but this has been revised to 64% mortality for monkfish caught with scallop dredges (Deroba 2022).

- For ACL accounting (Table), GARFO estimates discards using a Cochran discard ratio estimator with observed trips stratified by gear, mesh group, management area and half year. Discard ratios estimated from observed trips were then applied to stratified unobserved trips to estimate discards on unobserved trips. Total discards were calculated by using the estimates of observed discards on observed trips and using the calculated rate and trip K_{all} on unobserved trips. The ACL accounting data presented here assumed 100% discard mortality across all gear types.

Total Landings. Total landings of monkfish were calculated by GARFO using the CFDERS dealer dataset after the close of the fishing year for both federal commercial and state permits.

Recreational catch. Recreational catch was calculated from the MRIP database. Monkfish recreational discard mortality was assumed to be 100%.

Total Catch. From FY 2017-2020, the ACL was exceeded in the NFMA twice and never in the SFMA (Table 17). Commercial landings made up 77-90% of total catch in the NFMA and 30-59% in the SFMA. State landings, defined as vessels that have never had a federal fishing permit, consistently make up under 0.5% of catch. Recreational catch is consistently under 3% of catch. In the NFMA, discards were 9% of catch in FY 2017 and increased to 28% and lowered to 20% and 19% of catch in FY 2018-2020. In the SFMA, discards were higher in FY 2017-2019 (41-43%) but lowered to 13% in FY 2020.

Table 18. Year-end monkfish annual catch limit (ACL) accounting, FY 2017-2021.

Catch accounting element	Pounds	Metric tons	% of ACL
FY 2017			
Northern Fishery Management Area (ACL = 7,592 mt)			
Commercial landings	15,003,103	6,805	89.6%
State-permitted only vessel landings	60,031	27	0.4%
Estimated discards	1,567,883	711	9.4%
Recreational catch (MRIP landings and discards)	11,725	5.3	0.1%
Total Northern monkfish catch	**16,642,742**	**7,549**	**99.4%**
Southern Fishery Management Area (ACL = 12,316 mt)			
Commercial landings	8,392,979	3,807	30.9%
State-permitted only vessel landings	66,936	30	0.2%
Estimated discards	11,531,614	5,231	42.5%
Recreational catch (MRIP landings and discards)	1,627	1	0.0%
Total Southern monkfish catch	**19,993,156**	**9,068**	**73.6%**
FY 2018			
Northern Fishery Management Area (ACL = 7,592 mt)			
Commercial landings	13,237,011	6,004	79.1%
State-permitted only vessel landings	37,468	17	0.2%
Estimated discards	4,666,815	2,117	27.9%
Recreational catch (MRIP landings and discards)	6,977	3	0.0%
Total Northern monkfish catch	**17,948,271**	**8,141**	**107.2%**
Southern Fishery Management Area (ACL = 12,316 mt)			
Commercial landings	10,133,407	4,596	37.3%
State-permitted only vessel landings	64,841	29	0.2%

Estimated discards	11,505,833	5,219	42.4%
Recreational catch (MRIP landings and discards)	742,988	337	2.7%
Total Southern monkfish catch	**22,447,069**	**10,181**	**82.7%**
FY 2019			
Northern Fishery Management Area (ACL = 7,592 mt)			
Commercial landings	13,673,898	6,202	81.7%
State-permitted only vessel landings	16,474	7	0.1%
Estimated discards	3,418,346	1,551	20.4%
Recreational catch (MRIP landings and discards)	164,771	75	1.0%
Total Northern monkfish catch	**17,273,489**	**7,835**	**103.2%**
Southern Fishery Management Area (ACL = 12,316 mt)			
Commercial landings	8,236,922	3,736	30.3%
State-permitted only vessel landings	66,673	30	0.2%
Estimated discards	11,174,259	5,069	41.2%
Recreational catch (MRIP landings and discards)	11,410	5	0.0%
Total Southern monkfish catch	**19,489,264**	**8,840**	**71.7%**
FY 2020			
Northern Fishery Management Area (ACL = 8,351 mt)			
Commercial landings	11,684,519	5,300	63.5%
State-permitted only vessel landings	13,416	6	0.1%
Estimated discards	3,503,282	1,589	19.0%
Recreational catch (MRIP landings and discards)	23,077	10	0.1%
Total Northern monkfish catch	**15,224,294**	**6,905**	**82.7%**
Southern Fishery Management Area (ACL = 12,316 mt)			
Commercial landings	4,944,794	2,243	18.2%
State-permitted only vessel landings	20,749	9	0.1%
Estimated discards	3,078,040	1,396	11.3%
Recreational catch (MRIP landings and discards)	359,987	163	1.3%
Total Southern monkfish catch	**8,453,570**	**3,834**	**31.1%**
FY 2021			
Northern Fishery Management Area (ACL = 8,351 mt)			
Commercial landings	11,496,640	5,215	62.4%
State-permitted only vessel landings	18,511	8	0.1%
Estimated discards	3,857,341	1,750	21.0%
Recreational catch (MRIP landings and discards)	7	0	0.0%
Total Northern monkfish catch	**15,372,499**	**6,973**	**83.5%**
Southern Fishery Management Area (ACL = 12,316 mt)			
Commercial landings	4,338,159	1,968	16.0%
State-permitted only vessel landings	32,185	15	0.1%

Estimated discards	7,278,106	3,301	26.8%
Recreational catch (MRIP landings and discards)	30,056	14	0.1%
Total Southern monkfish catch	**11,678,506**	**5,298**	**43.0%**

Notes:
"Commercial landings" includes all monkfish landings by vessels with a permit number over zero and party/charter landings sold to a federal dealer.
"State-permitted only vessel landings" are landings from vessels that never had a federal fishing permit (so the permit #=0).
"Recreational catch" includes landings and discards from party charter vessels and private anglers, not sold to a federal dealer.

Source: Commercial fisheries dealer and Northeast Fishery Observer Program databases; FY 2017 data accessed 10/2018; FY 2018 accessed 3/2020; FY 2019 accessed 3/2021; FY 2020 accessed 4/22; Marine Recreational Information Program database.

Landings

Landings since FY 2016 have been higher in the NFMA than in the SFMA. The NFMA has had a higher TAL and higher possession limits relative to the SFMA (Table 19). Landings relative to TAL in the NFMA have been between 80-107% since FY 2016, which could be a combination of revised management measures (possession limits) and the large 2015-year class. The NFMA TAL was increased by 10% for FY 2020-2022 (relative to FY 2017-2019) and the individuals from the 2015-year class have grown large enough to be retained by the fishery and are less likely to be discarded because of minimum size regulations. The landings relative to TAL in the SFMA have been lower than the NFMA, between 39-51% since FY 2016.

Table 19. Recent landings (whole/live weight, mt) in the NFMA and SFMA compared to target TAL.

Fishing Year	Northern Area			Southern Area		
	TAL (mt)	Landings (mt)	Percent of TAL achieved	TAL (mt)	Landings (mt)	Percent of TAL achieved
2014	5,854	3,403	58%	8,925	5,415	61%
2015	5,854	4,080	70%	8,825	4,733	53%
2016	5,854	5,447	93%	8,925	4,345	49%
2017	6,338	6,807	107%	9,011	3,802	42%
2018	6,338	6,168	97%	9,011	4,600	51%
2019	6,338	6,211	98%	9,011	3,785	42%
2020	6,624	5,299	80%	5,882	2,294	39%
2021	6,624	5,228	79%	5,882	1,982	34%
*2022	6,624	1,784	27%	5,882	1,082	18%

*Data as of September 2022.
Source: GARFO quota monitoring data, accessed 8/22/2022.

FY 2021 landings

Through FY 2021, 79% of the FY 2021 TAL had been landed in the northern area and 34% in the southern area. In the northern area, monthly landings were lower in May-November 2021 relative to December-March (312-417 lb/month vs. 501-654 lb/month). Otter trawls accounted for 63% of the FY 2021 landings to date. In the southern area, monthly landings were highest in May and June 2021 (439-535 lb/month), then dropped to a low in July-November (9-59 lb/month), then have been moderate since December (117-227 lb/month). These data and additional information can be found at GARFO's Quota Monitoring website: https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports//monkfish/mul.htm.

Landings and discards by gear type

The northern and southern areas have distinctions in terms of gear type. Since at least 1980, monkfish landings in the NFMA have largely been by vessels using trawls (NEFMC 2022b), 84% on average since 2012 (Table). In the SFMA, landings were primarily by vessels using dredges and trawls from 1980 to the early 1990s. Through the 1990s and to today, gillnets have been the predominant gear for vessels landing monkfish, 72% on average since 2012.

Discards have traditionally been higher in the SFMA relative to the NFMA, and since 2017, southern discards have approximated landings, exceeding landings in 2020 (Table). In the NFMA, discards have been primarily with otter trawl gear (64%), followed by scallop dredges (29%), and gillnets (7%) over the last 10 years. In the SFMA, discards have been primarily with scallop dredges (78%), followed by otter trawl (16%), and gillnets (6%).

Table 20. Landings by gear type (mt), CY 2012-2021.

Calendar Year	Gillnet		Otter trawl		Scallop Dredge		Total[a]
Northern Fishery Management Area							
2012	359	9%	3,561	87%	135	3%	**4,081**
2013	424	13%	2,813	84%	114	3%	**3,355**
2014	424	12%	2,958	86%	36	1%	**3,434**
2015	678	17%	3,277	80%	100	2%	**4,086**
2016	629	13%	3,949	84%	111	2%	**4,723**
2017	984	14%	6,044	85%	44	1%	**7,105**
2018	870	14%	4,958	83%	153	3%	**6,009**
2019	1,029	17%	4,950	81%	53	1%	**6,084**
2020	554	10%	5,020	90%	11	0%	**5,587**
2021	961	19%	4,122	80%	20	0%	**5,121**
Annual average	**691**	**14%**	**4,165**	**84%**	**78**	**2%**	4,959
Southern Fishery Management Area							
2012	3,614	64%	1,144	20%	766	14%	**5,674**
2013	3,394	65%	1,115	21%	627	12%	**5,207**
2014	3,139	62%	1,029	20%	899	18%	**5,099**
2015	3,293	72%	674	15%	542	12%	**4,550**
2016	3,247	75%	577	13%	372	9%	**4,331**
2017	2,773	73%	547	14%	418	11%	**3,796**
2018	3,346	76%	497	11%	486	11%	**4,388**
2019	3,526	81%	357	8%	260	6%	**4,373**
2020	1,956	75%	387	15%	190	7%	**2,593**
2021	1,530	76%	300	15%	150	7%	**2,005**
Annual Average	2,982	**72%**	663	**15%**	471	**11%**	4,202

Source: Deroba (2022).
[a] The total column includes landings from other minor gear types.

Table 21. Discards by gear type (mt), CY 2012-2021.

Calendar Year	Gillnet		Otter trawl		Scallop Dredge		Total
Northern Fishery Management Area							
2012	20	4%	233	47%	240	49%	**493**
2013	32	7%	300	65%	127	28%	**459**
2014	27	6%	384	79%	73	15%	**484**
2015	42	7%	462	81%	68	12%	**572**
2016	56	8%	483	66%	195	27%	**734**
2017	31	4%	712	85%	96	11%	**840**
2018	66	5%	404	32%	783	62%	**1,253**
2019	54	5%	512	47%	514	48%	**1,080**
2020	109	15%	528	73%	85	12%	**723**
2021	62	8%	500	62%	240	30%	**802**
Annual average	**50**	**7%**	**452**	**64%**	**242**	**29%**	**744**
Southern Fishery Management Area							
2012	192	10%	187	10%	1,583	81%	**1,962**
2013	236	17%	106	8%	1,030	75%	**1,372**
2014	151	13%	143	12%	893	75%	**1,188**
2015	73	8%	262	29%	583	64%	**919**
2016	87	4%	552	26%	1,475	70%	**2,114**
2017	116	3%	581	16%	2,847	80%	**3,544**
2018	142	4%	398	11%	2,936	84%	**3,476**
2019	172	5%	456	14%	2,730	81%	**3,358**
2020	82	4%	722	31%	1,491	65%	**2,295**
2021	67	3%	127	5%	2,147	92%	**2,340**
Annual Average	**132**	**6%**	**353**	**16%**	**1,772**	**78%**	**2,257**
Source: Deroba (2022).							

Revenue

Monkfish fishery revenue has generally declined in recent years, from $42.2M in CY 2005 to $10.3M in CY 2021 (Table , not adjusted for inflation). Since at least CY 2011, about half of this revenue is from trips where monkfish was over 50% of total revenue (Table). There is a declining number of vessels that had trips where the monkfish revenue was over 50% of total revenue, from 206 in CY 2011 to 76 in CY 2021. CY 2020 and 2021 were particularly low revenue years. Monkfish price per live pound has been on a declining trend since 2010, though prices have been increasing within the last year (Figure 2). Seasonally, prices tend to be lower in spring to summer months and higher in fall to winter.

Table 22. Total monkfish revenue, CY 2005 – 2021.

Calendar Year	Revenue	Calendar Year	Revenue
2005	$42.2M	2014	$18.7M
2006	$38.0M	2015	$19.1M
2007	$28.9M	2016	$20.0M
2008	$27.2M	2017	$18.4M
2009	$19.6M	2018	$14.8M
2010	$19.2M	2019	$14.5M
2011	$26.6M	2020	$9.3M
2012	$27.1M	2021	$10.3M
2013	$18.7M		

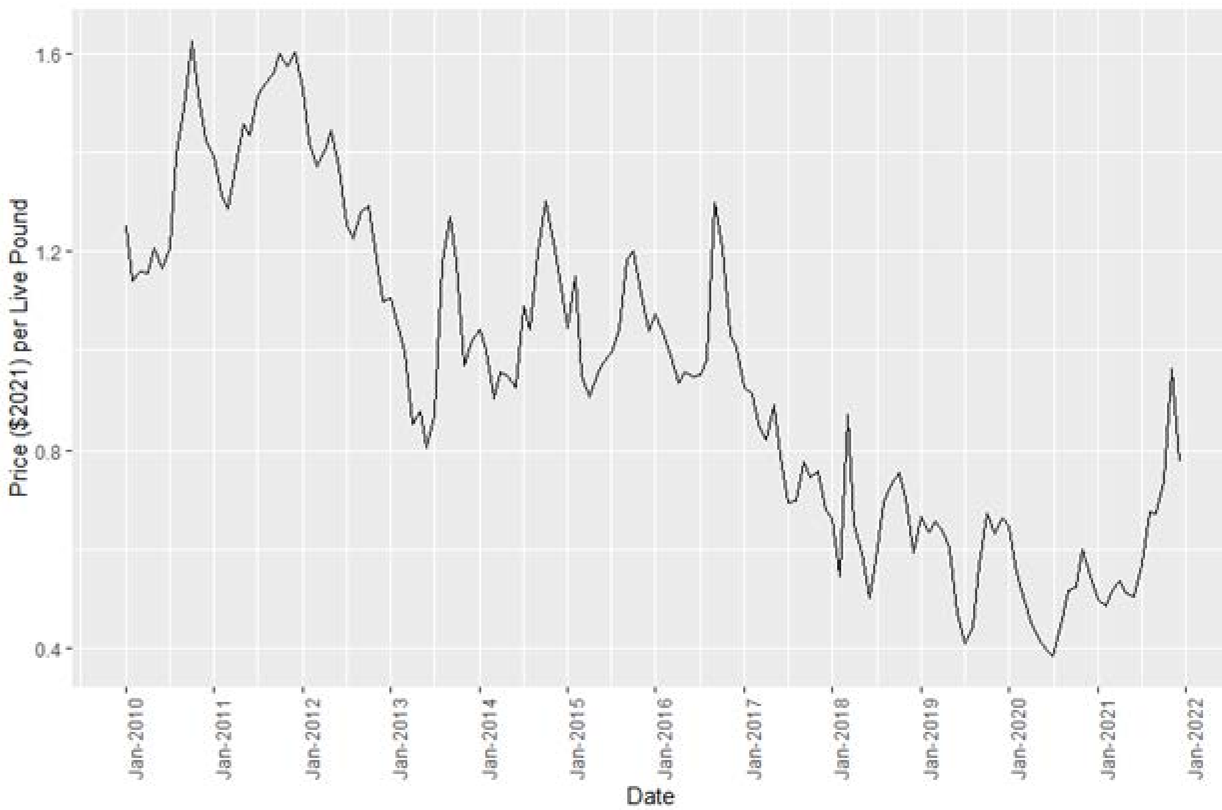
Source: ACCSP data, accessed April 2022.
Note: Revenues not adjusted for inflation.

Table 23. Monkfish revenue and revenue dependence on trips where over 50% of revenue is from monkfish, CY 2011 – 2020.

Calendar Year	Vessels	Monkfish Revenue		Non-Monkfish Revenue		Total Revenue	% Monkfish
		Total	Per vessel	Total	Per vessel		
2011	206	$16,517,143	$80,180	$3,354,458	$16,284	$19,871,601	83%
2012	196	$15,138,030	$77,235	$3,339,764	$17,040	$18,477,794	82%
2013	164	$8,994,464	$54,844	$2,414,798	$14,724	$11,409,262	79%
2014	173	$9,307,800	$53,802	$3,042,854	$17,589	$12,350,654	75%
2015	140	$9,319,537	$66,568	$2,286,111	$16,329	$11,605,648	80%
2016	127	$9,654,776	$76,022	$1,957,503	$15,413	$11,612,280	83%
2017	135	$9,471,858	$70,162	$2,545,266	$18,854	$12,017,124	79%
2018	108	$7,001,537	$64,829	$1,660,777	$15,378	$8,662,314	81%
2019	96	$7,021,724	$73,143	$1,912,752	$19,924	$8,934,476	79%
2020	70	$2,700,687	$38,581	$995,332	$14,219	$3,696,019	73%
2021	76	$3,611,791	$47,524	$1,057,492	$13,914	$4,669,283	77%

Source: NEFSC SSB.
Note: Revenues adjusted to 2021 USD.

Figure 2. Monthly monkfish price per live pounds ($2021), 2010 – 2021.



Source: NEFSC SSB, July 2022.

5.5.3 Fishing Effort

Effort controls such as Days-at-Sea (DAS) and possession limits are used to help ensure that the fishery landings remain within the TAL. Framework 10 established the possession limits and DAS allocations for FY 2017-2019, and these remain unchanged through FY 2022.

5.5.3.1 Day-at-Sea (DAS)

DAS use. DAS allocations have remained the same since FY 2017 (Framework 10). Limited access vessels are allocated 46 monkfish DAS per fishing year (45.2 with RSA deduction), 37 of which can be used in the SFMA. The number of monkfish DAS used each year is far below what is allocated, suggesting a substantial amount of latent effort in the monkfish fishery. An average of 575 permits were allocated DAS between FY 2019 – 2021, with permit categories C and D accounting for the greatest number of vessels and DAS (Table). DAS use varies with permit category. Of the Category A and B permit vessels, 52-64% used at least one DAS in FY 2019-2020, but that decreased to 28-38% in FY 2021. The Category C and D vessels had more stable participation, but was generally lower, 4-18% these past three years.

Table 24. Monkfish DAS usage, combined management areas and all vessels with a limited access monkfish permit, FY 2019 – FY 2021.

Permit Category	All Vessels			Vessels that used ≥ 1 DAS
	Total Vessels	DAS Allocated	DAS Used	
FY 2019				
A	21	909	385	11 (52%)
B	39	1,689	750	25 (64%)
C	273	11,821	583	24 (9%)
D	238	10,305	850	42 (18%)
FY 2020				
A	15	650	193	9 (60%)
B	37	1,602	444	23 (62%)
C	268	11,604	334	17 (6%)
D	229	9,916	490	32 (14%)
FY 2021				
A	18	779	130	5 (28%)
B	37	1,602	280	14 (38%)
C	255	11,042	177	11 (4%)
D	223	9,656	397	24 (11%)

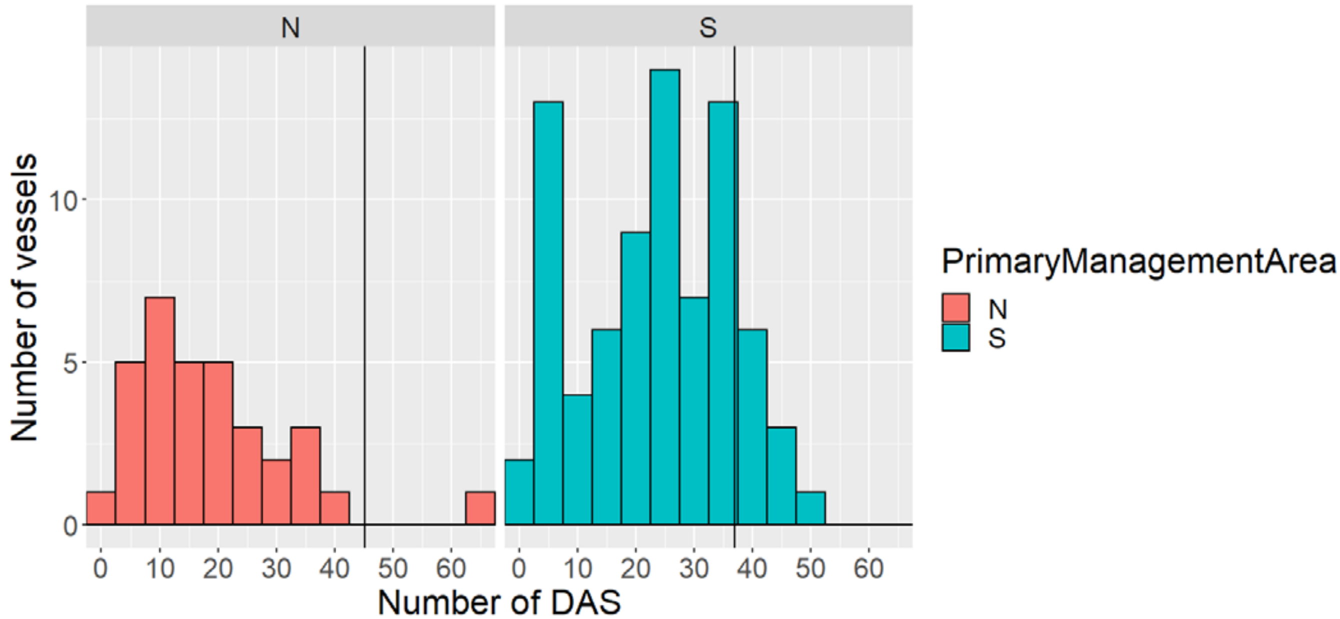
Notes: Permit categories F and H account for a minor number of permits, DAS allocated, and DAS used, thus, are not included in table.

Data include all vessels with a monkfish limited access permit (i.e., all activity codes).

Source: NMFS Vessel Permits and Allocation Management System (AMS) databases, accessed March 2022.

Use of the monkfish DAS allocation varies by vessel and fishing area. In FY 2019 and 2021, vessels that fished primarily in the NFMA used less DAS relative to the SFMA, despite the SFMA use restriction (Figure 3). Some of the vessels fishing primarily in the SFMA vessels appear to exceed the use restriction of 37 DAS, however, some of these vessels also took trips in the NFMA, where the DAS allocation is higher (45.2). For vessels fishing primarily in the NFMA, one vessel used more than the 45.2 DAS allocated. For primarily SFMA vessels, 12 vessels used more than 37 DAS and 2 used more than 45.2.

Figure 3. Frequency of monkfish DAS use by vessels allocated monkfish, average of FY 2019 and FY 2021.



Notes: Black vertical line represents annual DAS allocations to be used in the NFMA (45.2) and the SFMA (37). Each vessel was binned into one management area based on where most of its trips occurred.

Source: CAMS database. Accessed October 2022.

***FY 2021, 2019 monkfish landings by trip declaration*.**

Although use of a monkfish DAS is required for landing more than incidental amounts of monkfish, a substantial amount of monkfish landings occur on the incidental trips, particularly in the NFMA. An average of FY 2021 and FY 2019 performance is used to illustrate this. In the NFMA, the most trips and about 86% of the monkfish landings were on trips that did not use a monkfish DAS (Table). In the SFMA, vessels using a monkfish DAS accounted for the most trips and 73% of the monkfish landings.

In the NFMA, most of the monkfish landings are on trips using a Northeast (NE) multispecies DAS. Vessels with a Category C and D monkfish permit that also has a limited access NE multispecies DAS permit can declare a monkfish DAS while at sea in the NFMA if they are fishing on a NE multispecies DAS and declare the "monkfish option" prior to leaving port at the start of its trip. When these vessels do not declare a monkfish DAS, their monkfish landings are constrained by a possession limit (900 lb and 750 lb tail weight for Category C and D, respectively, per NE multispecies used; Table). If these vessels do select the "monkfish option" while at sea, then they declare and use a monkfish DAS and do not have a monkfish possession limit (unlimited). Trips using a multispecies DAS but not a monkfish DAS accounted for 85% (8.4M lb) of the NFMA monkfish landings, averaged over FY 2019 and FY 2021. Trips using both a NE multispecies and monkfish DAS accounted for >14% (>1.35 M lb) that year. The vessels participating in the Northeast multispecies sector fishery accounted for the greatest amount of monkfish landings.

Besides the NE multispecies fishery, monkfish is landed in other fisheries without a monkfish DAS declaration: declared out of fishery (DOF), scallop, herring, surfclam/ocean quahog/mussel, squid/mackerel/butterfish, and undeclared (Table). Out of these fisheries, trips that are DOF or use only a scallop DAS account for the greatest amount of landings.

Table 25. Monkfish landings and total number of vessels and trips by trip declarations (plan code) and DAS used, average across FY 2019 and FY 2021. Orange highlights indicate trips where monkfish was landed without a monkfish DAS.

Declaration/ Plan Code	Program Code Description	DAS used	Whole weight, live lb (mt in parentheses)	# of Vessels	# of Trips
NORTH					
Monkfish	*Monkfish Northern Management Area Common Pool Vessel Trip*	Monkfish and Northeast Multispecies	C	C	C
	Monkfish Northern Management Area Sector Vessel Trip	Monkfish and Northeast Multispecies	1,347,155 (611)	21	222
	Monkfish Northern Management Area Monkfish-Only Vessel Trip	Monkfish	26,851 (12)	6	20
Northeast Multispecies	*Multispecies Common Pool Vessel Trip*	Northeast Multispecies	55,255 (25)	5	100
	Multispecies Sector Vessel Trip	Northeast Multispecies	8,289,963 (3,760)	99	2,992
Scallop	*Special Access Area*	Scallop	43,979 (20)	20	28
	Limited Access General Category	Scallop	17,145 (8)	19	223
	Limited Access	Scallop	12,611 (6)	7	11
Other	*Herring; undeclared; surfclam, ocean quahog, mussel; squid, mackerel, butterfish*	-	61,447 (28)	22	469
Declared out of Fishery (DOF)		-	10,820 (5)	11	32
		NORTH Landings Total	**> 9,865,226 (4,475)**		

SOUTH					
Monkfish	*Monkfish Southern Management Area Common Pool Vessel Trip*	Monkfish and Northeast Multispecies	62,203 (28)	5	25
	Monkfish Southern Management Area Sector Vessel Trip	Monkfish and Northeast Multispecies	493,536 (224)	15	178
	Monkfish Southern Management Area Monkfish-Only Vessel Trip	Monkfish	3,200,563 (1,452)	50	1,183
Northeast Multispecies	*Multispecies Common Pool Vessel Trip*	Northeast Multispecies	50,555 (23)	14	145
	Multispecies Sector Vessel Trip	Northeast Multispecies	100,963 (46)	27	482
Scallop	*Special Access Area*	Scallop	168,319 (76)	91	210
	Limited Access General Category	Scallop	87,994 (40)	56	986
	Limited Access	Scallop	145,156 (66)	69	106
Other	*Herring, undeclared, surfclam/ocean quahog/mussel and squid/mackerel/butterfish*	-	575,484 (261)	243	2,195
DOF		-	293,271 (133)	152	2,094
		SOUTH Landings Total	**5,178,044 (2,349)**		

Notes:

- C = confidential, < 3 vessels. The 'Total' number of vessels is not the sum of the columns but the sum of the unique vessels.
- In the "Other" rows, data for undeclared trips include incidental landings, which do not require any declaration.
- The total monkfish landings from this table differs slightly from Table 18 likely due to differences in data source (CAMS versus quota monitoring), requirement of having a monkfish permit category associate with monkfish landings in Table 25, and when the data were pulled.
- Data do not include RSA trips; DOF includes scientific and other research trips.

Source: CAMS database. Accessed November 2022.

Additional data on DAS use are in Section 6.4.2.

5.5.3.2 Possession Limits

There are multiple monkfish possession limits depending on whether the vessel has a limited access or open access incidental monkfish permit, the specific permit category, whether a monkfish DAS is being used, and if so, whether the monkfish DAS is used alone or in combination with DAS for other fisheries (Table 26, Table 27).

Monkfish Possession Limits while on a Monkfish DAS

Table 26. NFMA FY 2020-2022 monkfish limited access possession limits while fishing on a monkfish DAS.

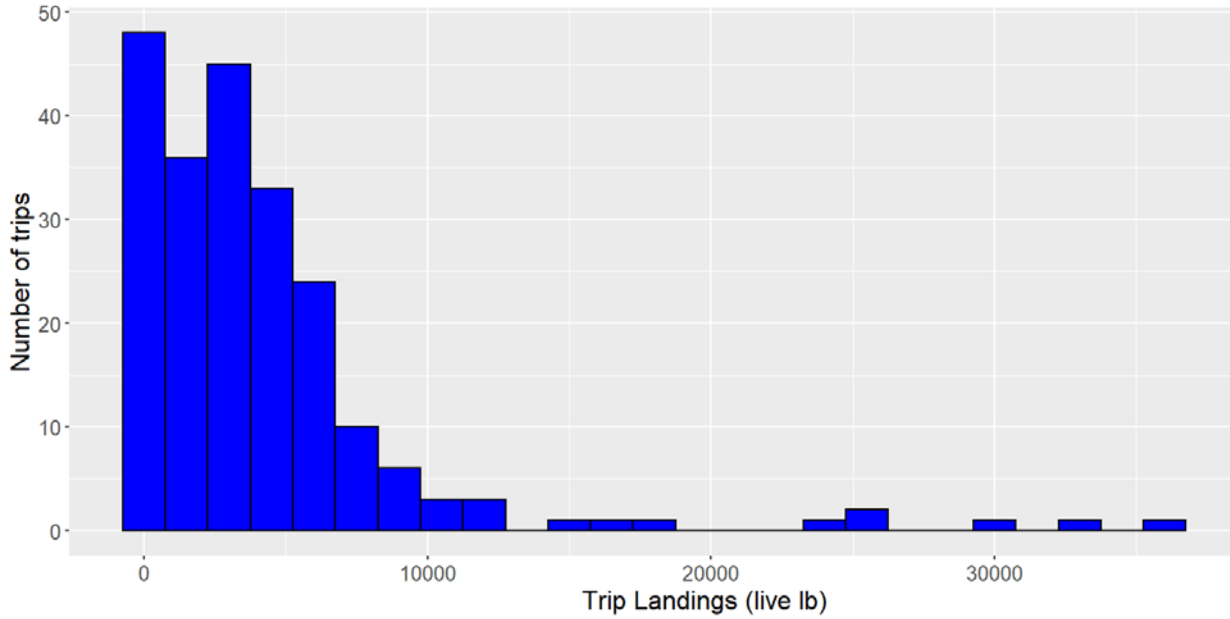
Monkfish Permit Category	Description	FY20-22 Monkfish Possession Limits (lb)	Previous Possession Limits
A	Only monkfish DAS	1,250 lb tail weight 3,638 lb whole weight	No change since at least FY 2011.
B		600 lb tail weight 1,746 lb whole weight	
C	Only monkfish DAS	1,250 lb tail weight 3,638 lb whole weight	
	Monk DAS & NE Mults A or Scallop DAS	Unlimited	FW9 (FY16): eliminated limit; No change since then.
D	Only monkfish DAS	600 lb tail weight 1,746 lb whole weight	No change in since at least FY 2011.
	Monk DAS & NE Mults A or Scallop DAS	Unlimited	FW9 (FY16): eliminated limit; No change since then.

Table 27. SFMA FY 2020-2022 monkfish limited access possession limits while fishing on at least a monkfish DAS.

Monkfish Permit Category	Description	FY20-22 Monkfish Possession Limits (lb)	Previous Possession Limits
A	Only monkfish DAS	700 lb tail weight 2,037 lb whole weight	No change since FY 2017.
B		575 lb tail weight 1,673 lb whole weight	
C	Only monkfish DAS	700 lb tail weight 2,037 lb whole weight	
	Monk DAS & NE Mults A or Scallop DAS	700 lb tail weight 2,037 lb whole weight	
D	Only monkfish DAS	575 lb tail weight 1,673 lb whole weight	
	Monk DAS & NE Mults A or Scallop DAS	700 lb tail weight 2,037 lb whole weight	
F	Seasonal offshore monkfish fishery in SFMA (Oct. 1-April 30)	1,600 lb tail weight 4,656 lb whole weight	No change since at least FY 2011
H	SFMA only	575 lb tail weight 1,673 lb whole weight	No change since FY 2017.

Vessels that use both a Northeast Multispecies (NE) DAS and a monkfish DAS in the NFMA have an unlimited monkfish possession limit. FY 2021, 16 vessels took at least one trip that used both DAS, taking a total of 208 trips, landing an average of 8,554 lb (whole weight) of monkfish per trip, with a range from 603 lb to 36,212 lb, whole weight (Figure 4, Table 25). Again, there is no monkfish landing limit for these trips.

Figure 4. Frequency of trip landings while using both a monkfish and Northeast Multispecies DAS in FY 2021.



Source: CAMS database. Accessed October 2022.

Incidental Possession Limits. To land incidental amounts of monkfish from federal waters, vessels must have a federal monkfish permit and not fish on a monkfish DAS. Incidental monkfish can be caught while on a Northeast Multispecies DAS, on a Scallop DAS or in the Sea Scallop Access Area Program, not under a DAS Program, and not under a DAS program that also hold permits in other fisheries/special cases. Incidental possession limits vary by trip type, gear, and management area (Table 28).

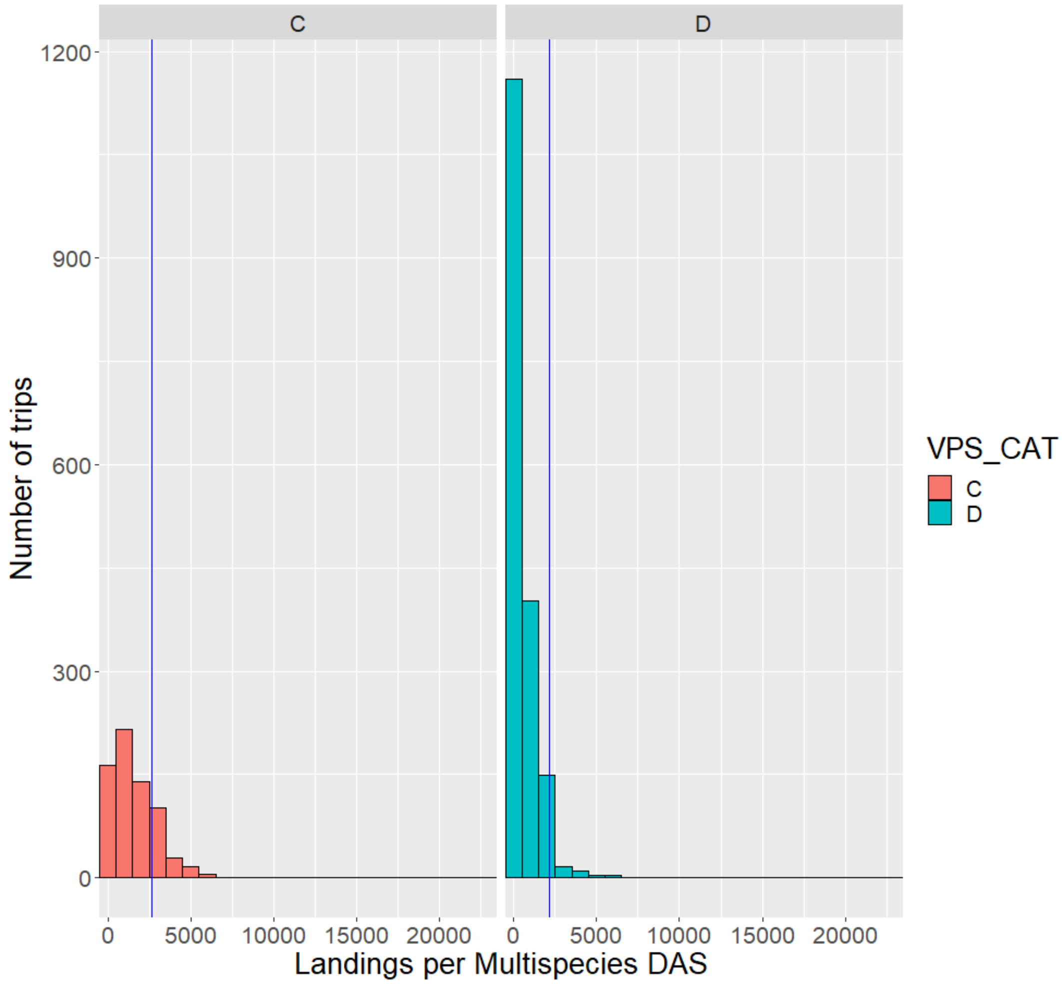
Again, vessels have the flexibility to land over the incidental limit when fishing on a Northeast Multispecies A DAS (e.g., a sector trip) if the vessel fishes only in the NFMA and declares the 'monkfish option' on the VMS unit before leaving port. If the vessel flexes the monkfish option during the trip (e.g., when landings exceed the incidental limit), then the vessel is charged both a Monkfish and NE Multispecies DAS and this is considered a directed monkfish trip. If the vessel selects the monkfish option prior to leaving port but does not flex on that option, then the vessel can only land incidental amounts of monkfish.

Table 28. Monkfish incidental possession limits by management area, gear, and permit category. Source: GARFO.

<table>
<tr><th colspan="3">Incidental Possession Limit Category</th><th>Management Area</th><th>Incidental Possession Limits by gear, permits</th></tr>
<tr><td colspan="3" rowspan="2">While on a NE Multispecies DAS</td><td>NFMA</td><td>All gear - 900 lb tail weight (2,619 lb whole weight; permit C), 750 lb (2,183 lb whole weight; permit D), up to 300 lb (permits E/F/H)</td></tr>
<tr><td>SFMA</td><td>Non-trawl – 50 lb tail weight for permits C, D, H
Trawl – 300 lb tail weight for permits C, D, H</td></tr>
<tr><td colspan="3">While on a Scallop DAS or in the Sea Scallop Access Area Program</td><td>NFMA and SFMA</td><td>All gear - 300 lb tail weight</td></tr>
<tr><td rowspan="8">While not under a DAS Program</td><td colspan="3">GOM, GB Reg. Mesh Areas</td><td>5% of total fish weight on board</td></tr>
<tr><td colspan="3">SNE Reg. Mesh Area</td><td>50 lb tail weight/day, up to 150 lb per trip</td></tr>
<tr><td colspan="3">MA Exemption Area</td><td>5% of total fish weight on board up to 450 lb tail weight</td></tr>
<tr><td colspan="3">NFMA or SFMA</td><td>50 lb tail weight/day, up to 150 lb per trip</td></tr>
<tr><td colspan="2">And fishing under skate bait Letter of Authorization</td><td>SNE Reg. Mesh Area</td><td>50 lb tail weight/day, up to 150 lb per trip</td></tr>
<tr><td rowspan="3">And holds permits in other fisheries/special cases</td><td>NE Multispecies Small Vessel Permit</td><td rowspan="3">NFMA or SFMA</td><td>All gear - 50 lb tail weight/day, up to 150 lb per trip</td></tr>
<tr><td>Surfclam or ocean quahog permit</td><td>Hydraulic clam dredge or mahogany quahog dredge - 50 lb tail weight/day, up to 150 lb per trip</td></tr>
<tr><td>Sea scallop permit</td><td>Scallop dredge only - 50 lb tail weight/day, up to 150 lb per trip
If in scallop dredge exemption areas - 50 lb tail weight/trip</td></tr>
</table>

In FY 2021, most NFMA monkfish landings were from vessels participating in the Multispecies sector program using only a Northeast Multispecies DAS (10.1 M live lb, Table 25). These incidental trips were harvested by vessels using either a monkfish C or D permit category using either trawl or gillnet gear, thus, have incidental limits of 2,619 lb and 2,183 lb whole weight per Northeast Multispecies DAS used (Table 28). The average incidental landings per Multispecies DAS used were 1,638 lb and 573 lb whole weight for permit category C and D, respectively (Figure 5). The majority of monkfish landings while only on a NE Multispecies DAS were less than the possession limits, however, some trips did exceed these limits (Table 29).

Figure 5. Frequency of monkfish landings per Northeast Multispecies DAS in the NFMA for permit categories C and D in FY 2021.



Notes: Blue vertical lines represent trip possession limits while using a Northeast multispecies DAS in the NFMA (2,619 lb for permit C and 2,183 lb for permit D, whole weight).

RSA trips were removed.

Source: CAMS and discard modules, November 2022.

Table 29. Monkfish landings (lb, whole weight) under and over incidental trip limits while using and not using a Northeast Multispecies DAS, by permit category, FY 2021.

Permit Category	Trips using NE Mult. DAS					Trips not using NE Mult. DAS (undeclared or NE Mult. sector or common pool)*	
	Trips landing < incidental limit		Trips landing > incidental trip limits				
	Total Landings	# Trips	Total Landings	Landings in excess**	# Trips	Total Landings	# Trips
C	5,242,947	620	196,625	49,961	56	1,098,745	251
D	2,171,167	1,674	243,711	59,392	72	877,139	750
TOTAL	7,414,116	2,294	440,336	109,353	128	1,975,884	1,001

Notes: RSA trips were removed from data.

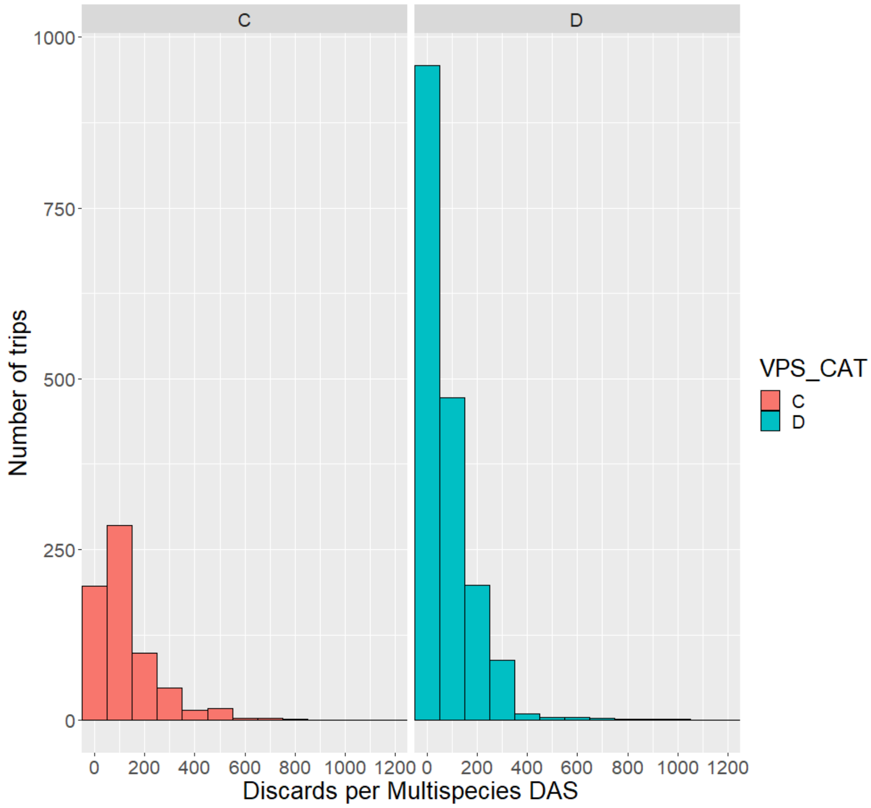
* These are either undeclared or NE Multispecies sector or common pool trips where a DAS is not required. These trips have incidental possession limits (146 lb whole weight per day, not to exceed 437 lb whole weight per trip). ~30% of these trips are landing over the incidental amount, landing 888,504 lb whole weight in excess, but some of these trips are Exempted Fishing Permit trips which have different possession limits.

** Only includes the landings more than the incidental possession limits (i.e., does not include the incidental landings legally allowed).

Source: CAMS and discard modules, November 2022.

When on a NE Multispecies DAS, vessels discarded about 80 to 129 lb (whole weight) per NE Multispecies DAS used, depending on whether a D or C permit category was used, respectively (Figure 6). The amount of discarding appears to increase as landings increase (Figure 7).

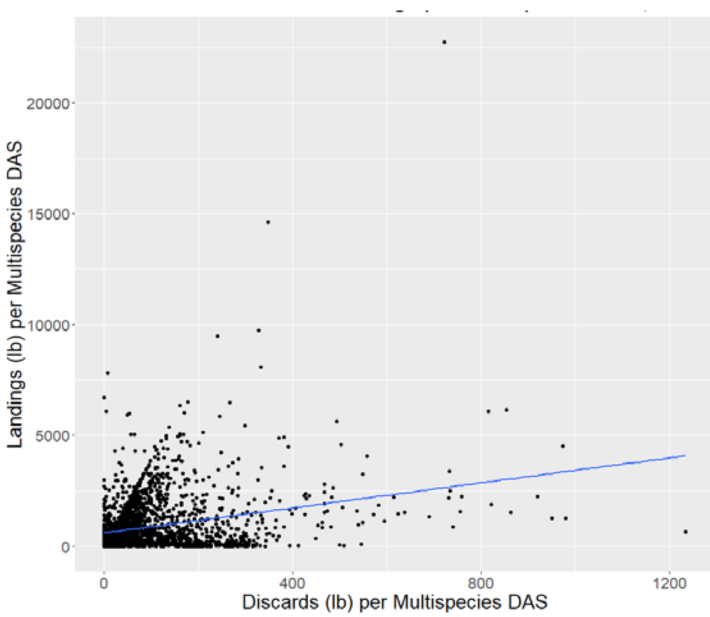
Figure 6. Frequency of trip discards per NE Multispecies DAS, by permit category in FY 2021.



Notes: RSA trips were removed.

Source: CAMS and discard modules, November 2022.

Figure 7. Discards as a function of landings (lb, whole weight), per NE Multispecies DAS in FY 2021.



Notes: RSA trips were removed. Blue line indicates a trend line.

Source: CAMS and discard modules, November 2022.

5.5.3.3 Gillnet Measures

To fish only on a monkfish DAS (i.e., not using a groundfish or scallop DAS), vessels must fish exclusively in an exemption area or fishery. With some exemptions, the minimum gillnet mesh size while fishing on a monkfish DAS is 10” diamond mesh (50 CFR 648.91(c)(1)(iii)). There are five exemption areas that apply to the monkfish fishery, each with specific gear requirements; only exemptions pertaining to gillnet are included here. Note that these exempted fisheries allow vessels to be exempt from certain Northeast Multispecies regulations (not required to use a NE multispecies DAS or to be on a NE multispecies non-DAS sector trip) provided a larger mesh size is used to help ensure bycatch of regulated groundfish species is minimal. If a vessel fishes outside these exemption areas in either the Gulf of Maine or Georges Bank Regulated Mesh Areas (thus, using both a monkfish DAS and a NE Multispecies DAS), then the gillnets must be a minimum of 6.5 inches throughout the entire net.

- *The Gulf of Maine/Georges Bank Monkfish Gillnet Exemption.* Seasonal exemption (July 1 – September 14) for vessels using gillnets with a minimum mesh size of 10 inches (diamond) throughout the net; vessels can only land monkfish and/or American lobster.
- *The SNE Monkfish Gillnet Exemption Area*. Year-round exemption for vessels using gillnets in Southern New England with a minimum mesh size of 10-inch diamond; vessels can also land skates, spiny dogfish, and incidentally caught species allowed in the SNE Regulated Mesh Area.
- *The Mid-Atlantic Exemption Area – trawl or gillnet gear*. Year-round exemption for vessels using or gillnet gear (minimum mesh size of 5 inches, maximum of 50 stand-up gillnets); vessels can land spiny dogfish, monkfish, whiting and red hake but are not permitted to land other regulated multispecies.

5.5.4 Fishing Communities

Primary and secondary monkfish fishing ports are identified for the Monkfish FMP. Based on the criteria below, there are six primary ports in the fishery (Table 30). Of these, the highest revenue ports are New Bedford, Gloucester, and Boston, MA (Table 31). There are 14 secondary ports. The primary and secondary ports comprised 66% and 28% of total fishery revenue, respectively, during 2010-2019. There are 138 other ports that have had more minor participation (6%) in the fishery recently. More community information is available from the NEFSC Social Sciences Branch website and in Clay et al. (2007).

Primary Port Criteria. The monkfish fishery primary ports are those that are substantially engaged in the fishery. The primary ports meet at least one of the following criteria:

1. At least $1M average annual revenue of monkfish during 2010-2019, or
2. Ranking of very high (factor score ≥ 5)[2] for engagement in the monkfish fishery on average in 2016-2020, using the NOAA Fisheries Community Social Vulnerability Indicators (Table 30).

Secondary Port Criteria. The monkfish fishery secondary ports are involved to a lesser extent. The secondary ports meet at least one of the following criteria:

1. At least $100,000 average annual revenue of monkfish, 2010-2019, or
2. A ranking of high (factor score 1-4.99) for engagement in the monkfish fishery on average in 2016-2020, using the NOAA Fisheries Community Social Vulnerability Indicators (Table 31).

Table 30. Primary and secondary ports in the monkfish fishery.

State	Port	Average revenue 2010-2019		Monkfish Engagement, 2016-2020		Primary/ Secondary
		>$100K	>$1M	High	Very High	
ME	Portland	√		√		Secondary
NH	Portsmouth	√		√		Secondary
MA	Gloucester		√		√	Primary
	Boston		√		√	Primary
	Scituate	√		√		Secondary
	Chatham	√		√		Secondary
	Harwichport	√		√		Secondary
	New Bedford		√		√	Primary
	Westport	√		√		Secondary
RI	Little Compton	√		√		Secondary
	Newport	√		√		Secondary
	Narragansett/Point Judith		√		√	Primary
CT	New London	√		√		Secondary
NY	Montauk	√			√	Primary
	Hampton Bays/ Shinnecock	√		√		Secondary
NJ	Point Pleasant	√		√		Secondary
	Barnegat Light/Long Beach		√	√		Primary
	Cape May			√		Secondary
VA	Chincoteague	√				Secondary
	Newport News			√		Secondary

Table 31. Fishing revenue (unadjusted for inflation) and vessels in top Monkfish ports by revenue, calendar years 2010 – 2019.

Port	Average revenue, 2010-2019			Total active monkfish vessels, 2010-2019
	All fisheries	Monkfish only	% Monkfish	
New Bedford, MA	$368,627,420	$4,240,639	1%	**479**
Gloucester, MA	$48,514,248	$2,924,748	6%	**190**
Boston, MA	$15,999,540	$1,809,192	11%	**44**
Pt. Judith, RI	$47,753,305	$1,604,760	3%	**214**
Long Beach, NJ	$26,124,402	$1,459,529	6%	**74**
Chatham, MA	$11,764,003	$817,736	7%	**57**
Little Compton, RI	$2,398,385	$802,384	33%	**31**
Montauk, NY	$17,192,554	$726,690	4%	**116**
Hampton Bay, NY	$5,746,477	$578,235	10%	**64**
Portland, ME	$24,798,943	$559,798	2%	**71**
Other (n=146)	$368,846,866	$3,750,338	1%	
Total	**$937,766,141**	**$19,274,049**	**2%**	

Source: NMFS Commercial Fisheries Database (AA data), accessed April 2022.
Note: “Active” defined as landing > 1 lb of monkfish.

The Engagement Index can be used to determine trends in a fishery over time. Those ports with very high monkfish engagement in 2016-2020, generally had very high engagement in 2006-2010 and 2011-2015, except for Boston, MA, which had increasing engagement over this time (Table 32). There are 14 ports that have had high or very high engagement during all three periods, indicating a stable presence in those communities. Annual data on port engagement is available at the [Commercial Fishing Performance Measures website.]()

Table 32. Changes in monkfish fishery engagement over time for all ports with high engagement during at least one year, 2006 – 2020.

State	Community	Engagement Index			
		2006-2010	2011-2015	2016-2020	2020 only
ME	Portland	High	High	High	High
NH	Portsmouth	High	Med.-High	High	High
MA	Gloucester	Very High	Very High	Very High	Very High
	Boston	High	High	Very High	Very High
	Scituate	High	High	High	High
	Chatham	High	High	High	High
	Harwichport	Medium	Medium	High	High
	New Bedford	Very High	Very High	Very High	Very High
	Westport	Med.-High	High	High	Med.-High
RI	Tiverton	Med.-High	Medium	Medium	Medium
	Little Compton	High	High	High	High
	Newport	High	High	High	High
	Narragansett/Pt. Judith	Very High	Very High	Very High	Very High
CT	Stonington	Med.-High	Med.-High	Med.-High	High
	New London	Med.-High	High	High	High
NY	Montauk	Very High	Very High	Very High	High
	Hampton Bays/Shinnecock	High	High	High	High
NJ	Point Pleasant	High	High	High	High
	Barnegat Light/Long Beach	Very High	Very High	High	High
	Cape May	High	High	High	High
MD	Ocean City	High	High	Med.-High	Med.-High
VA	Chincoteague	High	High	Medium	Medium
	Newport News	Med.-High	High	High	High
NC	Wanchese	High	Med.-High	Med.-High	Med.-High
	Beaufort	Medium	Med.-High	Med.-High	Medium

Source: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

Landings by state
During CY 2012-2021, monkfish were landed in 11 states, mostly in Massachusetts (61%), followed by Rhode Island (13%), and New Jersey (9%, Table 33). Massachusetts continues to account for the greatest proportion of all monkfish landings.

Table 33. Monkfish landings by state, CY 2012 – 2021.

STATE	Monkfish landings (mt)											
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total	
ME	488	115	257	345	243	178	219	170	411	442	**4,062**	4%
NH	57	86	74	38	50	68	123	119	175	213	**1,463**	2%
MA	5,247	3,812	4,972	4,303	4,227	4,581	5,067	5,943	6,306	6,057	**55,961**	61%
RI	1,303	1,598	2,122	1,495	1,488	1,819	1,648	1,560	1,412	2,306	**11,441**	13%
CT	347	305	457	547	724	380	464	275	246	324	**2,123**	2%
NY	841	766	1,059	1,183	773	748	827	1,193	829	1,005	**5,996**	7%
NJ	1,003	1,418	1,676	1,389	1,351	1,740	1,250	1,335	1,229	1,205	**7,946**	9%
DE	0										**0**	0%
MD	51	83	98	69	86	78	36	51	32	19	**285**	0%
VA	412	402	638	567	413	352	259	218	88	142	**1,748**	2%
NC	10	27	10	3	38	47	56	33	36	20	**244**	0%
Total	**9,758**	**8,612**	**11,365**	**9,940**	**9,394**	**9,992**	**9,949**	**10,897**	**10,765**	**11,735**	**91,271**	**100%**

Source: ACCSP database, accessed April 2022.

6.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

6.1 INTRODUCTION

The impacts of the alternatives under consideration are evaluated herein relative to the valued ecosystem components (VECs) described in the Affected Environment (Section 0) and to each other. This action evaluates the potential impacts described in terms of their direction (negative, positive, or no impact) and their magnitude (slight, moderate, or high) based on the guidelines shown in Table 34.

Table 34. General definitions for impacts and qualifiers relative to resource condition (i.e., baseline).

VEC	Resource Condition	Impact of Action		
		Positive (+)	Negative (-)	No Impact (0)
Target and Nontarget 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 (Socioeconomic)	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities

Impact Qualifiers

A range of impact qualifiers is used to indicate any existing uncertainty	Negligible	To such a small degree to be indistinguishable from no impact
	Slight (sl) as in slight positive or slight negative	To a lesser degree / minor
	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.

6.1.1 Analysis of Potential Effort Changes Under Action 2

Action 2 includes alternatives that would change the DAS and possession limit effort controls of the monkfish fishery. This section describes the methods used to evaluate how these alternatives may change fishery effort and potential changes to monkfish landings. Results of this analysis are provided here as they are applicable to each VEC.

6.1.1.1 Analysis of reducing monkfish DAS allocations (Alternative 2)

Methods: Simulation of recent fishery performance

The analysis sought to determine how the reductions in DAS proposed in the three options in Alternative 2 would potentially change total landings and if the landings under each option would be within the FY 2023-2025 TALs in Action 1, Alternative 3. To accomplish this, the fishery in FY 2019 and 2021 was simulated under the options considered. While likely informative about the direction and relative scale of impacts, the simulation cannot capture all facets of fishery behavior in future years so deviations from simulation predictions are expected.

The rationale for using data from FY 2019 and 2021 is as follows. FY 2019 is the most recent year prior to the pandemic, and FY 2021 is the most recent complete fishing year. DAS charge was averaged across FY 2019 and FY 2021 by trip to account for DAS use before the pandemic and the latest available DAS use. The markets are still recovering from the pandemic so there is an expectation that DAS use will continue to rebound, likely to an effort level in between FY 2019 and FY 2021. For landings data, FY 2021 landings were not averaged with FY 2019 because the number of fishing vessels is generally declining over time, so landings are expected to follow a similar pattern (versus DAS use data which are determined by individual vessels). FY 2021 landings were primarily used for both Alternative 2 (DAS reduction) and solely used for Alternative 3 (incidental trip limit reduction) to reflect more recent fishing effort. For Alternative 2, however, some adjustments were needed to match the total vessels using DAS in FY 2019 and 2021 with the landings data in FY 2021. For vessels with only FY 2021 participation, FY 2021 DAS charge and landings data were used. For vessels with only FY 2019 participation, FY 2019 DAS charge and landings data were used. Relying only on FY 2019 landings data would likely result in higher estimated landings than what is shown in Table 25 given FY 2019 had higher landings than FY 2021.

To determine the fishery-wide changes to landings under each DAS option, the changes in landings for vessels that used a monkfish DAS were first calculated and then added to the landings by vessels not under a monkfish DAS, the latter not being impacted by the potential DAS reductions. The changes in landings for vessels that used a monkfish DAS were calculated in the following steps:

1. Identify the vessels that used over the DAS limits under consideration (20, 10, or 0 DAS) and those that use up to those limits.
2. For vessels that used over the limits (e.g., > 20, 10, or 0 DAS), landings per DAS were calculated and multiplied by 20, 10, or 0 DAS for each vessel. This results in the total landings from fully utilizing the newly reduced DAS. This was subtracted from their total landings using a monkfish DAS to identify their potential reduction in landings.
3. For vessels using up to the limits (e.g., ≤ 20, 10, or 0 DAS), actual landings for each vessel were used (i.e., these vessels would not experience any loss in DAS).
4. Landings from Steps 2 and 3 were added together to estimate total landings using a monkfish DAS under each DAS option.
5. Landings from vessels NOT using a monkfish DAS were summed from the orange rows in Table 25 (i.e., these vessels used DAS in other fisheries).
6. Total landings (MNK + non-MNK DAS) were calculated by summing monkfish DAS landings (Step 4) with non-monkfish DAS landings (Step 5) and then compared against the FY 2023-2025

TALs (Action 1, Alternative 3) to determine if expected landings would be within or exceed TALs.

Notes:

- Vessels were assigned to a fishery management area based on activity code data. Vessels that fished in both the NFMA and SFMA were assigned to one management area based on where most of their trips were taken.
- Reductions in landings may be tempered if vessels use whatever carryover of DAS is available to them from the prior fishing year. The potential for use of carryover is not included in this analysis, as it is highly specific to the vessels and can vary greatly each year.
- Reductions in landings could also be tempered if vessels choose to take advantage of the DAS overage provision in which vessels are permitted to land an additional day's trip limit worth of monkfish than would otherwise be allowed based on the vessel's actual monkfish DAS usage for that trip. The monkfish DAS charge would be rounded to the next 24-hour period plus 1 minute.

<u>Assumptions regarding discards</u>

This analysis does not quantify if and how discards may increase under these options, however, discards are not likely to increase substantially. In the SFMA, trips using a Monkfish DAS account for the greatest amount of landings, so reducing Monkfish DAS allocations would likely reduce the number or duration of trips taken. Reducing Monkfish DAS allocations in the NFMA is likely to have less of an impact on the number of trips taken, given most of the landings are from vessels not using a Monkfish DAS (Table 35). The analysis does not change the total expected discards from what is specified in Section 4.1.3, assuming that amount would be fully realized (i.e., 728.5 mt in the NFMA and 2,204.5 mt in the SFMA).

Results

<u>NFMA</u>

In the NFMA, Option 2A (20 DAS) would result in the least potential reduction in landings followed by Option 2B (10 DAS) and Option 2C with the greatest reduction in landings (0 DAS, Table 35). Using FY 2019 and 2021 data, there would be about 469K lb fewer landings under Option A, meaning that these were the landings from monkfish DAS above the Option 2A 20 DAS limit (likewise, a 1.1M lb and 2.1M lb reduction under Options 2B and 2C, respectively). Between 12 – 33 vessels are expected to be impacted by the monkfish DAS reduction options; the vessels that used monkfish DAS above these limits. While these reductions would be substantial for these vessels, most monkfish landings in the NFMA are from trips where a monkfish DAS was not used (8.5 M lb). All three options are estimated to result in landings remaining within the FY 2023-2025 TAL proposed for the NFMA under Action 1, Alternative 3, with a range of 83% to 100% of the TAL.

Alternative 2 is expected to have little impact in the NFMA on fishery effort. In the NFMA,14% of monkfish landings in FY 2019 and 2021 were landed using a monkfish DAS and 0.3% were landed only on a monkfish DAS (Table 25). Given most of the NFMA landings are from trips where a monkfish DAS is not used, reducing monkfish DAS would have little impact on the number or duration of trips overall. There were 33 vessels that used a Monkfish DAS, and of these, 21 used < 20 DAS (i.e., not impacted by Option A, Figure 3, Table 35).

<u>SFMA</u>

In the SFMA, Option 2A similarly results in the least potential reduction in landings (1.3 M lb) followed by Option 2B (2.6 M lb) and Option 2C with the greatest reduction in landings (4.1 M lb, Table 35). Between 48 – 78 vessels are expected to be impacted by the Monkfish DAS reduction options. The number of impacted trips is higher compared to the NFMA because trips using a Monkfish DAS account for more landings than trips not using a Monkfish DAS (unlike in the NFMA). Option 2A is not estimated to result in landings remaining within the FY 2023-2025 TAL, while Options 2B and 2C are estimated to be 91% and 45%, respectively, of the new TAL.

Alternative 2 is expected to have more impact in the SFMA on fishery effort than in the NFMA. In the SFMA, 73% of monkfish landings in FY 2019 and 2021 were landed using a monkfish DAS and 62% were landed only on a monkfish DAS (Table 25). Thus, monkfish is a more targeted fishery in the SFMA and reducing monkfish DAS would likely reduce the number and/or duration of trips.

Table 35. Estimated landings resulting from Alternative 2 Options A, B, and C.

	Option 2A 20 DAS	Option 2B 10 DAS	Option 2C 0 DAS
NORTH (ABC/ACL = 5,526 mt; TAL = 4,632 mt)			
# vessels that used Monkfish DAS over the limit	12	23	33
Landings from monkfish DAS over the DAS limit (i.e., potential reductions in landings)	468,642 lb (212.6 mt)	1,087, 050 lb (493.1 mt)	2,146,149 lb (973.5 mt)
Landings using a MNK DAS	1,677,507 lb (760.9 mt)	1,059,099 lb (480.4 mt)	0 lb (0 mt)
Landings not using a MNK DAS	8,491,220 lb (3,851.6 mt)	8,491,220 lb (3,851.6 mt)	8,491,220 lb (3,851.6 mt)
Total landings (MNK + non-MNK DAS)	10,168,727 lb (4,612.5 mt)	9,550,319 lb (4,332 mt)	8,491,220 lb (3,851.6 mt)
Total landings as % of FY23-25 TAL	100%	94%	83%
SOUTH (ABC/ACL = 3,766 mt; TAL = 1,449 mt)			
# of vessels that used Monkfish DAS over the limit	48	61	78
Landings from monkfish DAS over the DAS limit (i.e., potential reductions in landings	1,331,190 lb (603.8 mt)	2,559,949 lb (1,161.2 mt)	4,053,253 lb (1,838.5 mt)
Landings using a MNK DAS	2,722,063 lb (1,234.7 mt)	1,493,304 lb (677.4 mt)	0 lb (0 mt)
Landings not using a MNK DAS	1,421,742 lb (645 mt)	1,421,742 lb (645 mt)	1,421,742 lb (645 mt)
Total landings (MNK + non-MNK DAS)	4,143,805 lb (1,879.6 mt)	2,915,046 lb (1,322.2 mt)	1,421,742 lb (645 mt)
Total landings as % of FY23-25 TAL	130%	91%	45%

Notes: Landings in whole weight lb with metric tons in parentheses. Green highlights indicate landings remaining within the FY 2023-2025 TAL (under Action 1, Alternative 3).

6.1.1.2 Analysis of reducing NFMA Permit Category C and D Incidental Possession Limits (Alternative 3)

Methods

Theoretical maximum reductions in landings. An approach to identify how landings may change under Alternative 3 is to identify the maximum potential monkfish landings for vessels using only a NE multispecies DAS under the No Action and Alternative 3 incidental possession limits (Table 4). For this analysis, FY 2021 data were used as it is the latest complete year of fishery data and reflects the most recent effort in the fishery. First, identify the total NE Multispecies DAS used by monkfish permit category C and D vessels in FY 2021 when only a NE Multispecies DAS was used and multiply that total DAS by 2,619 lb for permit category C and 2,183 lb for permit category D (the No Action incidental possession limits). This would have been the total maximum monkfish landings on these incidental trips. Then, multiply these DAS totals by the reduced incidental limits. The difference between the landings under No Action and under reduced incidental limits represents the total reduction in incidental landings (Table 36).

Simulation of recent fishery performance. FY 2021 fishery data were used to identify potential changes in landings and discards under Alternative 2 and the number of trips and vessels that would be impacted. FY 2021 fishery data from the NFMA was selected to identify the trips in the NFMA where only a NE multispecies DAS was used. Monkfish landings on these trips are limited to the incidental possession limit per DAS (currently 2,619 lb whole weight for permit category C, 2,183 lb whole weight for permit category D). Identifying the monkfish landings and discards on these trips helps determine the potential for either 1) landings to be turned into discards if the incidental possession limit is lowered or 2) vessels that may opt to use a monkfish DAS so that they can land monkfish above the lowered incidental limit (these trips would have an unlimited possession limit). While likely informative about the direction and relative scale of impacts, the simulation cannot capture all facets of fishery behavior in future years so deviations from simulation predictions are expected.

Results

Theoretical approach: In FY 2021, there were 7,018 NE multispecies DAS used by vessels with monkfish category C and D permits when not fishing on a monkfish DAS (Table 36). The theoretical maximum incidental monkfish that could have been landed by these vessels was 16.9 M lb, which would be reduced by 20% or 40% under Options 3A and 3B, respectively. Option 3B (40% reduction) would result in the greatest reduction in incidental landings, 3 – 3.75M lb for permit categories D and C, respectively, compared to Option 3A (20% reduction) with an expected reduction of 1.5 – 1.87M lb for these permits, respectively.

This approach assumes that for each NE multispecies DAS used, the full incidental possession limit of monkfish is retained. However, these vessels are largely targeting NE multispecies, so there are vessel capacity, market, and other constraints such that actual monkfish landings are likely to be lower than the theoretical maximum. It is therefore more realistic to focus on actual FY 2021 data that illustrate this. The actual FY 2021 monkfish landings for category C (5.4M lb) and D (2.4M lb) vessels when only fishing on a NE multispecies DAS are lower than the theoretical maximums under No Action (16.9M lb total). Thus, the theoretical maximum reductions for Options 3A and 3B are likely higher than what would occur.

Table 36. Theoretical impact on landings by reducing the incidental limit while on a Northeast Multispecies DAS, based on FY 2021 data.

Alternatives	Permit Category	Possession Limits (lb, whole weight) per NE Mult. DAS	# of NE Mult. DAS used*	Theoretical max landings (lb, whole weight)**	Change relative to No Action (lb, whole weight)
No Action	C	2,619	3,574	9,360,306	n/a
	D	2,183	3,444	7,518,252	n/a
Option A: 20% reduction	C	2,095	3,574	7,487,530	-1,872,776 (-20%)
	D	1,746	3,444	6,013,224	-1,505,028 (-20%)
Option B: 40% reduction	C	1,571	3,574	5,614,754	-3,745,552 (-40%)
	D	1,310	3,444	4,511,640	-3,006,612 (-40%)

* These are the number of NE Multispecies DAS used in FY 2021 when not on a Monkfish DAS; each trip's NE Multispecies DAS charge is rounded up to the nearest whole number then summed across the fishery.

** This is the possession limit multiplied by the DAS in whole weight lb.

Source: CAMS landings and discard data, accessed November 2022. CAMS discard data are still under review by the NEFSC.

Simulation of recent fishery performance: The loss of landings was greatest for Option B (2.3M lb total) given this is a greater percent reduction in incidental trip limits while under a NE multispecies DAS relative to Option A (1.5M lb; Table 37). The total discards for the impacted Option B trips range from 82,000 -222,000 lb, higher than those for Option A (49,000 -169,000 lb), and higher than the discards for trips fully utilizing the current trip limits (No Action, ≥ 90% trip limits, 41,000-135,000 lb). It is difficult to model changes in fishing behavior, thus, the analysis does not calculate if, and to what extent, the reduction in incidental landings would be turned into discards given monkfish is not the target species in NE Multispecies fishery. Turning landings into discards would help the fishery stay within the TAL but not change the overall catch (landings plus discards).

On a given trip, the amount of monkfish landings may be unchanged but, should Action 2 Alternative 3 be selected, the Monkfish DAS that could be used by a vessel would be lowered. Once a vessel uses all its monkfish DAS, the vessel may choose to not fish rather than be limited to the incidental monkfish limit, which may reduce total effort and keep monkfish catch within the NFMA ACL.

Effort in the groundfish fishery has generally been declining over time and most of the monkfish caught in the NFMA is incidentally caught while targeting groundfish species. If groundfish effort is already constraining monkfish effort in the NFMA, then either status quo or a 20% reduction in category C and D incidental possession limits may be sufficient. If, however, effort is expected to increase in the groundfish fishery in the north, then a 40% reduction in incidental possession limits may be warranted.

Table 37. Number of trips potentially impacted by reducing the monkfish incidental possession limit while on a Northeast Multispecies DAS, using FY 2021 data.

Alternatives	Description of Trips Impacted by Alternatives	Permit Category	Possession Limit per NE Mult. DAS (lb, whole weight)*	# of Trips > Landing Limits per NE Mult. DAS	Landings (lb, whole weight)	Loss of landings from Alternative 2	Discards (lb, whole weight)
No Action	Landings, discards at full trip limits (≥ 90% trip limits)	C	2,619	169 (676 trips in FY21)	5,439,572	N/A	135,199 (446,822 lb total in FY21)
		D	2,183	121 (1,746 trips in FY21)	2,414,880	N/A	41,256 (295,018 lb total in FY21)
Option A: 20% reduction	Landings, discards at ≥ 80% trip limits	C	2,095	207	4,239,674	-1,199,898	169,000
		D	1,746	150	2,124,839	-290,041	49,244
Option B: 40% reduction	Landings, discards at ≥ 60% trip limits	C	1,571	280	3,658,754	-1,780,818	222,228
		D	1,310	230	1,923,608	-491,272	82,295

* Monkfish possession limit per each NE Multispecies DAS used.

Source: CAMS landings and discard data, accessed November 2022. CAMS discard data are still under review by the NEFSC.

6.1.2 Analysis of Potential Effort Changes Under Action 3

Methods. Vessel Trip Reports from FY 2018 – 2021 were used to identify the number of trips and vessels using ≥10” gillnet mesh sizes to understand the impact of increasing the minimum gillnet mesh size from 10” to either 11” or 12” mesh. The evaluation was done by management area given the fishing operations differ between the two areas. Generally, vessels fishing in the SFMA are considered the directed fishery using gillnet gear while vessels fishing in the NFMA are primarily those participating in the Northeast Multispecies fishery using trawl gear.

Results. Between FY 2018-2021, most vessels fishing with gillnet and using only a monkfish DAS are using mesh larger than the current minimum of 10”.

In the NFMA, there were no trips that used 10” mesh in the timeframe examined. Between 22% - 42% of monkfish gillnet trips used 11” mesh in FY 2018-2021, taken by 3-5 vessels (21-29% of vessels) in areas where a minimum of 10” mesh is required; (Table 38). 58% - 78% of monkfish gillnet trips used 12” mesh, trips taken by 11-12 monkfish gillnet vessels.

In the SFMA, < 1% of trips by about 7% of vessels made by an average of 3 vessels per fishing year using 10” mesh in areas where a minimum of 10” mesh is required (Table 38). No trips used 10” mesh in 2021. At least 99% of monkfish gillnet trips used at least 11” mesh size, trips taken by at least 93% of the monkfish gillnet vessels. 4-6% of trips by 9-16% of vessels (4-12 vessels) used 10” or 11” mesh. 94% - 96% of monkfish gillnet trips used at least 12” mesh, trips taken by 39-81 vessels (Table 38).

Table 38. Number of monkfish gillnet trips and vessels by mesh size, FY 2018 – FY 2021.

Mesh Size	Number of trips	Percent of trips	Number of vessels	Percent of vessels
Northern Fishery Management Area				
FY 2018				
11”	106	42%	4	25%
12”	148	58%	12	75%
FY 2019				
11”	75	34%	5	29%
12”	148	66%	12	71%
FY 2020				
11”	C	C	C	C
12”	66	C	11	C
FY 2021				
11”	40	~22%	3	~21%
11.5”	C	C	C	C
12”	138	~78%	11	~79%
Southern Fishery Management Area				
FY 2018				
10”	C	C	C	C
11”	96	~4%	8	~9%
12”	2,278	~96%	81	~91%
FY 2019				
10”	8	<1%	3	~4%
11”	105	~5%	9	~11%
12”	1,971	~95%	72	~86%
13”	C	C	C	C
FY 2020				
10”	8	<1%	5	7%
11”	81	6%	6	9%
12”	1,308	94%	56	84%
FY 2021				
11”	53	6%	4	~9%
12”	814	94%	39	~91%
14”	C	C	C	C

Notes: Data only include ‘MNK’ activity codes. The number of vessels by mesh size are not additive given there is a small number of vessels that fish multiple mesh sizes (i.e., the number of vessels are not unique vessels).

‘C’ represents confidential data with < 3 fishing vessels.

Source: Vessel Trip Reports 2018-2022, accessed September 2022.

6.2 IMPACTS ON TARGET SPECIES (MONKFISH)

Biological impacts discussed below focus on expected changes to the monkfish population. The impacts of the alternatives under consideration are likely not significant relative to the No Action alternatives.

The status of the monkfish resource is unknown. The lack of an analytical assessment in 2022 precluded the estimation of absolute biomass and a fishing mortality rate. While the 2013 stock assessment concluded that monkfish were not overfished and overfishing was not occurring, the basis for that determination was rejected during the 2016 stock assessment and the status has been unknown. Despite long-standing uncertainties about the monkfish resource, the fishery continues to be managed with the latest available data and catch limits have been set at levels determined to prevent overfishing and promote the long-term health of the resource. Management uncertainty is accounted for in the structure established for specifications that includes buffer between the ACL and the ACT. Moreover, accountability measures (AMs) would be triggered if an ACLs is exceeded, further reducing the risk of overfishing and adverse impacts to the stock.

6.2.1 Action 1 – FY 2023-2025 Specifications

6.2.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either fishery management area. The ABCs, ACLs, and TALs would be set at 0 mt.

The impacts of Alternative 1 on target species would be uncertain but likely moderately positive. The stock status of monkfish has been unknown in the last three assessments, so there is uncertainty about the impacts on monkfish of any specifications alternative. However, a directed fishery would likely be precluded under Alternative 1, so catch would likely be substantially reduced relative to recent levels, minimizing fishing mortality on monkfish.

6.2.1.2 Alternative 2 – Status Quo

Under Alternative 2, the specifications for FY 2023-2025 would be unchanged from the specifications for FY 2020-2022 (NFMA OFL = 17,805 mt, ABC/ACL = 8,351 mt, TAL = 6,624 mt; SFMA OFL = 23,204 mt, ABC/ACL = 12,316 mt, 5,882 mt; Table 2).

The impacts of Alternative 2 on target species may be uncertain but likely slightly negative and more negative than Alternative 1. The fishery would continue to operate under current specification levels, levels that are higher than what the SSC has recommended for FY 2023-2025 and not based on outcomes of the latest (2022) stock assessment. The ABC would not be reduced to reflect the recent decrease in monkfish survey indices (Table 6). The Alternative 2 specifications are based on a 2013 analytical assessment that was invalidated in 2016 and use survey and fishery data through 2018, with assumptions about discard mortality (100% discard mortality from all gears) that would not be updated. Due to the unknown stock status of monkfish, it is uncertain if the Alternative 2 OFL and ABC values would prevent overfishing. Considering the differences between the ACLs of Alternatives 2 and 3, the overall fishing mortality on monkfish would likely be higher under Alternative 2, though fishing mortality under either alternative cannot be quantified.

6.2.1.3 Alternative 3 – Updated Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (NFMA OFL = undetermined, ABC/ACL = 5,526 mt, TAL = 4,631 mt; SFMA OFL = undetermined, ABC/ACL = 3,766 mt, 1,448 mt; Table 3) and would continue to be in place until a subsequent action replaces them.

The impacts of Alternative 3 on target species may be uncertain but likely moderately positive, more negative than Alternative 1, and more positive than Alternative 2. The fishery would operate under specification levels that are at what the SSC has recommended for FY 2023-2025 and based on outcomes of the latest (2022) stock assessment that used survey and fishery data through 2021, an index-based approach to identify catch advice, and updated assumptions about discard mortality (dredge discard mortality at 64%, all other gears at 100%). Adopting undetermined OFLs is more consistent with the stock status conclusion of the last three assessments (unknown) than continuing with status quo OFLs that are based on an analytical assessment that was invalidated in 2016. Considering the differences between the ACLs of Alternatives 2 and 3, the overall fishing mortality on monkfish would likely be lower under Alternative 3, though fishing mortality under either alternative cannot be quantified.

Under Alternative 3, ABC would likely be set at levels that prevent overfishing and prevent monkfish from becoming overfished, but again, due to the unknown stock status, there is uncertainty about this conclusion. The peer-reviewed findings of the Index-based Methods Working Group and Legault et al. (in press) found that the Ismooth approach, in the face of multiple uncertainties, was likely to provide catch advice that prevents overfishing and promotes long-term stability of catch and biomass. The ABCs would be reduced to reflect the recent decrease in monkfish survey indices (Table 6). While catch advice stemming from the Ismooth approach is generally used as the ABCs (Equation 1), the SSC recommended that for these monkfish specifications, the catch advice be set equal to the annual catch targets (Equation 2), resulting in ABCs that would be set at 3% higher values, following the specifications flow-chart for monkfish (Figure 1). This small increase in ABC (from 5,360 to 5,526 mt in the NFMA; from 3,653 to 3,766 mt in the SFMA) is likely to have a negligible impact on the monkfish resource.

*Equation 1: catch advice = Trawl survey multiplier * latest 3-year average catch = ABC*

*Equation 2: catch advice = Trawl survey multiplier * latest 3-year average catch = ACT*

6.2.2 Action 2 – Effort Controls

6.2.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), each vessel issued a limited access monkfish permit is allocated 46 (45.2 after the RSA deduction) DAS per fishing year, 37 of which can be used in the SFMA. DAS carryover and monkfish possession limits specific to each permit category in the NFMA and the SFMA would be unchanged.

The impacts of Alternative 1 on target species would likely be slightly negative. Maintaining current monkfish DAS allocations and possession limits would unlikely change fishing effort and behavior (e.g., number of trips, amount of discarding). There would likely be the same number of trips and the proportion of discards to landings on each trip would be unchanged. If the ABCs in Alternative 3 under Action 1 are adopted, the ABCs would decline by 34% and 69% in the NFMA and SFMA, respectively. NFMA landings in FY 2021 were 584 mt (1.3M lb) higher than the TAL would be (5,215 vs 4,631 mt); SFMA landings were 520 mt (1.1 M lb) higher (1,968 vs 1,448 mt, Table 18). The No Action effort controls would help constrain landings but may not be sufficient to keep landings within the TALs. Alternative 1 would not create any additional measures to constrain monkfish landings and therefore may not prevent the ACLs and ABCs from being exceeded.

6.2.2.2 Alternative 2 - Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. There are three options for the DAS allocation (20, 10, 0 DAS) for each area. The possession limits per Monkfish DAS used would be unchanged in Alternative 2.

The impacts of Alternative 2 on target species would likely be slightly to moderately positive. If the ABCs in Alternative 3 under Action 1 are adopted, the ABCs would decline by 34% and 69% in the NFMA and SFMA, respectively. The Alternative 2 DAS reductions would help constrain landings and keep landings within the TALs and are not likely to increase discards, thereby helping keep the ACLs and ABCs from being exceeded compared to Alternative 1 (Table 35). Reducing Monkfish DAS allocations would likely result in a reduction in the number of trips taken primarily in the SFMA, where trips using a Monkfish DAS account for the greatest amount of landings, particularly for the Category A and B vessels that do not have DAS in other fisheries on which to catch incidental levels of monkfish. Reducing Monkfish DAS allocations in the NFMA is likely to have less of an impact on the number of trips taken given most of the landings are from vessels not using a Monkfish DAS (Table 35). DAS reduction would have more of a positive impact on the monkfish resource in the SFMA relative to the NFMA. Discards are not likely to change substantially under a reduction in DAS allocation because vessels targeting monkfish would more likely choose not fish once they use their full DAS allocation versus fishing at lower incidental limits and discarding the remaining.

Option A (20 DAS allocation) would result in the least positive impact to monkfish given the most monkfish would be harvested relative to Option B (10 DAS) and Option C (0 DAS). Option C would result in the most positive impact to monkfish because zero DAS would be allocated, which is lower than DAS allocation under Options A and B.

6.2.2.3 Alternative 3 - Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, monkfish incidental possession limits would be reduced for vessels fishing in the NFMA while fishing on a Northeast multispecies DAS with either a monkfish Category C or D permit without fishing on a monkfish DAS. There are two options for monkfish possession limit reductions (20% and 40%), applied per Northeast multispecies DAS used.

The impacts of Alternative 3 on target species would likely be slightly positive and more positive than Alternative 1 but less positive than Alternative 2. If the ABCs in Alternative 3 under Action 1 are adopted, the ABCs would decline by 34% and 69% in the NFMA and SFMA, respectively. The Alternative 3 reduction in NFMA incidental limits would result in positive impacts to monkfish if landings remain within the new TALs and if total catch (landings and discards) do not exceed the ACL. Option A (20% reduction, 1.5M lb, Table 37) would have less positive impacts on the monkfish resource relative to Option B (40% reduction, 2.3M lb). These potential reductions in landings (1.5M lb or 2.3M lb) in the NFMA would be enough to keep the NFMA fishery within TAL proposed under Action 1, Alternative 3 (would need to reduce landings by 1.3M lb). NFMA landings in FY 2021 were 584 mt (1.3M lb) higher than the TAL would be (5,215 vs 4,631 mt).

Reducing incidental landings while fishing on a Northeast multispecies DAS will likely reduce landings, however, that reduction may be tempered by some increase in discards if vessels land monkfish with the lower incidental limit rather than choose to use a monkfish DAS (with unlimited monkfish possession limits). The analysis does not change the total expected discards from what is specified in Section 4.1.3, assuming that amount would be fully realized (i.e., 728.5 mt in the NFMA and 2,204.5 mt in the SFMA), thus, it is not likely the ACL will be exceeded. Vessels fishing in the NFMA primarily operate as part of the Northeast multispecies fishery, which target groundfish, not monkfish (Table 36). A reduction in monkfish incidental limits is not likely to substantially change fishing behavior and operations of the NE Multispecies fishery (i.e., the fishery will continue targeting groundfish). Once these vessels use all their monkfish DAS, they likely would opt to continue making trips directing on groundfish (and discard monkfish over the incidental limit) rather than stop taking trips.

Summary of Selecting a Combination of Action 2 Alternatives

Should the Councils choose an option under both Alternative 2 (NFMA and SFMA Monkfish DAS reductions) and Alternative 3 (NFMA incidental possession limit reductions), then the impacts on the monkfish resource would likely be slightly to moderately positive. There would likely be a low interacting effect by selecting both Alternatives 2 and 3 given NFMA vessels are likely to continue targeting groundfish and may or may not use a Monkfish DAS to land monkfish in amounts greater than the incidental limits. This means that the reduction in landings would be cumulative. In the NFMA, vessels primarily target groundfish and use fewer Monkfish DAS compared to the SFMA, thus, a reduction in Monkfish DAS is not likely to have a substantial impact on fishing effort. A reduction in incidental monkfish limits in the NFMA is likely to result in vessels either using a Monkfish DAS to have an unlimited trip limit or choose not to use a Monkfish DAS and land the reduced incidental limits while discarding the remaining (which would not substantially change total catch). Again, it is uncertain whether vessels that are primarily targeting groundfish would use a Monkfish DAS to land a higher amount of monkfish.

Should the Councils only choose Alternative 2 (NFMA and SFMA Monkfish DAS reductions) then the impacts on the monkfish resource would likely be slightly to moderately positive as previously described, and more positive than Alternatives 1 and 3. Should the Council only choose Alternative 3 (NFMA incidental possession limit reductions) then the impacts on the monkfish resource would likely be negligible to slightly positive, less positive than Alternative 2, and more positive than Alternative 1.

6.2.3 Action 3 – Monkfish Gillnet Mesh Size

6.2.3.1 Alternative 1 – No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10” if fishing only under a monkfish DAS. The minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would also remain at 10”.

The impacts of Alternative 1 on target species would likely be slightly negative. Continuing to require a 10” minimum gillnet mesh size would maintain the size composition of monkfish catch, so any discarding of smaller monkfish would continue. Gillnets have an assumed 100% discard mortality rate for monkfish, so all monkfish discards contribute to the overall mortality.

6.2.3.2 Alternative 2 – Increase gillnet mesh size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action). Option A would increase mesh size to 11” and Option B would increase to 12”.

The impacts of Alternative 2 on target species would likely be slightly positive and more positive than Alternative 1. Increasing the minimum gillnet mesh size to 11” or 12” could alter the size composition of monkfish catch, such than catch of smaller monkfish would be reduced. Given the 100% discard mortality assumption monkfish, measures to reduce the catch of monkfish would contribute to reduced fishing mortality and promote the sustainability of the resource. Option 2B (12”) would have more positive impacts than Option 2A (11”), as fewer monkfish would be retained with a larger mesh. These positive impacts are tempered by the facts that Alternative 2 has a delayed implementation timeline and that most monkfish gillnet vessels are already using 12” mesh. Between FY 2018-2021, there were no trips in the NFMA and under 1% of the trips in the SFMA that used 10” mesh where required (Table 38). In the SFMA, at least 99% of monkfish gillnet trips used at least 11” mesh size in these years, trips taken by at least 93% of the monkfish gillnet vessels. Thus, the gains to the monkfish resource would be minor under the Alternative 2 options.

6.3 Impacts on Nontarget Species

6.3.1 Action 1 – FY 2023-2025 Specifications

6.3.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either Fishery Management Area. The ABCs, ACLs, and TALs would be set at 0 mt.

The impacts of Alternative 1 on non-target species would likely be positive as there would be no effort in the monkfish fishery, thus no catch of non-target species.

6.3.1.2 Alternative 2 – Status Quo

Under Alternative 2, the specifications for FY 2023-2025 would be unchanged from the specifications for FY 2020-2022 (NFMA ACL = 8,351 mt, TAL = 6,624 mt; SFMA ACL = 12,316 mt, TAL = 5,882 mt; Table 2).

The impacts of Alternative 2 on non-target species would likely be slightly positive but less positive than Alternative 1. Monkfish fishing effort is unlikely to change under Alternative 2, so on the trips targeting monkfish while on a monkfish DAS, catch of non-target species is likely to be unchanged from levels that were previously determined to be sustainable. When targeting monkfish, common non-target species include skate, spiny dogfish, and NE multispecies, and their catch is controlled by measures in their FMPs. Especially in the NFMA, the monkfish fishery is largely incidental, prosecuted during fishing under other FMPs (Section 5.5.3). Catch of other species on trips landing monkfish are controlled by the DAS limits, sector rules, or other discard limiting measures in other FMPs.

6.3.1.3 Alternative 3 – Updated Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (NFMA ACL = 5,526 mt, TAL = 4,631 mt; SFMA ACL = 3,766 mt, 1,448 mt; Table 3) and would continue to be in place until a subsequent action replaces them.

The impacts of Alternative 3 on non-target species would likely be moderately positive, less positive than Alternative 1, and more positive than Alternative 2. Alternative 3 is likely to lower monkfish fishing effort, so on the trips targeting monkfish while on a monkfish DAS, nontarget catches would be lowered from levels that were previously determined to be sustainable. When targeting monkfish, common nontarget species include skate, spiny dogfish, and NE multispecies and their catch is controlled by measures in their FMPs. Especially in the NFMA, the monkfish fishery is largely incidental, prosecuted during fishing under other FMPs (Section 5.5.3). Catch of other species on trips landing monkfish are controlled by the DAS limits, sector rules, or other discard limiting measures in other FMPs.

6.3.2 Action 2 – Effort Controls

6.3.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), each vessel issued a limited access monkfish permit is allocated 46 (45.2 after the RSA deduction) DAS per fishing year, 37 of which can be used in the SFMA. DAS carryover and monkfish possession specific to each permit category in the NFMA and the SFMA would be unchanged.

The impacts of Alternative 1 on non-target species would likely be negligible because there would be no change in fishing effort (DAS or incidental possession limits). Therefore, interactions and discards of non-target species would not be expected to change. Alternative 1 is not expected to have any negative impacts on non-target species given the current stock status of the Northeast skate complex and spiny dogfish (Section 5.2.2 and 5.2.3, respectively) and no expected increase in effort in the monkfish fishery.

6.3.2.2 Alternative 2 – Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. There are three options for the DAS allocation (20, 10, 0 DAS) for each area.

The impacts of Alternative 2 on non-target species would likely be slightly to moderately positive and more positive than Alternative 1 because Alternative 2 would be expected to decrease overall fishing effort, especially in the SFMA where fishing occurs primarily under a Monkfish DAS (Table 35). Interactions and discards of non-target species would be expected decrease with an expected reduction in trips taken.

Option A would result in the least positive impact to non-target species given this option has the highest fishing effort relative to Option B (10 DAS) and Option C (0 DAS), meaning the highest chance for interactions and discards of non-target species. Option C would result in the most positive impact to non-target species because zero DAS would be allocated, which is the lowest fishing effort compared to Options A and B. This would result in the least number of interactions and discards of non-target species because it is more likely vessels would choose not to fish versus fish under lower incidental limits. The possession limits per Monkfish DAS used would be unchanged in Alternative 2.

6.3.2.3 Alternative 3 – Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, monkfish incidental possession limits would be reduced for vessels fishing in the NFMA while fishing on a Northeast multispecies DAS with either a monkfish Category C or D permit without fishing on a monkfish DAS. There are two options for monkfish possession limit reductions (20% and 40%), applied per Northeast multispecies DAS used.

The impacts of Alternative 3 on non-target species would likely be negligible to slightly positive and slightly more positive than Alternative 1. Reducing incidental landings while fishing on a Northeast multispecies DAS will likely not change fishing effort or behavior in the NFMA because vessels primarily operate as part of the NE Multispecies fishery, which targets groundfish, not monkfish (Table 37). The fishery would likely continue targeting groundfish, continuing to interact with non-target species.

Option A (20% reduction) would have negligible impacts on non-target species relative to Option B (40% reduction) given interactions would likely be similar under both options assuming no change in fishing effort in the NE multispecies fishery.

6.3.3 Action 3 – Monkfish Gillnet Mesh Size

6.3.3.1 Alternative 1 – No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10” if fishing only under a monkfish DAS. The minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would also remain at 10”.

The impacts of Alternative 1 on non-target species would likely be slightly negative. Continuing to require a 10” minimum gillnet mesh size would maintain the size composition of nontarget species catch, particularly skate, spiny dogfish, and NE multispecies. Any discarding of smaller fish would continue. The assumed discard mortality rate varies across species, so the contributions to overall mortality for each species will vary.

6.3.3.2 Alternative 2 – Increase gillnet mesh size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action). Option A would increase mesh size to 11” and Option B would increase to 12”.

The impacts of Alternative 2 on non-target species would likely be slightly positive and more positive than Alternative 1. Increasing the minimum gillnet mesh size to 11” or 12” could alter the size composition of nontarget species catch, such than catch of smaller fish would be reduced. Measures to reduce the catch of non-target fish would contribute to reduced fishing mortality and promote the sustainability of the fish resources. The assumed discard mortality rate varies across species, so the contributions to overall mortality for each species will vary. Option 2B (12”) would have more positive impacts than Option 2A (11”), as fewer fish would be retained with a larger mesh. These positive impacts are tempered by the facts that Alternative 2 has a delayed implementation timeline and that most monkfish gillnet vessels are already using 12” mesh. Between FY 2018-2021, there were no trips in the NFMA and under 1% of the trips in the SFMA used 10” mesh where required (Table 38). In the SFMA, at least 99% of monkfish gillnet trips used at least 11” mesh size in these years, trips taken by at least 93% of the monkfish gillnet vessels. Thus, the gains to the non-target species would be minor under the Alternative 2 options.

6.4 IMPACTS ON PROTECTED RESOURCES

The Framework 13 alternatives are evaluated for their impacts on species protected under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972. The current conditions of protected species are summarized in Table 7 and described in Section 5.3.

The following impact analysis considers how the fishery may overlap with protected species in time and space, as well as records of protected species interaction by gear type (e.g., gillnet, bottom otter trawl). In addition, the impacts of the alternatives on protected species consider impacts to ESA-listed species and impacts to MMPA-protected species in good condition (i.e., marine mammal stocks whose PBR level have not been exceeded) or poor (i.e., marine mammal stocks that have exceeded or are near exceeding their PBR level) condition. For ESA-listed species, any action, including actions that reduce interactions, that may result in interactions or take is likely to have some level of negative impacts. Actions likely to have positive impacts on ESA-listed species include only those that contain specific measures to ensure no interactions (i.e., no take). All ESA-listed species are in poor condition and any take can negatively impact that species' recovery. The stock conditions for marine mammals not listed under the ESA varies by species; however, all need protection. For marine mammal stocks that have their PBR level reached or exceeded, some level of negative impacts would be expected from alternatives that result in the potential for interactions between fisheries and those stocks. For species that are at more sustainable levels (i.e., PBR levels have not been exceeded), alternatives not expected to change fishing behavior or effort relative to current operating conditions in the fishery may have some level of positive impacts by maintaining takes below the PBR level and approaching the zero mortality rate goal (Table 7).

6.4.1 Action 1 – FY 2023-2025 Specifications

6.4.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either fishery management area. The ABCs, ACLs, and TALs would be set at 0 mt.

The impacts of Alternative 1 on protected resources would likely be slightly to moderately positive as there would be no directed effort in the monkfish fishery, thus no interaction risks with protected resources.

6.4.1.2 Alternative 2 – Status Quo

Under Alternative 2, the specifications for FY 2023-2025 would be unchanged from the specifications for FY 2020-2022 (NFMA ACL = 8,351 mt, TAL = 6,624 mt; SFMA ACL = 12,316 mt, TAL = 5,882 mt; Table 2).

The impacts of Alternative 2 on protected resources would likely range from slightly negative to slightly positive but be less positive than Alternative 1. Alternative 2 would likely maintain the current levels of fishing opportunities for vessels, and a change in effort patterns is not expected (e.g., gear quantity, soak/tow time, area fished). Understanding expected fishing behavior/effort in a fishery informs potential interaction risks with protected species. Specifically, interaction risks with protected species are strongly associated with amount, time, and location of gear in the water; vulnerability of an interaction increases with increases, relative to respective fisheries current operating conditions, of any of these factors. Continuation of status quo monkfish fishing behavior and effort is unlikely to change any of these operating conditions and therefore, is unlikely to introduce new or elevated interaction risks to protected species. Additionally, the monkfish fishery must comply with take reduction plans of specific protected resources (i.e., HPTRP, the BDTRP, ALWTRP) and sea turtle resuscitation guidelines.

MMPA (Non-ESA Listed) Protected Species Impacts

Considering the above information, and the fact that there are non-listed marine mammal stocks/species whose populations may or may not be at optimum sustainable levels, impacts of the Alternative 2 on non-ESA listed species of marine mammals are likely to be slightly negative to slightly positive.

As provided in Section 5.3, there are some bottlenose dolphin stocks experiencing levels of interactions that have resulted in exceedance of their PBR levels. These stocks/populations are not at an optimum sustainable level and therefore, the continued existence of these stocks/species is at risk. As a result, any potential for an interaction is a detriment to the species/stocks ability to recover from this condition. As provided above, the risk of an interaction is strongly associated with the amount of gear in the water, the time the gear is in the water (e.g., soak or tow time), and the presence of protected species in the same area and time as the gear, with risk of an interaction increasing with increases in of any of these factors. As effort under Alternative 2 is expected to be like current operating conditions in the fishery, no new or elevated interaction risks to these non-ESA listed marine mammal stocks in poor condition are expected. Specifically, the amount of gear in the water, gear soak or tow duration, and the overlap between protected species and fishing gear (i.e., bottom trawl or gillnet gear), in space and time, is not expected to change relative to current operating conditions in the fishery. Given this information, and the information provided in Section 5.3), Alternative 2 is likely to result in slightly negative impacts to non-ESA listed marine mammal stocks/species in poor condition (i.e., bottlenose dolphin stocks).

Alternatively, there are also many non-ESA listed marine mammals that, even with continued fishery interactions, are maintaining an optimum sustainable level (i.e., PBR levels have not been exceeded) over the last several years. For these stocks/species, it appears that the fishery management measures that have been in place over this timeframe have resulted in levels of effort that result in interaction levels that are not expected to impair the stocks/species ability to remain at an optimum sustainable level. These fishery management measures, therefore, have resulted in indirect slightly positive impacts to these non-ESA listed marine mammal species/stocks. Because effort under Alternative 2 is expected to be like current operating conditions in the fishery and the potential risk of interacting with gear types used in the fishery varies between non-ESA listed marine mammal species in good condition (e.g., no observed or documented interactions between bottom trawl gear and minke whales; Section 5.3), the impacts of the Alternative 2 on these non-ESA listed species of marine mammals are expected to be negligible to slightly positive.

ESA-Listed Species Impacts

As provided in Section 5.3, interactions between ESA-listed species and bottom trawl, and/or sink gillnet gear have been observed or documented. Based on this, the monkfish fishery is likely to result in some level of negative impacts to ESA listed species.

Taking into consideration that: (1) fishing behavior/effort under Alternative 2 will be like current operating conditions in the fishery; and (2) interaction risks with protected species are strongly associated with amount, time, and location of gear in the water, Alternative 2 is not expected to introduce new or elevated interaction risks to ESA listed species. Based on this, and the fact that the potential risk of interacting with gear types used in the fishery varies between ESA listed species (e.g., interactions between ESA-listed species of large whales and bottom trawl gear have never been documented or observed; Section 5.3), the impacts of Alternative 2 on ESA listed species are expected to be negligible to slightly negative.

6.4.1.3 Alternative 3 – Updated Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (NFMA ACL = 5,526 mt, TAL = 4,631 mt; SFMA ACL = 3,766 mt, 1,448 mt; Table 3) and would continue to be in place until a subsequent action replaces them.

The impacts of Alternative 3 on protected resources would likely be slightly negative to moderately positive, more negative than Alternative 1 but less negative than Alternative 2. The decreases in the ACTs and TALs under Alternative 3 may reduce fishery effort (e.g., fewer trips) relative to current operating conditions. As the potential for interactions is dependent upon fishing behavior and effort, the reduction in effort may result in reduced interaction risks to protected species. Based on this and taking into consideration the information provided in Alternatives 1 and 2, as well as Section 5.3, impacts to protected species are expected to range from slightly negative to moderately positive, with negligible to slightly negative impacts expected for ESA-listed species and MMPA protected species in poor condition, and negligible to moderately positive impacts to MMPA protected species in good condition. Impacts are more negative than Alternative 1 because more fishery effort is expected under Alternative 3, but less negative than Alternative 2 because Alternative 2 would likely have the most fishery effort.

6.4.2 Action 2 – Effort Controls

6.4.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), each vessel issued a limited access monkfish permit is allocated 46 (45.2 after the RSA deduction) DAS per fishing year, 37 of which can be used in the SFMA. DAS carryover and monkfish possession specific to each permit category in the NFMA and the SFMA would be unchanged.

The impacts of Alternative 1 on protected resources would likely be slightly negative to slightly positive. Interaction risks to protected resources species are influenced by gear type, amount of gear fished, gear soak/tow duration, and area fished. As Alternative 1 would not change the DAS allocated to the fishery or possession limits, fishing behavior and effort (e.g., total trips) are not expected to change relative to current operating conditions in the fishery. Refer to Section 6.4.1.2 for rationale supporting this determination.

6.4.2.2 Alternative 2 – Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. There are three options for the DAS allocation (20, 10, 0 DAS) for each area.

The impacts of Alternative 2 on protected resources would likely be slightly negative to moderately positive and more positive impacts relative to Alternatives 1 and 3. Interaction risks to protected resources species are influenced by gear type, amount of gear fished, gear soak/tow duration, and area fished. Alternative 2 would reduce the monkfish DAS allocated to the fishery. In the NFMA, this is likely to have minimal impact on effort because most monkfish are caught incidentally on trips directing in the NE multispecies fishery (Section 6.1.1.1 analyzes potential effort changes under this alternative); there would be little incentive to change the number or duration of trips. In the SFMA, a DAS reduction is likely to have more of an impact on effort, because monkfish are targeted more in that area, likely reducing the number and/or duration of trips. Thus, fishing behavior and effort (e.g., total trips) would likely decline in the SFMA but not change substantially in the NFMA, relative to Alternative 1. Alternative 2 would likely result in the greatest potential reduction in fishing effort compared to Alternatives 1 and 3, thus, would likely have the most positive impact on protected resources.

6.4.2.3 Alternative 3 – Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, monkfish incidental possession limits would be reduced for vessels fishing in the NFMA while fishing on a Northeast multispecies DAS with either a monkfish Category C or D permit without fishing on a monkfish DAS. There are two options for monkfish possession limit reductions (20% and 40%), applied per Northeast multispecies DAS used.

The impacts of Alternative 3 on protected resources would likely be slightly negative to slightly positive. Interaction risks to protected resources species are influenced by gear type, amount of gear fished, gear soak/tow duration, and area fished. Alternative 3 would reduce incidental limits in the NFMA for vessels using a NE Multispecies DAS. In the NFMA, this is likely to have minimal impact on effort because most monkfish are caught incidentally on trips directing in the NE multispecies fishery (Section 6.1.1.1 analyzes potential effort changes under this alternative); there would be little incentive to change the number or duration of trips. Thus, fishing behavior and effort (e.g., total trips) would not likely substantially change relative to Alternative 1 as these vessels would likely continue targeting groundfish. Alternative 3 would have more positive, though likely negligible impact compared to Alternative 1 and would have a more negative, though likely negligible impact compared to Alternative 2.

6.4.3 Action 3 – Monkfish Gillnet Mesh Size

6.4.3.1 Alternative 1 – No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10” if fishing only under a monkfish DAS. The minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would also remain at 10”.

The impacts of Alternative 1 on protected resources would likely be slightly negative to slightly positive. Interaction risks to protected resources species are influenced by gear type, amount of gear fished, gear soak/tow duration, and area fished. As Alternative 1 would not change the gear used in the fishery, fishing behavior and effort (e.g., mesh size) are not expected to change relative to current operating conditions in the fishery. Section 6.4.1.2 has rationale supporting this determination.

6.4.3.2 Alternative 2 – Increase gillnet mesh size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action). Option A would increase mesh size to 11” and Option B would increase to 12”.

The impacts of Alternative 2 on protected resources would likely be slightly negative to slightly positive and negligible relative to Alternative 1. The impacts of Option A and Option B are negligible relative to each other. The assessment of sink gillnet gear risks to protected species is not centered on mesh size, rather, on specifications such as length, height, and the buoys used and how the gillnets are fished (e.g., soak time). As Alternative 2 would not change the parameters that would increase the risk to protected species, nor create incentive for effort or fishing behavior to change, interaction risk is not expected to change relative to current operating conditions in the fishery.

6.5 IMPACTS ON PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

6.5.1 Action 1 – FY 2023-2025 Specifications

6.5.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either fishery management area. The ABCs, ACLs, and TALs would be set at 0 mt.

The impacts of Alternative 1 on the physical environment and EFH would likely be slightly positive, relative to current conditions in the fishery (Alternative 2), and relative to the updated specifications (Alternative 3). Some monkfish are caught with bottom trawls, which have an adverse effect on seabed habitats and EFH. In the NFMA, most monkfish are landed using otter trawls (Table 19). Many of these trips are still expected to occur, as monkfish are one of multiple species targeted on some trips. This is especially true in the northern management area, where groundfish, skates, and/or monkfish may be landed during the same trip. Not being able to target monkfish due to a 0 mt TAL could lead to shorter trips, with fewer tows, thus reducing fishing time and habitat impacts. Monkfish are also caught with gillnets, which have minimal and temporary effects on seafloor habitats and EFH. In the NFMA, some landings are from gillnet trips, but in the SFMA, most landings are from gillnet trips (Table 19). Changes in gillnet effort thus will not affect the magnitude of habitat impacts associated with the monkfish fishery.

Monkfish discards, particularly in the SFMA, are often associated with scallop dredge gear, which has adverse effects on EFH. However, scallop allocations, and not monkfish catch limits, determine effort in the scallop fishery. Thus, differences between Alternatives 1, 2, and 3 are not expected to have a substantial influence on dredge-related impacts to EFH.

6.5.1.2 Alternative 2 – Status Quo

Under Alternative 2, the specifications for FY 2023-2025 would be unchanged from the specifications for FY 2020-2022 (NFMA ACL = 8,351 mt, TAL = 6,624 mt; SFMA ACL = 12,316 mt, TAL = 5,882 mt; Table 2).

The impacts of Alternative 2 on the physical environment and EFH would likely be slightly negative, as bottom trawl gears used to target monkfish have adverse effects on seafloor habitats and EFH. As noted above, monkfish are often targeted as one of multiple species. The higher ACLs and TALs under Alternative 2 as compared to Alternative 3 suggests that the impacts to EFH associated with Alternative 2 would be more negative as compared to Alternative 3.

6.5.1.3 Alternative 3 – Updated Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (NFMA ACL = 5,526 mt, TAL = 4,631 mt; SFMA ACL = 3,766 mt, 1,448 mt; Table 3) and would continue to be in place until a subsequent action replaces them.

The impacts of Alternative 3 on the physical environment and EFH would likely be slightly negative, as bottom trawl gears used to target monkfish have adverse effects on seafloor habitats and EFH. The lower ACLs and TALs under Alternative 3 suggest that this alternative would have fewer negative impacts than Alternative 2, status quo.

6.5.2 Action 2 – Effort Controls

6.5.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), each vessel issued a limited access monkfish permit is allocated 46 (45.2 after the RSA deduction) DAS per fishing year, 37 of which can be used in the SFMA. DAS carryover and monkfish possession specific to each permit category in the NFMA and the SFMA would be unchanged.

The impacts of Alternative 1 on the physical environment and EFH would likely be slightly negative and more negative compared to Alternatives 2 and 3, which reduce DAS allocations and incidental possession limits, respectively, because Alternative 1 will allow more directed fishing effort. This should result in additional fishing time, and thus additional impacts to seabed habitats and EFH. The magnitude of impact is expected to be slight, for at least two reasons. First, most DAS in the fishery are used in the SFMA (Table), where effort is predominantly associated with gillnet vessels (Table), which have minimal and temporary impacts to EFH. Second, there is a lot of latent effort in the monkfish fishery, meaning that DAS allocations and usage are not closely related, with many more DAS allocated than are used, especially in the SFMA. Therefore, adjustments to DAS allocations are likely to affect effort for a relatively small number of vessels that use higher number of DAS, but many other vessels will not be affected by these changes.

6.5.2.2 Alternative 2 – Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. There are three options for the DAS allocation (20, 10, 0 DAS) for each area.

The impacts of Alternative 2 on the physical environment and EFH would likely be slightly negative but less negative than Alternative 1, with the magnitude depending on the DAS allocation selected for each management area (Option 2A being the most negative, Option 2C being the least negative). The impacts of this change will be influenced by multiple factors. In the NFMA, where monkfish tend to be targeted incidentally, trips landing monkfish will still occur, with vessels landing the incidental limit if they do not have DAS available. The number or duration of tows targeting monkfish might be reduced, reducing fishing effort and therefore impacts to EFH, or catch that would otherwise have been landed might be converted to discards, such that effort and EFH impacts will not change. A combination of these outcomes is plausible. Because trawls are used to catch monkfish in the NFMA, the amount of effort will influence the magnitude of impacts to EFH.

In the SFMA, where the fishery is more DAS-based using gillnets, reductions in DAS are likely to have a greater influence on the magnitude of effort in the fishery, with the lowest effort if 0 DAS are allocated, and increasing effort as DAS allocations increase. As noted above, there is substantial latent effort in both management areas, but in the SFMA in particular, such that the smaller DAS reductions to 20 or 10 days may not affect fishing behavior for many vessels. Furthermore, the gillnets that predominate in the SFMA do not have adverse impacts to EFH.

6.5.2.3 Alternative 3 – Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, monkfish incidental possession limits would be reduced for vessels fishing in the NFMA while fishing on a Northeast multispecies DAS with either a monkfish Category C or D permit without fishing on a monkfish DAS. There are two options for monkfish possession limit reductions (20% and 40%), applied per Northeast multispecies DAS used.

The impacts of Alternative 3 on the physical environment and EFH would likely be slightly negative but less negative than Alternative 1, because lower incidental limits should cause vessel operators to reduce the number of tows they make targeting monkfish. This would result in lower fishing effort and therefore reduced impacts to EFH. Assuming that fishermen are unable to exactly match catches to possession limits, it is plausible that lower incidental possession limits will lead to situations where catch is converted to discards. This will change the economic value of these trips, but not fishing effort or habitat impacts. Impacts of Option 3B are more negative than Option 3A. The smaller percentage reduction of Option 3A (20%) will lead to smaller changes in effort and thus smaller changes in impacts, and the larger percentage reduction of Option 3B (40%) will lead to larger changes in effort, and correspondingly larger changes in impacts relative to Alternative 1.

6.5.3 Action 3 – Monkfish Gillnet Mesh Size

6.5.3.1 Alternative 1 – No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10" if fishing only under a monkfish DAS. The minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would also remain at 10".

Alternative 1 will have no impact on the physical environment and EFH, because gillnet gear does not cause adverse effects to EFH. Therefore, changes in the amount of gillnet effort, or the configuration of gears used, will have a neutral effect on the EFH impacts associated with the fishery.

6.5.3.2 Alternative 2 – Increase gillnet mesh size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action). Option A would increase mesh size to 11" and Option B would increase to 12".

Alternative 2 will have no impact on the physical environment and EFH, because gillnet gear does not cause adverse effects to EFH. Therefore, changes in the amount of gillnet effort, or the configuration of gears used, will have a neutral effect on the EFH impacts associated with the fishery.

6.6 Impacts on Human Communities

When examining potential economic and social impacts of management measures, 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); monkfish dealers and processors; final users of monkfish; 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 monkfish fishery.

Economic impacts. In general, the economic effects of regulations can be categorized into regulations that change costs (including transactions costs such as search, information, bargaining, and enforcement costs), revenues (by changing market prices or by changing the quantities supplied), and ultimately profits. These economic effects may be felt by the directly regulated entities, and by crew who are generally compensated through a revenue sharing arrangement. They may also be felt by related industries.

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

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

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

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

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

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

6.6.1 Action 1 – FY 2023-2025 Specifications

General impacts of monkfish fishery specifications on human communities

Human communities are impacted by monkfish fishery specifications as they set harvest levels for the fishery. Generally, increasing the monkfish ABC (and associated catch limits) would likely have positive short-term impacts on fishing communities. Likewise, lowering allowable harvests could result in short-term revenue reductions, which may, in turn, have negative impacts on employment and the size of the monkfish 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 5.5.4. This includes six primary ports (Gloucester, Boston, New Bedford, Narragansett/Point Judith, Montauk, Barnegat Light/Long Beach; Table 27) and 14 secondary ports for the monkfish fishery. The communities more involved in the monkfish 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 area-wide harvest levels, impacts would likely occur across the communities that participate in the monkfish fishery, proportional to their degree of participation.

6.6.1.1 Alternative 1 – No Action

Under Alternative 1 (No Action), no specifications for FY 2023-2025 would be in place for either fishery management area. The ABCs, ACLs, and TALs would be set at 0 mt. No landings would be allowed, and all catch would contribute to an ACL overage and pound-for-pound reductions in the ACT the second year following the year of the overage.

The economic impacts of Alternative 1 would be highly negative since there would be no landings of monkfish allowed for the next three years, and no revenue earned from monkfish landings. Vessels need to be able to cover their fixed costs, and this alternative may lead to some vessels becoming financially insolvent. Additionally, some crew may be forced to leave the industry and seek land-based jobs to offset their loss in wages.

The social impacts of Alternative 1 would likely be highly negative. Without specifications, there would be no fishery for the next three years. In the short term, Alternative 1 may cause firms to exit the monkfish industry. Those that depend heavily on monkfish are likely to cease fishing while firms that have a more diverse set of activities may be able to shift into other fisheries. If businesses fail in the short term, they will receive no long-term benefit from future potential monkfish biomass increases and future benefits would accrue to the businesses that remain viable. Note that the firms that get the benefits of higher stock levels and catch limits in the future are those that continue to operate. These are likely to be part of larger, diversified firms.

6.6.1.2 Alternative 2 – Status Quo

Under Alternative 2, the specifications for FY 2023-2025 would be unchanged from the specifications for FY 2020-2022 (NFMA ACL = 8,351 mt, TAL = 6,624 mt; SFMA ACL = 12,316 mt, TAL = 5,882 mt; Table 2). The fishery would be allowed to continue at status quo levels. Comparing these specifications to FY 2021 performance (under the same specifications), NFMA landings (5,215 mt) were 79% of this TAL and catch (6,973 mt) was 84% of this ACL (Table 17); SFMA landings (1,968 mt) were 33% of this TAL and catch (5,298 mt) was 43% of this ACL.

The economic impacts of Alternative 2 would likely be moderately positive and more positive than Alternative 1 as fishing vessels would be allowed to land and sell monkfish. This would provide an economic benefit to both vessel owners and crew compared to Alternative 1.

The social impacts of Alternative 2 would likely be moderately positive and more positive than Alternative 1. With no change in specifications, Alternative 2 would likely result in a degree of constancy for fishing industry operations and a steady supply to the market (in addition to the predictability provided by a three-year specification process). In the short term, the size and demographic characteristics of the fishery-related workforce would likely be unchanged, as would the historical dependence on and participation in the fishery. However, since the ABC is higher than the level recommended by the SSC to be biologically acceptable, Alternative 2 could lead to overfishing, which could have negative impacts if it necessitates a reduction in future monkfish catch. There may also be a negative impact on the attitudes, beliefs, and values of stakeholders towards management should overfishing occur.

6.6.1.3 Alternative 3 – Updated Specifications

Under Alternative 3, the specifications for FY 2023-2025 would be updated based on the 2022 monkfish management track assessment and recommendations of the SSC (NFMA ACL = 5,526 mt, TAL = 4,631 mt; SFMA ACL = 3,766 mt, 1,448 mt; Table 3) and would continue to be in place until a subsequent action replaces them. These TALs are 30% lower in the NFMA and 75% lower in the SFMA relative to status quo. Comparing these specifications to FY 2021 performance (Table 18; under the status quo, higher specifications), NFMA landings in FY 2021 were 584 mt higher than this TAL (5,215 vs 4,631 mt) and catch was 1,447 mt higher than this ACL (6,973 vs 5,526 mt); SFMA landings were 520 mt higher than this TAL (1,968 vs 1,448 mt) and catch was 1,532 mt higher than this ACL (5,298 vs 3,766 mt).

The economic impacts of Alternative 3 are negative due to reduced revenues from the lower TALs compared to Alternative 2, but positive compared to Alternative 1. Using FY 2021 landings (Status Quo Landings, Table 19) and a 2021 monkfish price of $1,429 per metric ton ($10.3M/7,210 mt), the estimated reduction in revenue for the NFMA is $853,113 (i.e. (4,631 mt – 5,228 mt)*$1,429). For the SFMA, it is $793,086 (i.e., (1,448 mt -1,982 mt)*$1,429). Taken together, the loss in revenue is $1,616,199, which is about 16% of the FY 2021 revenue (Table 23). Assuming a boat share of 50%, the loss in profits for the NFMA would be $426,55 and for the SFMA $381,543. Together, the total potential one-year loss in profits is estimated to be $808,100. Over the three-year time period that the quota specification are in effect, the estimated total reduction in profits is $2,424,299.

Note that the crew employed on the fishing vessels would experience an equivalent reduction in revenue to the vessel owners. Given that there are no cost models which show the percent of monkfish revenue which cover trip costs, and monkfish are often landed with other species on a fishing trip, the revenue losses to crew are slightly overstated under this alternative assuming the fishing crews pay the trip costs. There may be a slight offset in revenue and profit losses if the reduction in landings leads to a higher price. However, price models are not available to estimate this change.

The social impacts of Alternative 3 would likely be moderately negative, more positive than Alternative 1, and more negative than Alternative 2. Alternative 3 would substantially reduce catch limits (though TAL reductions relative to recent landings is more moderate) relative to recent years. There would be a degree of predictability for fishing industry operations provided by a three-year specifications process. It is possible that the size and demographic characteristics of the fishery-related workforce would be reduced, as would the dependence on and participation in the fishery – relative to current conditions, unless these near-term catch reductions lead to long-term increases in biomass available for future years. Alternative 3 has less long-term risk relative to Alternative 2, because the ABCs in 2023-2025 would exceed the SSC recommendations. However, if businesses fail in the short term, they would receive no long-term benefit from these restrictions and the benefits would accrue to the businesses that remain viable.

6.6.2 Action 2 – Effort Controls

6.6.2.1 Alternative 1 – No Action

Under Alternative 1 (No Action), each vessel issued a limited access monkfish permit is allocated 46 (45.2 after the RSA deduction) DAS per fishing year, 37 of which can be used in the SFMA. DAS carryover and monkfish possession specific to each permit category in the NFMA and the SFMA would be unchanged.

The economic impacts of Alternative 1 would be negligible. There would be no reduction in revenue, costs or profitability for vessels that use monkfish DAS and no change in possession limits from prior regulations. Additionally, there would be no reductions in crew earnings under this alternative.

The social impacts of Alternative 1 would likely be slightly negative. While fishery operations could continue as is, if the fishery is operating under the reduced TALs of Action 1, Alternative 3, it is likely that the new TALs would be exceeded. Comparing these TALs to FY 2021 performance (Table 18; under the status quo, higher specifications), NFMA landings in FY 2021 were 584 mt higher than this TAL (5,215 vs 4,631 mt); SFMA landings were 520 mt higher than this TAL (1,968 vs 1,448 mt). If discards do not decrease and landings exceed TAL, then the accountability measure may be triggered (reduction in ACT in the second year following an ACL being exceeded). Doing so would lead to more negative views of management and negative social impacts from reductions in catch levels from what was specified.

6.6.2.2 Alternative 2 – Separate Monkfish DAS Allocation by Area and Reduce DAS Allocations

Under Alternative 2, distinct annual DAS allocations for limited access monkfish vessels would be set for the NFMA and the SFMA. A vessel could use up to the total allocated in the respective areas, which may be different for each area. There are three options for the DAS allocation (20, 10, 0 DAS) for each area.

The economic impacts of Alternative 2 would likely be negative relative to No Action. Under Alternative 2, the number of days a monkfish vessel can fish using monkfish DAS would be reduced. Losses per vessel are calculated using trip profits defined as revenue from all species caught times the vessel share, which is assumed to be 50%. Trip profits were then converted to profits per DAS for each vessel. Total monkfish DAS was calculated for each vessel in FY 2021, and if the vessel fished more than the proposed DAS limits, the reduction in DAS was multiplied by the profit per day at sea to determine losses.

Losses to crew earnings are calculated by first subtracting the estimated cost per day at sea from the estimated revenue per day at sea, since crew typically pays for the trip expenses. This yielded an estimate of net crew earnings per day at sea. Total monkfish DAS was calculated for each vessel in FY 2021, and if the vessel fished more than the proposed DAS limits, the reduction in DAS was multiplied by the net crew earnings per day at sea to determine crew losses.

The social impacts of Alternative 2 would likely be slightly negative but more positive than No Action. Alternative 2 impacts would be experienced more by the segment of the fishery that directs on monkfish (using monkfish DAS). While each option may reduce effort in the fishery which could have negative impacts on fishery participation, there would be positive social benefits if Alternative 2 helped keep the fishery within specifications, particularly if the triggering of accountability measures is avoided.

Option 2A – Reduce DAS to 20 DAS.

In the NFMA, Option 2A would result in the least potential reduction (498K lb fewer) in landings relative to Alternative 1 (Table 35, Section 6.1.1.1, the landings from monkfish DAS above the Option 2A 20 DAS limit). These landings were by 12 of the 33 vessels that used a monkfish DAS. While these reductions would be substantial for these vessels, most monkfish landings in the NFMA are from trips where a monkfish DAS was not used (8.5 M lb). Option 2A is estimated to result in landings that are about 100% of the FY 2023-2025 TAL proposed for the NFMA under Action 1. A comparison of all three options and their economic losses is shown in Table 40.

In the SFMA, Option 2A similarly results in the least potential reduction (1.3M lb fewer) in landings relative to Alternative 1 (Table 35, Section 6.1.1.1). These landings were by 48 of the 78 vessels that used a monkfish DAS. The number of impacted vessels and trips is higher compared to the NFMA because trips using a monkfish DAS account for more landings than trips not using a monkfish DAS (unlike in the NFMA). Option 2A is not estimated to result in landings remaining within the FY 2023-2025 TAL (130% higher).

The economic impacts of Option 2A would likely be negative compared to Alternative 1. Under a 20 DAS cap, one-year profit losses are estimated to be $238,143 ($2021) in the NFMA and $292,788 in the

SFMA yielding a one-year loss of $530,931 (Table 39). Losses in crew earnings are estimated to be $205,765 in the NFMA and $266,249 in the SFMA for a total of $472,013. Total one-year losses for vessel owners and crew from both areas are estimated to be $1,002,944. During the three-year quota specification period, total vessel and crew losses under this option are estimated to be $1,331,724 in the North, and $1,677,109 in the South for a total three-year loss of $3,008,833 (Table 39).

The social impacts of Option 2A would likely be more positive than Options 2B and 2C as this option would negatively impact the least number of vessels. However, Option 2A in the SFMA may lead to exceeding the TAL, which could have longer-term negative impacts.

Option 2B – Reduce DAS to 10 DAS.

In the NFMA, Option 2B would result in the more potential reduction (1.1M lb fewer) in landings relative to Alternative 1, more than Option 2A, but less than Option 2C (Table 35, Section 6.1.1.1, the landings from monkfish DAS above the Option 2B 10 DAS limit). These landings were by 23 of the 33 vessels that used a monkfish DAS. While these reductions would be substantial for these vessels, most monkfish landings in the NFMA are from trips where a monkfish DAS was not used (8.5 M lb). Option 2B is estimated to result in landings that are about 94% of the FY 2023-2025 TAL proposed for the NFMA under Action 1.

In the SFMA, Option 2A similarly results in more potential reduction (2.6M lb fewer) in landings relative to Alternative 1, more than Option 2A, but less than Option 2C (Table 35, Section 6.1.1.1). These landings were by 61 of the 78 vessels that used a monkfish DAS. The number of impacted vessels and trips is higher compared to the NFMA because trips using a monkfish DAS account for more landings than trips not using a monkfish DAS (unlike in the NFMA). Option 2B is estimated to result in landings that are about 91% of the FY 2023-2025 TAL proposed for the NFMA under Action 1.

The economic impacts of Option 2B would likely be negative, and worse than Alternative 1 and Option 2A (Table 42). Under a 10 DAS cap, one-year profit losses are estimated to $412,624 in the North and $712,567 in the South for a one-year total loss of $1,125,191 ($2021, Table 39). Crew losses are estimated to be $357,521 in the North and $646,923, for a total of $1,004,174. In total, vessels and crew will suffer one-year losses of $2,129,265, and a total of $6,388,096 over the three-year quota period.

The social impacts of Option 2B would likely be more negative than Option 2A and more positive than 2C. However, Option 2B in both areas may keep landings within the TAL, which could have longer-term positive impacts.

Option 2C – Reduce DAS to 0 DAS.

In the NFMA, Option 2C would result in the most potential reduction (2.1M lb fewer) in landings relative to Alternative 1, more than Options 2A and 2B (Table 35, Section 6.1.1.1, the landings from monkfish DAS above the Option 2C 0 DAS limit). These landings were by all 33 vessels that used a monkfish DAS. While these reductions would be substantial for these vessels, most monkfish landings in the NFMA are from trips where a monkfish DAS was not used (8.5 M lb). Option 2C is estimated to result in landings that are about 83% of the FY 2023-2025 TAL proposed for the NFMA under Action 1.

In the SFMA, Option 2C similarly results in more potential reduction (4.1M lb fewer) in landings relative to Alternative 1, more than Options 2A and 2B (Table 35, Section 6.1.1.1). These landings were by all 78 vessels that used a monkfish DAS. The number of impacted vessels trips is higher compared to the NFMA because trips using a monkfish DAS account for more landings than trips not using a monkfish DAS (unlike in the NFMA). Option 2C is estimated to result in landings that are about 45% of the FY 2023-2025 TAL proposed for the NFMA under Action 1.

The economic impacts of Option 2C would likely be negative, and worse than the No-Action alternative and options 2B and 2A (Table 40). Under a zero DAS cap, one year profit losses are estimated to $690,300 in the North and $1,341,539 in the South for a one-year total loss of $2,031,839 ($2021, Table

39). Losses in crew earnings are estimated to be $589,051 in the North and $1,218,884 in the south for a total of $1,807,935. Together, one-year losses for vessels and crew were estimated to be $3,839,774, and $11,519,321 for the three-year quota specification period. The social impacts of Option 2C would likely be more negative than Options 2A and 2B. However, Option 2C in both areas may keep landings within the TAL, which could have longer-term positive impacts. Option 2C may be more conservative than necessary for the fishery to remain in the TAL, so may result in the most negative attitudes towards management.

Table 39. Estimated loss in profits from the reduced DAS options.

	Allowable DAS		
	Option 2A: 20	**Option 2B: 10**	**Option 2C: 0**
Vessels Impacted			
North	5	9	16
South	19	32	41
Loss in Vessel Profits ($) 1-Year)			
North	$238,143	$412,624	$690,300
South	$292,788	$712,567	$1,341,539
Total	$530,931	$1,125,191	$2,031,839
Loss in Crew Earnings – 1 Year			
North	$205,765	$357,521	$89,051
South	$266,249	$646,923	$1,212,884
Total	$472,013	$1,004,174	$1,807,935
Total 1 Year losses (Vessel & Crew)	$1,002,944	$2,129,365	$3,839,774
3-Year Cumulative Losses (Vessels and Crew)			
North	$1,331,724	$2,309,623	$3,838,054
South	$1,677,109	$4,078,473	$7,681,266
Total	$3,088,833	$6,388,096	$11,519,321
Note: Results are based on using only FY 2021 data, thus, do not match exactly with Table 34, which used FY 2019 and FY 2021 data.			

6.6.2.3 Alternative 3 – Reduce NFMA Permit Category C and D Incidental Possession Limits

Under Alternative 3, monkfish incidental possession limits would be reduced for vessels fishing in the NFMA while fishing on a Northeast multispecies DAS with either a monkfish Category C or D permit without fishing on a monkfish DAS. There are two options for monkfish possession limit reductions (20% and 40%), applied per Northeast multispecies DAS used.

The economic impacts of Alternative 3 would likely be negative. Expected losses in profitability from the Alternative 3 options are calculated by first determining whether there is a negative difference between potential trip landings (live-weight) given static DAS and the proposed daily trip limits and monkfish landings (live-weight) on trips operating in FY 2021. What this means is that trips are counted if the potential landings under the new trip limits are less than what occurred in FY 2021, otherwise they are not included in the calculation. The difference in trip landings is multiplied by $0.6482 per pound yielding the expected revenue loss. Expected revenue loss is then multiplied by an assumed boat share of 0.50, which results in the expected profit loss. Crew losses would be slightly lower than vessel profits losses as trip expenses are usually paid by the crew. However, there are no economic models currently available to estimate cost per pound of monkfish landed, particularly for trips with multiple species being landed on a trip which is primarily what happens on trips subject to this option.

The social impacts of Alternative 3 would likely be slightly negative but more positive than Alternative 1 and negligible relative to Alternative 2. Contrary to Alternative 2, Alternative 3 impacts would be experienced more by the segment of the fishery that directs on the NE multispecies fishery and lands monkfish (incidentally). Although Alternative 3 would reduce monkfish landings. While the options may reduce landings in the fishery, there would be positive social benefits if Alternative 1 helped keep the fishery within specifications, particularly if the triggering of accountability measures is avoided.

Option 3A – Reduce NFMA incidental possession limits by 20%.

Under Option 3A, Category C vessels not fishing on a monkfish DAS are limited to 720 pounds tail weight or 2,095 pounds whole weight per Northeast multispecies DAS used. Category D vessels are limited to 600 pounds tail weight, or 1,746 pounds live weight per Northeast multispecies DAS used.

Option 3A would result in the least potential reduction in landings (1.5M lb) relative to Alternative 1 and Option 3B (Table 37, Section 6.1.1.2, the landings by from monkfish DAS above the Option 2A 20 DAS limit). These landings were made on 357 trips.

The economic impacts of Option 3A would likely be negative compared to the No-Action alternative. Under Option 3A, there were 24 Category C vessels and 207 trips impacted, and a one-year profit loss of $388,948. Category D vessels had a total profit loss of $94,500, and there were 19 vessels making 150 trips contributing to this loss (Table 40). Taken together, 43 vessels making 357 trips are impacted and total estimated one-year profit losses are $482,998. Over the three-year quota specification period, total projected profit losses are $1,448,903. The loss in crew earning is likely to be slightly less than the loss in vessel profits under Option 3A. Losses under Option 3A are likely to be lower than Option 3B for both vessels and fishing crews.

The social impacts of Option 3A would likely be less negative than Option 3B as 3A would have lower reduction in landings and may lead to fewer discards, which could be seen as a wasteful practice and more negative attitudes about the fishery.

Option 3B – Reduce NFMA incidental possession limits by 40%.

Option 3B would result in more potential reduction in landings (2.3M lb) relative to Alternative 1 than Option 3A (Table 37, Section 6.1.1.2). These landings were made on 510 trips.

Under Option 3B, Category C vessels not fishing on a monkfish DAS are limited to 540 pounds tail weight or 1,571 pounds whole weight per Northeast multispecies DAS used. Category D vessels are limited to 450 pounds tail weight, or 1,310 pounds live weight per northeast multispecies days at sea used.

The economic impacts of Option 3B would likely be negative compared to both the No-Action alternative and Option 3A. Under Option 3B, 28 Category C vessels making 279 trips are impacted yielding a one-year profit loss of $577,336. Category D vessels estimated one-year losses are $159,182, and there were 26 vessels making 230 trips contributing to this loss (Table 40). Together, 54 vessels making 509 trips will suffer one-year combine loss in profits of $736,517. Over the three-year quota specification period, total profit losses under this option are projected to be $2,209,552. The loss in crew earning is likely to be slightly less than the loss in vessel profits under option 3A. Losses under Option 3B are likely to be higher than Option 3A for both vessels and fishing crews.

The social impacts of Option 3B would likely be more negative than Option 3B as 3A would have less reduction in landings and may lead to fewer discards. The higher potential discards under Option 3B could be seen as a wasteful practice and more negative attitudes about how the fishery is managed.

Table 40. Economic impacts of Alternative 3, Options A and B.

Permit Category	Alternative 3	
	Option A	**Option B**
Category C		
Vessels Impacted	24	28
Trips Impacted	207	279
One-Year Profit Loss ($2021)	$388,948	$577,336
Category D		
Vessels Impacted	19	26
Trips Impacted	150	230
One-Year Profit Loss ($2021)	$94,050	$159,182
Totals		
Vessels Impacted	43	54
Trips Impacted	357	509
One-Year Profit Loss ($2021)	$482,998	$736,517
Three-Year Profit Loss ($2021)	$1,448,993	$2,209,552
Source: CAMS Landings data, accessed November 2022.		

Summary of Selecting a Combination of Action 2 Alternatives

The selection of an option in Alternative 2 and Alternative 3 may be seen as fairer across the fishery, as the impacts of Alternative 2 focus more on the directed fishery and Alternative 3 on the incidental fishery. Options within each alternative would achieve the landings reduction necessary to keep landings within the TALs proposed under Action 1, Alternative 3, relative to FY 2021 performance. However, these potential reductions are likely to be additive, so selecting an option in both alternatives may result in more reduction than necessary.

6.6.3 Action 3 – Monkfish Gillnet Mesh Size

6.6.3.1 Alternative 1 – No Action

Under Alternative 1 (No Action), the monkfish gillnet minimum mesh size would be unchanged from the current regulations of 10” if fishing only under a monkfish DAS. The minimum mesh size for the Gulf of Maine/Georges Bank Dogfish and Monkfish Gillnet Fishery Exemption Area would also remain at 10”.

The economic impacts of Alternative 1 would be negligible, as there would be no additional costs to replace gear.

The social impacts of Alternative 1 would likely be slightly positive. Vessels would continue to have the flexibility to fish with gillnets using any size larger than 10”. There would be no disruption in fishing practices. Examined by primary landing port, most of the active landing ports by gillnet mesh size are confidential, but in FY 2018-2021, the vessels using under 11” mesh are in Rhode Island and New York (Table 44).

6.6.3.2 Alternative 2 – Increase gillnet mesh size

Under Alternative 2, the monkfish gillnet minimum mesh size would increase if fishing only under a monkfish DAS. Also, the minimum mesh size for the GOM/GB Dogfish and Monkfish Gillnet Fishery Exemption Area would increase. Alternative 2 would be implemented in FY 2025 (i.e., delayed two years from implementation of this action). Option A would increase mesh size to 11” and Option B would increase to 12”.

The economic impact of Alternative 2 would likely be slightly negative compared to Alternative 1 if Option B is selected. Although Alternative 2 would not be implemented until 2025, potential costs of this alternative are illustrated using FY 2021 data (see below), and then discounting the costs by two years to account for the delay in implementing the regulations. Overall, there would be no additional cost to vessels in either fishing area under Option A. Under Option B, we estimate the total cost for both areas to be between $31,042 and $235,200, with a mean value of $93,600. Assuming the costs occur after a two-year delay, and using a 3% discount rate, the expected cost would be between $29,260 and $221,699, with a mean value of $88,277. With a 7% discount rate, the total cost would be between $27,133 and $205,433 with a mean value of $81,754. There would be no impact to crew from this option as the vessel owners typically pay gear replacement costs.

The social impacts of Alternative 2 would likely be slight positive and more positive than Alternative 1. Although Alternative 2 would require vessels to replace gillnet mesh and alter fishing practices as a result, there are very few vessels using mesh that is under 12” (Table 38), so impacts would be experienced by a subset of vessels. In FY 2018-2021, there were 4-12 vessels per year fishing in the SFMA (of about 44-85 total) and at most five vessels in the NFMA (of about 12-17 total) that used mesh under 12” when fishing only on a monkfish DAS. There were up to five vessels using 10” gillnets in FY 2018-2020 in the SFMA (none in the NFMA) and none in FY 2021 in either area. The vessels using 10” mesh in FY 2018 were landing in Rhode Island and New York. The two-year delay in implementation would lessen the impact on these vessels; when vessels need to replace their gillnets within this period, they could replace nets with the necessary mesh size. The implementation delay could lessen the amount of discarded gear due to this regulation and improve attitudes and beliefs towards management.

Option A – Increase gillnet mesh size to 11”

In the GOM/GB Dogfish and Monkfish Gillnet fishery Exemption Area, virtually all vessels are currently using 12-inch mesh in FY2021 (Table 38). There were three vessels using 11-inch mesh and at least one vessel using 11.5-inch mesh.

Under Option A, there would likely be no economic impact as there would be no additional costs to replace gear since all vessels are using greater than 11-inch gear currently.

The social impacts of Option A would likely be negligible relative to Option B, given that there are very few vessels that are not using 12” mesh already and any impacts would be mitigated by the delay in implementation.

Option B – Increase gillnet mesh size to 12”

Under Option B, there would be a slightly negative economic impact compared to the No Action alternative and Option A as at least four vessels in the northern management area would need to purchase new nets under the 12-inch mesh requirement (Table 41). Observer data from 2019-2022 was used to determine how many nets monkfish gillnet vessels were hauling per trip, and the mean value was 39.3. The bottom 5% of the distribution was 13 nets and the maximum number of nets pulled was 98 nets. It is likely that the number of nets needing to be replaced is somewhere in this range, and we present a range of values for the cost of net replacement. Using a cost of $300 per net, the cost per vessel to replace 39 nets would be $11,700. The lower 5% bound on our estimate was $3,880 and the maximum amount was $29,400 per vessel. For a fleet of four vessels, we estimate the nominal total cost of net replacement to be between $15,520 and $117,600, with a mean value of $46,800. If these costs took place in FY2025, the discounted cost using a 3% interest rate would be between $14,630 and $110,849, with a mean value of $44,133. Using a 7% discount rate, the discounted cost would be between $13,566 and $102,716, with a mean value of $40,877. By allowing the net replacement two years after implementation of the regulations, the costs are lower for vessels needing to replace their nets. We expect there to be no decline in revenue from going to a 12-inch mesh as the larger fish will command a higher price, offsetting any potential decline in landings. This is consistent with the findings of three mesh size studies cited below.

In the SFMA, there were no vessels in FY2021 using less than an 11-inch mesh, and therefore there is no additional cost for Option A (Table 38). Under option B, at least four vessels will need to replace their nets (Table 41). Therefore, the expected costs are equivalent to the Northern Management Area.

The social impacts of Option A would likely be negligible relative to Option B, given that there are very few vessels that are not using 12" mesh already and any impacts would be mitigated by the delay in implementation.

Table 41. Number of vessels by primary landing port and mesh size, averaged across FY 2018 – FY 2021.

Principle Port / Landing Port	**Mesh Size**					
	10”	***11”***	***12”***	***12.5”***	***13”***	***14”***
Portland, ME			C			
Rye, NH			C			
Gloucester, MA			C			
Chatham, MA		3	4			
Harwich, MA		C				
Fairhaven, MA			C			
New Bedford, MA			C			
Westport, MA			C			
Newport, RI			C	C		
Point Judith, RI	C		4			
Sakonnet, RI	C		4			
Tiverton, RI	C		4			
Little Compton, RI			C	C		
New London, CT			C			
Center Moriches, NY			C			
Montauk, NY	C	4				C
Hampton Bays, NY	C	C	C			
Shinnecock, NY			C			
Barnegat Light, NJ			9	C	C	
Point Pleasant, NJ			3			
Waretown, NJ			C			
Manasquan, NJ		C	C			
Ocean City, MD			C			
Chincoteague, VA			C			
Greenbackville, VA			C			
Wanchese, NC			C			
Source: Vessel Trip Reports 2018-2022, accessed August 2022. *Notes*: ‘C’ represents confidential data with < 3 fishing vessels.						

Research may inform analysis of increasing minimum mesh size. The PDT is aware of the following research that may inform the consideration of management alternatives but will continue looking for other prior studies. The PDT would like to investigate if and how the Council has used this research to inform decision-making in the past.

In 2007, the Monkfish Research-Set-Aside (RSA) program funded a study called “Determining the Best Size for Gillnetting Monkfish *Lophius americanus*” (Mike Pol and Brad Bowen, PIs) and the final report was completed in 2009. The project was a collaboration of the Massachusetts Division of Marine Fisheries and commercial fishermen. Mesh sizes of 10, 12 and 14” were tested for monkfish retention and bycatch reduction. Increasing mesh size from 10 to 12” resulted in: increased monkfish length and weight per trip, decreased bycatch including smaller monkfish. While fewer monkfish were caught in the larger mesh, revenues were similar as larger monkfish have higher prices.

In 2010, the Gulf of Maine Research Institute and Massachusetts Division of Marine Fisheries completed a study called “Analysis of Size Selectivity and Bycatch in the Gillnet Fishery for Monkfish.” The study evaluated the monkfish catch and bycatch rates for gillnet mesh sizes 10”, 12”, and 14” and otter trawl gear in the Gulf of Maine. For gillnet gear, 12” mesh sizes had the highest monkfish catch (by weight) and lowest bycatch levels, while the 14” mesh had the lowest monkfish catch (by weight and number) and the 10” mesh had the highest bycatch (Salerno *et al.* 2010).

In 2018, the Monkfish RSA program funded a study called “Increasing Twine Thickness and Mesh Size to Reduce Skate Bycatch in Monkfish Sink Gillnets” led by Cornell Cooperative Extension. In that study, 12” mesh is the control and 13” mesh is the test, with and without tie-downs. The project had several delays and extensions; the fieldwork is expected to be completed this winter, and the final report is due in October 2022. Data analysis is ongoing, so it is unclear if/how this research would inform the development of Framework 13.

6.7 Cumulative Effects Analysis

[To be written after the Councils take final action]

7.0 APPLICABLE LAWS/EXECUTIVE ORDERS

[To be written after the Councils take final action]

8.0 GLOSSARY

Fishing mortality (F): A measurement of the rate of removal of fish from a population caused by fishing. This is usually expressed as an instantaneous rate (F) and is the rate at which fish are harvested at any given point in a year. Instantaneous fishing mortality rates can be either fully recruited or biomass weighted. Fishing mortality can also be expressed as an exploitation rate (see exploitation rate) or less commonly, as a conditional rate of fishing mortality (m, fraction of fish removed during the year if no other competing sources of mortality occurred. Lower case m should not be confused with upper case M, the instantaneous rate of natural mortality).

Overfished: A condition defined when stock biomass is below minimum biomass threshold and the probability of successful spawning production is low.

Overfishing: A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

[to be completed after the Council takes final action]

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